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PDF Principles of Chemistry: A Molecular Approach (3rd Edition)







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The components of compound are separated by physical processes. Hence, rate of evaporation is less. The products formed are CO2 and SO2 which dissolve in water to form H2CO3 and H2SO3, respectively. 30 mL of water is taken in a beaker and 15 mL of alcohol is poured into this beaker. The significance of water in the sustenance of the biosphere dates back to the evolution of aquatic life in oceans millions of years ago. The maximum number of electrons that can be accommodated in an orbit is equal to 2n2. Both the formation of mist and clouds involve the condensation of water vapour. hydrogen from acids are considered as less active metals than hydrogen. POINTS TO REMEMBER • • • • • • • • • • • • • • • • • he intermolecular forces of attraction between similar molecules are T called cohesive and adhesive forces, respectively. Match the following: Column A A. What is the valency of the metal? NO2 + H2O → () b. (ii) Reaction with magnesium (Mg): Magnesium reacts with oxygen upon slight heating to form magnesium oxide. Element C. (a) badc (b) abcd (c) bacd (d) cabd Directions from 37 to 39 Match the entries given in Column A with the appropriate ones in Column B. (a) H2 (b) CO2 (c) N2 (d) O2 20. During baking, baking soda present in baking powder induces bitter taste and yellow colour to breads and cakes due to the alkaline nature of its aqueous solution. its atmosphere. Give reasons for the following. This is called metal reactivity series. Mesosphere (a) The layer above the stratosphere which extends to about 8590 km above the earth's surface is called mesosphere. False Fill in the blanks 15. What type of metals are found in free state? One molecule of H3PO4 is treated with one molecules of NaOH, two molecules of NaOH, two molecules of NaOH, two molecules of NaOH and three mixed with water. 24H2O. Potassium loses one electron to form cation and phosphorous gains three electrons to form anion. Sublimation is the process of the conversion of a (c) magnesium (d) potassium ties of both metals and nonmetals. (a) calcium (b) aluminium (c) iron (d) lead 26. Nitre is the common name of sodium nitrate. Camphor undergoes sublimation and gets deposited on the cooler wall of the funnel and later on it is scrapped off. C -> b In condensation, water vapour changes into water. We know that mass of proton is 1837 times that of electron. (b) when a red hot iron is made to react with steam? Balance the following chemical equations: (i) NH3 + Br2 → N2 + NH4Br (ii) FeS2 + O2 → Fe2O3 + SO2 49. Cotton has the property of absorbing sweat. Heating solid ammonium chloride involves change in the compounds X and Y combine to form a compound Z. By losing one electron, it forms Na+ ion which attains the configuration of neon, i.e., 2, 8. This is because of high heat of combustion of hydrogen. Arrange the following given reactions in a sequence for the process of nitrogen fixation. (d) hydrogen chloride gas 4. d 39. compound 4. Efflorescent Deliguescent Hygroscopic Food additive Column B () a. Name the salts used for the following purposes: (a) Purification of water (b) Fire extinguisher (c) calcium nitrate 3.17 (b) potassium sulphate 45. (a) acetic acid (c) carbonic acid (d) nitric acid 16. Due to increased pressure in the deep sea, more amount of oxygen gets dissolved in blood. B → d, a Nitrogen dilutes the activity of oxygen. The name of CrO4-2 radical is dichromate ion. 1 Figure Caption • explain the transformation of matter, types of reactions and balance chemical equations. (a) compressibility of gas/vapour (b) diffusion of gas/vapour (c) expansibility of gas/vapour (d) both (b) and (c) 12. c 40. Thermal expansion of solids is the least among the three states of matter due to (a) high kinetic energy of molecules of solids. Y + XZ → No reaction Y cannot displace X from its compound because it is less reactive than X. Chlorofluorocarbons 4. Describe the laboratory preparation of oxygen gas from hydrogen peroxide with a neat diagram. Nitric acid is used in the purification of metals like gold and silver since it dissolves the impurities like various metal oxides present on the surface of gold (or) gold being insoluble in HNO3 remains insoluble.  $\Delta \rightarrow 2$ KH Examples: 2K + H 2  $\longrightarrow \Delta \rightarrow 2$ NaH 2Na + H 2  $\longrightarrow \rightarrow CaH 2$ . These salts can be used as fertilisers. Separation of a mixture constituting one solid and one liquid The mixture of a solid and liquid can be of different types. Element-element combination reactions are called synthesis reactions. (c) Solid molecules are closely packed and highly Ca + H 2 — 4. Ammonium hydroxide on and compressible. • study the importance of these gases in nature and their uses. (a) carbonic acid (b) nitrous acid (c) sulphuric acid 42. Why do we observe fog and mist in winter mornings? Multiple choice guestions 21. That means, in a molecule of a compound, the positive valencies are balanced by the negative valencies. Structure of an Atom Fundamental particles: An atom consists of three types of fundamental particles, namely, protons, electrons and neutrons. In \_\_\_\_\_\_, the temperature decreases with the increase in altitude. Table 3.16 Uses of salts Chemical names and formulae Sodium chloride, NaCl Common salt Sodium bicarbonate, NaHCO3 Baking soda Sodium carbonate, Na2CO3. False 4. Comment on the nature of products formed and write their names. Lime water is a \_\_\_\_\_\_(a) mixture (b) element (c) compound (d) all the above elements if any. both physical and chemical changes 10. Which compound among the following is used for the laboratory preparation of oxygen? Liebig condenser is a long glass tube enclosed in a jacket of glass. A negative ion of an atom of element X has 18 electrons and 16 protons. In the year 1789, Lavoisier has given the ratio of these two components, that is oxygen and nitrogen in air, as 1 : 4 by volume. Aqueous solutions of SO3 and Na2O turn blue litmus to red and red litmus to blue, respectively. CuO + NO2 + H2O + O2 (a) 2 : 3:1 (b) 1:2:3 (c) 1:1.5:1 (d) 3:2:1 20. 2.21 (d) Melting of a candle. After a few minutes, it is observed that oil forms the upper layer and water forms the upper layer. Formula of washing soda is Na2CO3.10H2O (sodium carbonate decahydrate) 6. Two salts X and Y are taken in two test tubes A and B, respectively, and subjected to heating. Liquid D. Name the gases which are responsible for acid rain. The constituents of baking soda, i.e., Na, H, C and O do not retain their properties, and hence, backing soda is a compound. (d) The mixture is exposed to wind to remove sawdust. Key Ideas After completing this chapter, you should be able to: • learn about symbols of various elements. 2Na+ () b. Fossil fuels such as petrol, diesel are replaced by CNG in some metropolitan cities. 13. Mention the ways of minimising global warming. Mass of one proton is 1837 times the mass of an electron. These are called efflorescent substances. amounts of MgCl2 and CaCl2 are present as impurities which are deliquescent in nature. Assertion (A): Rate of evaporation is less in rainy season. If the formula of its dihydrogen phosphate is (a) M2(PO4)3 (b) MHPO4 (c) M(H2PO4)2 (d) M2HPO4 6. (a) sublimation (b) deposition (c) melting (d) freezing 5. Carbon dioxide () c. He predicted the occurrence of this gas in coal mines and found that it can extinguish candle flame. Gold is purified by treating it with HNO3; all the impurities are oxidised by nitric acid. Matter can be transformed from one state to another by altering the temperature and pressure and this phenomenon is called interconversion of states of matter. Corresponding ous and ic acids of sulphur are H2SO3 and H2SO4, respectively. Coating with B. Depending on the relative proportions of water and acid or bases are categorised as concentrated and dilute acids or bases. It causes air pollution. (iii) Reaction with phosphorus: When phosphorus is heated in an atmosphere of oxygen, it burns to produce phosphorus pentoxide. The gaseous products that are formed when gunpowder is subjected to heating are dissolved in water. 2.30 Chapter 2 (a) Both A and R are true and R is the correct explanation for A. Oxygen present in X is univalent. Soft drinks () d. It ionises in water and gives hydrogen ions. Gas E. A  $\rightarrow$  d, e B $\rightarrow$ a C $\rightarrow$ b D $\rightarrow$ c CONCepT appLICaTION Level 1 aNsWeR Keys True or false 1. Among the following which is a mixture of nitrogen, oxygen, carbon dioxide and water vapour. The vapour density of oxygen is 16 and that of the air is 14.4. Hence, due to higher vapour density of oxygen its amount in air decrease on higher altitudes such as mountains, i.e., more denser molecules experience more gravitational pull. Rate of evaporation is directly proportional to surface area of the liquid. (i) NaOH + H3PO4 → NaH2PO4 + H2O (ii) NaOH + H3PO4 → NaH2PO4 + H2O (iii) NaOH + H3PO4 → NaH2PO4 + H3PO4 → NaH2PO4 + H3PO4 → NaH2PO4 + H3O (iii) NaOH + H3PO4 → NaH2PO4 + H3O (iii) NaOH + NaH2PO4 → NaH2PO gases are CO2, H2O, N2O, CH4, O3, CFCs, etc. Al2(SO4)3. The number of valence electrons in the valence shells, 1, 2, 3 of the X, Y, Z elements are 2, 8, 6, respectively. (v) Two basic and one acidic radicals are present in one molecule of this salt. What is the role of calcium hydroxide used in making mortar and white washing? Example: Sodium, Z = 11, means that an atom of sodium contains 11 protons inside the nucleus and 11 electrons outside the nucleus. Filtration All sorts of insoluble solids can be separated from the liquid in this process. These are called active metals Reaction with metal oxides: All dilute mineral acids react with metallic oxides to form their respective metallic salts and water Reaction with metal carbonates: This reaction also comes under neutralisation but accompanied by the release of CO2 gas along with the formation of salt and water Examples  $Zn + H2SO4 \rightarrow ZnSO4 + H2O CaO + 2HNO3 \rightarrow Ca(NO3)2 + H2O + 2HNO3 \rightarrow Ca(NO$  $CaCO3 + 2HCl \rightarrow CaCl2 + H2O + CO2 MgCO3 + H2SO4 \rightarrow MgSO4 + CO2 + H2O Some Important Chemical Properties of bases are listed in Table 3.8. Table$ decomposition reaction. (a) dissolution of lime in water. A little amount of X when tested with blue litmus turns to red. Uses 1. neutral 16. Ammonium chloride (3) ferric phosphate (4) ferric hydroxide and hydrochloric acid (3) ferric phosphate (4) ferric hydroxide and sulphuric acid (5) barium sulphate (6) sodium hydroxide and sulphuric acid (3) ferric phosphate (4) ferric hydroxide and sulphuric acid (5) barium sulphate (6) sodium hydroxide and sulphuric acid (6) ferric hydroxide and sulphuric acid (7) ferric hydroxide and hydroxide and hydroxide and hydroxide and sulphuric acid (7) ferric hydroxide and 426351 (d) 624351 PRACTICe QUeSTIONS 26. Examples: O3, P4, S8, etc. Hence, tinned iron sheets are extensively used for making boxes to store edible substances. Assertion (A): Dogs stretch out their tongues in summer. Air is a homogeneous mixture of different gases 14. number of surface molecules are exposed to atmo- methods are evaporation Graphite is a which nonmetal is a good conductor of into for key questions along sphere gainand kinetic energy and escape electricity. The arrangement of electronic configuration 2, 8, 8, 1 2, 8, 8, 2 19 20 9. H2CO3 () f. (a) deep-sea diving (b) mountaineering (c) travelling in an aeroplane (d) walking on the moon 8. So, the atomic number of X should be 30. (c) Arrange the electronic configuration. Lack of civic sense by the people 7. Hence, inert gas like Ar or less reactive gases like nitrogen are used as it does not react with the meta filament. greenhouse effect Multiple choice questions 11. 2KOH + H2SO4 → K2SO4 + 2H2O Ca(OH)2 + 2H2O Example Why is KOH called caustic potash? Arrangement of Molecules in Three Different States of Matter Molecules in Three Different States of Matter Molecules in Three Different States of Matter Molecules are packed in different states of Matter Molecules in Three Different States of Matter Molecules in Three Different States of Matter Molecules are packed in different states of Matter Molecules in Three Different States of parameters like intermolecular space, intermolecular force of attraction and the movement of molecules. Washing soda is \_\_\_\_\_\_. 'Z' which is used for construction of monuments gets affected by acid rain. (ii) This salt reacts further with an acid. Being the major component in all living cells, water plays the most crucial role in all biological processes. Soft metals are sodium and potassium Match the following 24. (b) One constituent is a magnetic in nature. The following 24. (b) One constituent is a magnetic in nature. force of attraction between similar molecules is called a cohesive force and that between dissimilar molecules is called an adhesive force. As a compound, the constituents (sodium and chlorine) do not retain their properties, and therefore, we can take NaCl in our daily meal. Germanium is a \_\_\_\_\_ (a) gas (b) metal (c) liquid (d) metalloid 27. (a) 15X31 (b)  $92U_{235}$  (c)  $19K_{39}$  solution (a) Number of neutrons = 31 - 15 = 16 (b) Number of neutrons = 32 - 92 = 143 (c) Number of neutrons = 32 - 92 = 143 (c) Number of neutrons = 31 - 15 = 16 (b) Number of neutrons = 32 - 92 = 143 (c) Number of neutrons = 31 - 15 = 16 (b) Number of neutrons = 31 - 15 = 16 (c residue. The combining capacity of the metal which can exhibit more than one valency is called . In Y, there are 20 electrons or 20 protons (Z). a 28. Mention any four important uses of hydrogen. The positive ion part is called basic radical and the negative ion part is called acidic radical. For the sake of convenience and universal application, all the elements are assigned unique symbols. d 9. How can the constituents of compounds and a mixture be separated respectively? If a uninegative ion has 10 neutrons and 9 protons, then the electronic configuration of the atom of the element is (a) 2, 8, 1 (b) 2, 7 (c) 2, 8 (d) 2, 8, 8 6. (c) The constituents of a compound and a mixture can be separated by chemical and physical methods, respectively. (a) emissions from industries (b) burning of coal (c) burn complete dissociation in aqueous solutions. Ice changes to water vapour Column A A. NO2 is a reddish brown gas, dissolves in HNO3 and imparts yellow colour. On the basis of these, explain the classification of acids and bases. CNG does not produce any harmful gas, and thus, it reduces the maintenance cost and it is a clean fuel. Hence, it cannot be collected by water. Boiling point: Water gets converted into steam at 100°C under normal atmospheric pressure, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of water is proportional to external pressure. If subscripts are changed, then the molecular formulae, i.e., 76 cm of Hg. The boiling point of the compound is changed. which it can still dissolve more amount of solute, the solution is said to be unsaturated. Physical and Chemical Substances in different forms is attributed to the inherent tendency of matter to undergo transformation. Electronic configuration of X is 2, 8, 7 Electronic configuration of Y is 2, 8, 6 Valencies of X and Y are 1 and 2, respectively. This is called negative valency. (a) sulphur dioxide (b) carbon dioxide (c) sulphur trioxide (d) nitrogen dioxide 7. Which of the following: (a) Molecules of solids possess only vibratory motion. the tiniest particles of matter which cannot exist independently. Magnesium hydroxide is the base which turns red litmus blue. a 17. FeSO4 . of gases which surrounds the planet earth is calledand atmosphere. (a) The wet cloth is placed over the funnel and the stem is closed with a cotton plug. With the increase in altitude, the atmospheric pressure (a) increases (b) decreases (c) remains the same (d) first increases then decreases 12. Examples: Ca(OH)2 + HCl → Ca(OH)(Cl) + H2O Calcium hydroxychloride (basic salt) Differences Between Acidic Salts and Basic Salts The differences between an acidic and a basic salt) are listed in Table 3.11. The oxides of on hydrolysis give bases. Meteorites burn up in mesosphere. homogeneous 3. A and B are chemically inert because of stable octet configuration. During this process the energy required for the surroundings decreases, i.e., evaporation causes cooling. Salt: Salt is a substance which contains positive and negative ions or radicals and ionises completely in its aqueous solution. Explain different processes of interconversions from 30 to 49 Answer the following questions. • have basic concept of hydrosphere. Huge amount of heat is also liberated. Colourless particular chapter (c) Temperature does not alter much upColour to a height of about 25 km from the earth's surface. (d) of the absence of convection current. H2SO4 is diluted by adding acid to water with continuous stirring because addition of water to acid is associated with liberation of large amount of heat at a time which may lead to violent and explosive reaction. d 8. 70. \_ is used in the refrigeration of sea food. Hydrogen gas was first prepared by the action of H2SO4 on iron. 40. Therefore, for such liquids, the density decreases with an increase in temperature as the liquids expand on heating. h I N T s a N D e x p L a N aT I O N 11. Which among the following is a bad conductor of (a) soda water (b) liquid ammonia 6. (a) 4231 (b) 2431 10. Bromine is a liquid and hence it possesses stronger intermolecular forces of attractions than gases. Decomposition reaction D. However, the basic difference between compound and mixture is that the constituents of the mixture retain their properties, whereas the constituent elements of the compound completely lose their original properties. Refrigerant to preserve perishable foods like meat, fish, fruits, vegetables, etc., for longer time. Name a natural indicator. X possesses stable electronic configuration and M is the valence shell for both X and Y. When an atom attains stability by gaining one or more electrons, the number of electrons becomes more than the number of electrons becomes more than the number of protons and the ion so formed becomes more than the number of protons and the ion so formed becomes more than the number of protons and the ion so formed becomes more than the number of electrons becomes more than the number of electrons becomes more than the number of protons and the ion so formed becomes more than the number of protons and the ion so formed becomes more than the number of electrons becomes more than the number of electrons becomes more than the number of protons and the ion so formed becomes more than the number of electrons becomes more than the number of electrons becomes more than the number of protons and the ion so formed becomes more than the number of electrons becomes more than the num Oxygen Uses of Hydrogen 1. Atmosphere is a cloud of gases which becomes thinner with distance from the earth and the region above the atmosphere which is absolutely free of air is called outer space. They can neither be created nor destroyed nor transformed into atoms of another element. The colour change of CuSO4 solution can be observed when it is made to react with (a) silver (b) silver chloride solution (c) zinc (d) gold 19. Since there is no turbulence in the atmosphere of the stratosphere of the stratosphere. (a) 2 : 5 16. Hydrogen gas gets adsorbed on the surface of some metals like palladium, platinum, nickel, etc. Identify the weak mineral acid among the following.  $Mg(OH)2 + H2SO3 \rightarrow Mg(OH)BO3 + H2O$  magnesium bisulphite  $Mg(OH)2 + H2SO3 \rightarrow Mg(HSO3)2 + H2O$  magnesium bisulphite  $Mg(OH)2 + H2SO3 \rightarrow Mg(HSO3)2 + H2O$  magnesium bisulphite  $Mg(OH)2 + H2SO3 \rightarrow Mg(HSO3)2 + H2O$  magnesium bisulphite  $Mg(OH)2 + H2SO3 \rightarrow Mg(HSO3)2 + H2O$  magnesium bisulphite  $Mg(OH)2 + H2SO3 \rightarrow Mg(HSO3)2 + H2O$  magnesium bisulphite  $Mg(OH)2 \rightarrow 2MgSO3 + 2H2O$  magnesium bisulphite  $Mg(OH)2 \rightarrow 2MgSO3 + 2H2O$ Z is produced by hydrolysis of Y. Nitrogen being chemically less reactive (inert in nature), is used in the preservation of foods. Atomic S tructure and Transformation of Matter Example Give the necessary chemical equations and balance them. (Sunlight) 6CO2 + 6H 2O — C6H12O6 + 6O2 ↑ (Glu cos e) 7. Thermosphere or Ionosphere (a) This layer is also called upper atmosphere which extends up to 690-950 km above the earth's surface. A mixture of sulphur remains non-uniformly distributed in water is an example of heterogeneous mixture because sulphur remains non-uniformly distributed in water. postulated a theory which regarded atoms as the fundamental building blocks of matter. These three can be collected separately by (a) filtration and evaporation.  $2Mg + O2 \rightarrow 2MgO$ , MgO is basic in nature. Step III Hydrogen are balanced at the end. (d) Electrolysis of water. +5 - 2X2X5 Valency of non-metal is 5. What is greenhouse effect? The atomic number and mass number of an element are 13 and 27, respectively. The positive radical is written first followed by the negative radical is written first followed by the negative radical. b 9. The percentage of noble gases is 0.94 per cent and that of CO2 is 0.03 per cent in atmosphere. As the farm house is located in the city outskirts, they could escape from the hot sun in summer. (d) Corrodes the marble statues or monuments or buildings. Then mass of total positive charge present in the atom is times to that of mass of electron (a) 36,740 (b) 27,555 (c) 18,370 (d) 55,110 17. Explain the role of oxygen in the following: 62. This is the result of change of state from liquid to vapour, i.e., evaporation. Pollutants such as CFCs when reach stratosphere react with ozone, and thus, depletes the ozone layer in a period of time. The O2 gas obtained is collected by the upward displacement of air. 60. TAbLe 4.6As Physical Properties The density air and temperature gradually decrease(d) with height Sawdust + water, sawdust floats on tion and hence carbon and potassium possess strong water (iv) The solid retained on the filter paper is called a forces of attraction. A gas is collected by the upward displacement of air but cannot be collected by the upward displacement of a compound do not retain their properties and they can be separated only by chemical means. (iv) SO2 when passed through potassium dichromate turns the solution from orange to green. One molecule of base to form a salt X. What is alloying? A base is defined as a substance which on dissolution in water furnishes OH- ions as the only negatively charged ions. Identify the formula of the corresponding hydride of a non-metal X which attains an octet configuration by gaining two electrons. (c) Dispose industrial wastes safely. CaCl2 is an example of (a) normal salt (c) basic salt (d) complex salt Acids, Bases and Salts (a) (b) (c) (d) concentrated and pure H2SO4 concentrated and pure HNO3 liquid hydrogen chloride all the above 27. The SI unit of atmospheric pressure is Pascal or kilo Pascal. What are the suffixes of salts formed from the following acids? Write the chemical formula of hypo. (a) It is heavier than air and insoluble in water. 36. Reactions taking place between acids and bases: All acids react with alkalies (metal hydroxides) to form salt and water. Identify the pair of water-soluble bases: (a) copper oxide and potassium oxide (b) copper oxide and potassium oxide (c) sodium, oxide and potassium oxide (b) copper oxide and potassium oxide (c) sodium, oxide and potassium oxide (b) copper oxide and potassium oxide (c) sodium, oxide (c) sodi explanation for A. ZnCl2 (a) (b) (c) (d) Column B () a. (a) CO (b) CO2 (c) SO2 (d) N2 25. During certain double displacement reactions, a solid substance is found to be deposited. Sulphur dioxide on hydrolysis gives sulphurous acid. Articles used to preserve edible food materials  $A \rightarrow c$ ,  $B \rightarrow a$ ,  $C \rightarrow b$ ,  $D \rightarrow d A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow a$ ,  $C \rightarrow b$ ,  $D \rightarrow d A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow b$ ,  $D \rightarrow a A \rightarrow d$ ,  $D \rightarrow d \rightarrow d$ ,  $D \rightarrow b A \rightarrow b$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow c$  Reason (R): Liquid hydrogen is a very light fuel. 13. Application' Identify the soft metal among the following: (d) A mixture of water and glucose physical methods. (c) upward displacement of water in both the cases. From this observation, it can be concluded that copper is a less active metal than iron. The maximum number of electrons that can be accommodated in an orbit is equal to where n is the number of orbits. As NH4OH is soluble in water it is an alkali. • Neutralisation is the process in which an acid reacts with a base to form salt and water. homogeneous 14. c 8. Similarly, the valencies of other elements with atomic numbers 16, 18, 19 are 2, 0 and 1, respectively. c 33. Vidya went to her grandfather Rajaram's house to spend her summer vacation. The ratio of difference in the number of electrons between the K and M shells is 3 : 2 for X and Y elements, respectively. (c) Mixtures are always heterogeneous. 5 H2O (ii) FeSO4. Ionosphere 19. In a properties of the constituents are retained. three Multiple choice questions 11. (a) Ammonium nitrate (b) Ferrous sulphate solution (a) Ammonium nitrate NH4+ NO3 \ Formula is NH4NO3. Among the noble gases which gas does not have an octet configuration? Sulphur dioxide on hydrolysis gives . These can be separated by (a) filtration and distillation. Assertion (A): Washing soda compound. In which way is greenhouse effect useful to us? Which among the following substances has the strongest intermolecular forces of attraction? A → d Tin coated iron articles are used to preserve edible food materials. Naphthalene sublimation. A Cl-1 1 MCl2 31. b 20. d, c, b, a (i) copper (ii) water (iii) calcium carbonate (iv) sodium bicarbonate 6. These salts furnish hydrogen ions when dissolved in water. Reason (R): Evaporation leads to cooling. It is believed that complex chemical reactions between the minerals in sea water took place in the presence of sunlight which resulted in the origin of unicellular organisms such as bacteria and fungi. Lavoisier named it hydrogen which means water-former (Hydrowater, gen-producing). Uses of acids: Various uses of acids: Various used in the production of industrial chemicals such as washing soda, baking soda, baking soda (NaHCO3), white lead (Pb (OH)2.PbCO3), etc. A can be SO2 or NO2 because they pollute air and cause acid rain to pollute water. Hence, the valency of hydrogen is a mixture of proteins, fats, vitamins, carbohydrates and mineral salts. Carbogen is a mixture of 94 per cent oxygen, 4 per cent oxygen, 4 per cent oxygen, 5 a mixture of 94 per cent oxygen, 4 per cent oxygen, 4 per cent oxygen, 4 per cent oxygen is a mixture of 94 per cent oxygen, 4 per cent oxy Ca(OH)Cl (iii) Ca3(PO4)2 (iv) CaOCl2 10. (a) 20 and 13 (c) 17 and 20 (d) 20 and 14 Tripositive ion, i.e., X+3 has 13 protons and 14 neutrons. An atom of an element has the electrons distributed in four shells. Is it filled with air or vacuum? (a) manufacture of gunpowder (b) manufacture of glass (d) all the above 4. Evaporation is the process of conversion of (a) a liquid to its gaseous state below the boiling point of the substance (b) a liquid state at the melting point of the substance (c) a solid to its liquid state below the boiling point of the substance 18. (c) It is heavier than air and it is highly soluble in water. A  $\rightarrow$  e B  $\rightarrow$  d, a C  $\rightarrow$  f, a D  $\rightarrow$  b, c 39. A  $\rightarrow$  b chemical decomposition (cFCs), O3 in type of mixture can be separated by a simple physical process called sublimation process. Density: In general, solids possess greater densities than liquids. Examples: CO, chlorofluorocarbons (CFCs), O3 in troposphere, etc. Magnesium attains an octet configuration by electrons. Y is precedent to X. This increase of temperature from aboutlayer. Mother took her two daughters Bhavani and Shivani to a swimming pool in summer vacation. What is the maximum number of electrons it can have in an atom? Precautions 1. (d) downward displacement of water in both the cases. Dalton's atomic theory has been contradicted with the advancement of science and modified on the basis of further research and discoveries. MnO2 used should be devoid of impurities. CaCl2 is deliquescent in nature, absorbs moisture and is converted into solution state. Hence, nitrogen present in the atmosphere is converted into compounds by which it can be assimilated by plants. Preparation (d) sublimation 29. The difference in the number of electrons between K and L and M shells is the same for an atom of element X (M shell is the valence shell) and the difference value is the number of valence electrons in the M shell of the other element Y. Blue coloured solid anhydrous cobalt chloride is exposed to atmosphere and forms a pink-coloured solid. The rate of evaporation is directly proportional to the surface area of the liquid. Curdling of milk results in the formation of curd which is a . (b) The cloud formation takes place in lower layers while mist formation takes place in the upper layers of the troposphere. Distinguish between acidic salts and basic salts. In a solid the molecules are closely packed due to strong forces of attraction, and hence, thermal expansion of solids is the least among useful change. Melting of wax is a the three states of matter. Y is obtained by the decomposition of a substance X. Directions for questions, four choices have been provided. What is the composition of water gas and how is it formed? 2. In scandium, the K, L, M and N shells are filled with 2, 8, 8, and 2 electrons, respectively and the remaining 1 electron goes to the M shell. 4SO2 Column B () a. (b) Both A and R are true and R is not the correct explanation for A. (a) A mixture of water and sugar and hence it is a surface phenomenon. Efflorescent () d. Oxygen is found in dissolved state in water bodies, due to which aquatic species are able to survive. (a) Flourine (b) Sodium (c) Chlorine (d) Chlorine (Z = 17) Electronic arrangement = 2, 8, 7 e e - - e - - e - - e - - e - - e - - e - - e - - e - In nature, some elements are found to be quite stable electronic configuration and M is the valence shell for both X and Y. Y is limestone, CaCO3 which on heating gives CaO. Example  $2KNO3 + FeSO4 \rightarrow K2SO4 + Fe(NO3)2$  In the above reactive K+ (potassium ion) combines with SO4- (sulphate ion) and Fe+2 (ferrous ion) combines with SO4- (sulphate ion) through heavy rollers.  $Zn + 2HCl \rightarrow ZnCl2 + H2 \uparrow Zn + H2SO4 \rightarrow ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 Gas jar Water Beehive Shelf Figure 4.4 Laboratory preparation of hydrogen Experiment: Some granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 Gas jar Water Beehive Shelf Figure 4.4 Laboratory preparation of hydrogen Experiment: Some granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated Zinc and dil H2SO4 or ZnSO4 + H2 \uparrow Thistle funnel Delivery tube Hydrogen Conical flask Granulated$ fitted with a two-holed air-tight cork. d 34. What is carbogen? Reaction with air: Hydrogen burns in air, i.e., it reacts with oxygen of air forming water. (a) physical state only. (c) Displacement of copper from its sulphate salt solution by zinc. Anhydrous CaCl2, absorbs moisture till it becomes saturated and changes its physical state. (1) (2) (3) (4) (5) (Fe3O4 is a mixed oxide, i.e., FeO + Fe2O3) (valency of iron in Fe3O4 is 2 as well as 3) Steam (ferroso-ferric oxide) (b) 3Mg + N2 → Mg3N2 (c) CuSO4 + Zn → ZnSO4 + Cu MHPO4 (c) 33. Carbon Dioxide Historical aspects: van Helmont predicted the formation of this gas when charcoal is burnt in air and he called this gas as carbonium. Reducing the growth of population. When water is added to anhydrous salt, it forms copper sulphate pentahydrate which is blue in colour. Table 2.9 Comparative study of physical and chemical changes (i) (ii) (iii) Physical change Molecular composition of the matter does not change No new substance is formed. (a) alloying (b) electroplating (c) tinning (d) galvanisation 16. Ous 6. When food grains are kept in the atmosphere of carbon dioxide, it prevents the grain from destruction by insects. Short Answer Type Questions 54. Explain the decantation. Washing soda is (a) hydrated sodium carbonate (b) anhydrous sodium carbonate (c) hydrated magnesium sulphate (d) anhydrous magnesium sulphate 10. (a) normal (b) acidic (c) basic (d) none of these Directions for questions, four choices have been provided. Ozone layer acts as a shield as it absorbs highly energetic harmful UV radiations. This is because the temperature gradually increases with increase in altitude due to the absorption of highly energetic UV radiations. Name and formula of the salt formed by complete neutralisation of aluminium sulphate, Al2(SO3)3 (b) aluminium sulphate, Al2(SO3)3 (c) aluminium sulphate, Al2(SO3)3 (d) aluminium sulphate, Al2(SO4)3 21. It is the most abundant element in the earth's crust. Hence it is neither combustible nor a supporter of radiations and thus protects life on the earth. The changed perception that an atom is divisible made various scientists such as Rutherford, Bohr, Heisenberg, etc., to throw light on the structure of the atom precisely. Predict the formula of the salt 'x.' (a) Mg(HCO3)2 (b) Ca(HCO3)2 (c) CaCO3 (d) MgCO3 12. Mercuric nitrate is a deliquescent salt. Hence, the temperature in the interior of the cities is higher than in the outskirts of the cities. However, fishy odour of hydrogen gas is attributed to the presence of impurities Negligible Least density Neutral Difficult due to very low critical temperature and not possible at room temperature Rate of diffusion is very high Adsorption or Occlusion. 1.15 1.16 32. Process: A mixture of sawdust and water is taken in a beaker. Chemical decomposition: The reaction in which a compound undergoes decomposition to form more than one substance in the presence of heat or light or electricity is called chemical decomposition. Since it involves partial separation of the components of milk, boiling of milk is a physical change. b 17. decrease with height. element from its compound is called chemical displacement reaction. Dust particles along with water vapour present in the formation? Which of the following involves only a physical change? Sodium sulphate is a normal salt. (a) silicate (b) ammonium (c) ferrous (d) chromium 26. Write a short note on nascent hydrogen. The region that extends from 25 km to 40 km above the earth's surface is called ozonosphere or ozone layer. CaSO4 ½ H2O Column B (colour in acidic solution) () a. 8 molecules of chlorine a. (d) It is lighter than air and water. Among the noble gases, only helium has two electrons in the valence shell and the electronic configuration is called duplet configuration. Name two metals that can exhibit variable valency. Humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inversely proportional to the amount of moisture (humidity: The rate of evaporation of a liquid is inve the true statement regarding X and Y. Acids turn methyl orange solution to pink. The accumulation of molecules of one compound over the surface of another substance is called adsorption. (a) distillation (b) evaporation (c) filtration (d) sublimation 13. Acids, Bases and Salts 34. KOH + HCl  $\rightarrow$  KCl + H2O Potassium Potassium chloride hydroxide 3.9 3.10 Chapter 3 3. The remaining constituents are covered with a niverted funnel is plugged with a moist filter paper and the open end of the stem of the funnel is plugged with a moist filter paper or cotton to prevent vaporisation. When iron C - a is exposed to humid atmosphere, it forms hydrated D - e ferric oxide (Fe O . Nitrogen dilutes the activity of phere. Write a short note on rusting. Define water of crystallisation. (a) 4n2 (b) 2n2 (c) (2n + 1)2 (d) n2 + 4 23. If a dispositive ion of an element X consists of 12 protons and 12 neutrons and another disp ositive ion of an element Y consists of 18 electrons and twice the number of electrons of dis number of neutrons of Y. Molecule () () () () () () Column B a. Identify the four layers of atmosphere as per the temperature range mentioned and arrange them in a sequence. Hence, matter can be defined as anything that occupies space and has mass. Due to this reason, a decrease in the level of mercury is observed in the case of container B having alcohol but not in the case of A having water. (v) Arrange the electrons in shells around the nucleus following the electronic configuration. H3PO4 on dissociation furnishes 3H+ ions in aqueous solution, therefore, it is a tribasic acid. The acid containing less number of oxygen atoms is called ous acid. Nitre dissolves in hot water. In a chemical laboratory, a student broke the thermometer while performing an experiment. Bisuphite D. Polyatomic elements: The elements in which each molecule contains more than two atoms. Hence, constituents of the mixture can be separated easily by means of some physical processes. (a) hydrochloric acid (b) nitric acid Essay Type Questions 68. The glass rod helps to pour off the liquid, without disturbing the solid settled at the bottom. How can ozone depletion be prevented? 68. Acid turns methyl orange solution . Metals are highly ductile and malleable. Hence, it Figure is considered as a protective is calledalso troposphere. (c) placement of the electrons in shells around the nucleus according to the electronic configuration. 42. c 10. 'X' is highly soluble in water. The process is similar to galvanisation. Assertion (A): If excess of carbon dioxide is passed through lime water, it becomes transparent. d 12. These salts are formed during complete neutralisation. Carbon monoxide present in water gas gets oxidised to CO2 leaving hydrogen gas. Give balanced equations showing neutralisation reactions of the following: (a) slaked lime and sulphuric acid (b) sodium bicarbonate and hydrochloric acid (c) magnesium carbonate and hydrochloric acid (b) sodium bicarbonate and hydrochloric acid (c) magnesium carbonate and hydrochloric acid (c) ma atom. Jack asked the teacher 'why are electrons, assumed to be in continuous motion around the nucleus instead of being stationary?' What could be the explanation given by the teacher? (d) naphthalene balls and camphor. (d) None of the above. Three atoms of oxygen Column A B. SO2 turns orange-coloured K2Cr2O7 green due to the formation of Cr2(SO4)3. Atmosphere is a cloud of gases and non-metals. When carbon dioxide gas is passed through lime water, it gives a white precipitate due to the formation of calcium carbonate which is insoluble in water. Which among the following acids is present in lemons? Table 2.1 Elements and their symbols as first letter of their names Element Boron Carbon Fluorine Hydrogen Iodine Nitrogen Oxygen Phosphorus Sulphur Vanadium Uranium Symbol B C F H I N O P S V U 2. The process of heating is continued till the evolution of white vapour is observed. (d) All the above PRACTICe QUeSTIONS Directions from 1 to 15 Select the correct alternative from the given choices. one 1 1837 16. A → b B → e, d C → a D → c E → f 31. (1) Ca3(PO4)2 (3) CaOCl2 (2) Ca(OH)Cl (4) K4[Fe(CN)6] Arrange the above salts in the order of complex salt, respectively. Example: Conversion of water vapour or steam to water. Example In the table given below, some compounds are listed. Salts of sodium and potassium are colourless, whereas salts of iron, copper, chromium, etc., are coloured. is a surface phenomenon, whereas boiling is a . Therefore, total positive charge present in nucleus is 20 × 1837 = 36740. Composition of water gas is CO + H2. Washing soda (Na2CO3) is a compound because the constituents combine (a) chemically in fixed ratio by weight. Hence, P2O5 is acidic in nature. Chile salt petre is used in the manufacture of nitric acid. The constituents of a mixture retain their properties.  $2Pb(NO3) \rightarrow PbO() + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 22.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 23.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 24.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 25.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 24.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 25.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 25.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 26.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 27.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 27.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 27.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 27.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 28.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 29.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 29.  $4HNO3 \rightarrow 2H2O + 4NO2 + O2 B$ . 20. bodies like river, seas, etc. (a) displacement reaction (b) combination reaction (c) double displacement (d) decomposition reaction sequence to arrange the following reactions: (a)  $A + B \rightarrow AB$ . Decrease in humidity increases the rate of evaporation. Hence, 0°C is the melting point of ice. When a chemical change is represented in the form of an equation with the help of symbols and formulae of the reactants and the products, it is called chemical equation. The teacher asked the students to predict the type of change/reaction associated with the above process. Oxygen () a. • know the states of matter—solid, liquid and gas. Hence, it weakens the iron structures. What would be the justification given by the teacher for the above observation? Hydrogen Hydrogen is the lightest among all elements. (a) H2CO3, HNO3 (b) H2SO3, H2CO3 15. This signifies the fact that the number of atoms of each element on either side must be equal. A → d In boiling process, water changes into vapour. The atmosphere that is made up of different layers holds various components of air.  $4Fe(s) + 3O2 \rightarrow 2Fe2O3$  (s) Fe2O3 (s) + XH2O (l)  $\rightarrow Fe2O3.XH2O$  (s) Rust (X indicates the number of water molecules which is variable) Iron gets corroded due to the formation of rust. Aerated drinks 32. Name the device used to measure the atmospheric pressure. Hydrated sodium sulphate and hydrated copper sulphate are taken in two air-tight containers X and Y, respectively. Anhydrous calcium chloride is deliquescent in nature which absorbs moisture and forms a solution. The atomicity of which among the following is the maximum? 2 3 2 h I N T S a N D E x p l a N aT I O N 36. with highlights on the N AT I O N 33. 2SO2 + O2 - 2SO3 SO3 + H2O - H2OO4 2NO2 + H2OO4 2NO2 + H2O - H2OO4 + H2O - H2O + H2O decreases with height due to the decrease in density of air with increase in altitude. (d) Solid molecules are loosely packed and possess strong forces. Oxygen combines with magnesium to produce magnesium to produce magnesium to produce magnesium to produce magnesium oxide with dazzling white flame. temperature of the earth and contributes to global warming. Camphor 19. It could be stored in liquid helium to prevent it from recombining into molecular hydrogen. (b) The positive ion, i.e., Zn+2 followed by the negative ion, i.e., and contributes to global warming. taken as unit positive charge (+1). Y is neutral since it does not respond to either red or blue litmus test. Troposphere (d) Radio waves get reflected in this layer which, thus, helps in long-distance radio communications. The mass of one proton is 1.67 × 10-27 kg. Reaction with metals: Metals react with oxygen to form corresponding metallic oxides which are generally basic in nature. Matter is composed of tiny indivisible particles called atoms. Oxygen inhaled during respiration is utilised in oxidising the glucose to carbon dioxide and water, which is accompanied with evolution of energy. Table 3.12 Naming of salts of hydracids Formula of bases NaOH NaOH NaOH Salts formed Name of the salts Sodium chloride Sodium sulphide NaCl Na2S NaHS The salts derived from oxy acids are given names depending on the type of the constituents? The rate of evaporation depends upon the nature of the liquid. Aluminium, when exposed to the atmosphere, reacts with air, i.e., O2, and forms Al2O3 which is chemically inert. (e) The height and thickness of this layer vary from the equator to the poles. (a) carbon dioxide and oxides of nitrogen (b) methane and water vapour (c) carbon dioxide and ozone (d) carbon dioxide and water vapour pRaCTICe QUesTIONs (a) (b) (c) (d) 4.35 4.36 Chapter 4 TesT yOUR CONCepTs Fill in the blanks 1. Identify the element which is chemically reactive?  $C \rightarrow f$ , a CO2 is used in the making of white lead. Similarly, there are some substances which absorb moisture from the atmosphere on exposure to air. d 11. Valency of metal is 2. Hence, the total mass of protons in boron is 9185 times (5 × 1837) the total mass of electrons. Substances like carbon and chromium are added to iron to form a homogeneous mixture called stainless steel, an alloy by which corrosion resistant is made. . a 1. This absorbed radiation is transformed into heat and is reradiated back into the atmosphere. Based on the molecular composition, matter is classified into pure substances and mixtures. Note: Diluted H2SO4 is not used for the preparation of CO2 because the calcium sulphate formed being insoluble in water forms a layer over called marble chips, and thus, marble chips do not come in contact with dil H2SO4 further. Hence, electric bulbs are filled with inert gas like argon or chemically inert nitrogen. What is the valency of iron in the products formed? Diatomic elements: The elements in which each molecule contains two atoms. It has to gain two electrons to attain an octet configuration. c 16. 61. 2.3 2.4 Chapter 2 The main postulates of Dalton's atomic theory are the following: 1. H2SO3 C. When this is exposed to atmosphere, sweat undergoes evaporation which causes cooling, and hence, we feel cool by wearing cotton clothes in summer. Y is CaO. Δ C + CO2 — → 2CO Red hot coke Uses of Carbon Dioxide CO2 finds many applications in various fields like industry, medicine, agriculture, etc. The different reactants and products are separated by a '+' sign. Sawdust can be separated by a '+' sign. Sawdust can be separated by a '+' sign. condenses as the white powder. MgO + H2O  $\rightarrow$  Mg(OH)2. Copper loses one electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from its valence shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the second last shell to form Cu+ and can loss one more electron from the se Though Dalton's atomic theory could not give convincing explanation to any of the above facts, it laid down the foundation for the development of modern atomic theory.  $2SO2 + O2 \rightarrow 2SO3 SO3 + H2O \rightarrow HNO3 + HNO2 Effect$ : (a) The fertility of the soil is lost or reduced. (a) A (b) B (c) C (d) both A and B 14. 1. Hence, 0°C is the freezing point of water. Column B One of the component goes into vapour state on heating Separation of mixture by evaporation and subsequent condensation Insoluble solids can be separated from a liquid In a mixture, heavier solid particles are allowed to settle and are separated from clear solution A mixture of sand and iodine pRACTICe QUesTIONs 23. To separate soluble solids from a liquid the suitable surface area of the liquid. The electrons enter the third shell after the second shell gets completely filled by eight electrons. Soft metals are sodium and potassium 38. (a) NO2, SO2 (b) SO2, CO (c) SO grandfather. Free state: It is found in the free state in the atmosphere and also found in water bodies like oceans, lakes, rivers, etc., in the dissolved form. 2KMnO4 + H2CO4 → K2SO4 + 2MnSO4 + H2CO4 → K2SO4 + 2MnSO4 + H2CO4 → K2SO4 + 2MnSO4 + H2CO4 → K2SO4 + Machineree at a state in the atmosphere and also found in water bodies like oceans, lakes, rivers, etc., in the dissolved form. 2KMnO4 + H2CO4 → K2SO4 + Machineree at a state in the atmosphere at a state in the atmosphere at a state in the atmosphere at a state in the atmospheree at a atmosphere in the thermosphere, only a few molecules present here absorb high energetic radiations, and hence, the temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but the ambient temperature of molecules or ions formed is great but temperature of molecules or ions formed is great but temperature of molecules or ions formed is great but temperature of mo emissions from industries (b) burning of coal (c) burning of coal combustible nor a supporter of combustion CO2 reacts with water to form carbonic acid. Find the atomic number of X. Ltd Published by Pearson India Education Services Pyt. B  $\rightarrow$  c NaCl is a compound because it is made up of sodium and chlorine in a fixed ratio by mass. What is meant by intermolecular space and intermolecular forces of attraction? Smelling salt is (a) sodium chloride (b) calcium carbonate (c) ammonium chloride (d) ammonium carbonate 31. Normal salts: When all the H+ ions furnished by an acid molecule are replaced by the metal ions, then the salts formed are called normal salts. phenomena. (a) 20 and 13 (b) 20 and 13 (c) 17 and 20 (d) 20 and 14 34.  $302 \rightarrow 203 03 \rightarrow 02 + [0] 4$ . Give two examples of each. Line water turns milky due to the formation of CaCO3. The electrons of 02 or N2 atoms excite to higher energy levels and when they return to their lower energy levels, they emit beautiful colours of light. 24. Double salts: The salts which contain more than one simple salt are called double salts.  $4Na + 3CO2 \rightarrow 2MgO + CCO2$  when reacts with red hot coke gets reduced to CO, a very poisonous gas. Name the factors which affect the rate of evaporation. Two friends Neela and Leela went to a shop, brought mango and lemon pickle of 1 kg each, respectively. Potassium hydroxide is an extremely corrosive alkali 27. Solids have strong intermolecular forces of attrac- Filtration  $\rightarrow$  is called a filtrate. c 30. 37. Given any two chemical properties of CO2. Hence, it can be concluded that water and oil are immiscible liquids, and hence, form a heterogeneous mixture. (i) A mixture of sawdust and water is taken in a beaker. B o c Atomic number of scandium is 21, electronic configuration is 2, 8, 9, 2. hn a' s Chemistry Tr is Pearson IIT Foundation Series continu?es to be a source of comprehensive and reliable content for competitive readiness. (b) Saturated solution: If the solution is in a state in which it cannot dissolve any more amount of solute, the solution is said to be saturated. Medical: A mixture of 95 per cent CO2 is called carbogen. While coming back from school in the school bus. Bill asked his friend Gill to predict the atoms. X and Y which form a stable dinegative ion and a uninegative ion, respectively. Displacement reactions are the reactions which involve displacement of a less active element from its compound by a more active element from its compound by a more active element from its compound by a more active element. carbon monoxide which is a harmful gas and leads to respiratory problems. However, discovery of radioactive elements led the scientists to focus on the divisibility aspect of the atom. and water 2/2/2017 2:42:31 PM it can separated byindistillation 19. Which of the following is a true statement regarding mixtures? (a) downward displacement of water and downward displacement of air, respectively. Monoatomic elements: The elements in which each molecule contains only one atom. The series consists of textbooks and ?p?ractice books?for Physics, Chemistry and Mathematics for classes 6-10. (a) ammonium hydroxide (b) calcium hydroxide (c) potassium Chapter 3 3.20 Directions for questions from 39 to 41 Match the entries given in Column A with the appropriate ones in Column B. Mention two uses of the salts given below: (a) sodium bicarbonate (c) calcium sulphate hemihydrate 67. A salt 'x' has a positive radical in which the metal has electronic configuration 2, 8, 8, 2. During combustion a huge amount of heat is liberated and pressure increases inside the small area. Anhydrous and deliquescent salt () d. Hence, it is considered as a protective cover which is further divided into five distinct layers. c 22. Sodium oxide and potassium hydroxide, respectively. Directions for questions from 27 to 29 Match the entries given in Column A with the appropriate ones in Column B. Name the techniques by which the components can be separated. Emissions from industries and vehicles 5. Dust particles help in the formation of cloud. This phenomenon takes place because zinc is a more active metal than iron, and hence, it displaces iron from ferrous sulphate. 4.31 4.32 Chapter 4 number of electronic configuration of the atom. Example: H2 + Cl2 → 2HCl Hydrogen chloride 2. Sugar in water () d. (a) nitrogen oxides like N2O (b) carbon dioxide (c) sulphur dioxide (c) sulphur dioxide (c) sulphur dioxide (d) water vapour 14. d 17. (a) KNO3 (b) Pb(NO3)2 (c) H2O2 (d) HgO 17. Usage of scrubbers, containing lime water, in industries decreases the percentage content of the major air pollutants that contribute to acid rain. Identify the

layers of atmosphere as per activities mentioned and arrange them in a sequence. Water gas can be prepared by passing steam over red hot coke. The publisher reserves the right to remove any material in this eBook at any time. A  $\rightarrow$ d B  $\rightarrow$ e C  $\rightarrow$ a D  $\rightarrow$ c 32. (c) usage of catalytic convertor. Iron powder of rust are taken in two containers X and Y, respectively. Examples: CO2 + 2NaOH → Na2CO3 + H2O Air and Oxygen Properties (b) Reaction with lime water to form a milky white precipitate, i.e., CaCO3. and collected into another beaker which limation oncone heating 36. Evaporation, distillation Multiple choice questions Classification of Matter 1.25 Match the following 44. Methane on mixing with superheated steam at high temperature followed by compression to 30 atm pressure gives water gas. S + O2 → SO2 ↑ H2SO3 turns blue litmus paper to red. The sculptures and monuments get damaged due to acid rains. The holes in the ozonosphere is due to the attack of a pollutant that is released from (a) automobiles (b) air conditioners (c) industries (d) volcanic eruptions 33. Mention the advantage of existence of atmosphere. The downward pressure exerted by air due to its weight on surroundings is called atmospheric pressure. normal salt 17. A  $\rightarrow$  b B $\rightarrow$ a C $\rightarrow$ d D tropospheric layer due to the holes created in ozone and affect plant and animal life. (b) Solids are incompressible. (a) M2(SO3)3 (b) MSO4, M2(SO3)3 (c) M2SO4, M2SO3 (d) M2SO4, M2(SO3)3 (c) M2SO4, M2SO3 (d) M vapour in atmosphere. Water sticks to glass due to adhesive forces acting between water and glass. Reason (R): Mass of one proton is 1837 times the mass of electron. Laboratory Tests for Carbon Dioxide 1. Hydrogen 12. The methods of preparation of the substances are also given. of mixture of mud and water which can easily be separated by filtration. A  $\rightarrow$  e B $\rightarrow$ d C $\rightarrow$ a D $\rightarrow$ g D $\rightarrow$ c Level 1 1. Step II Among the elements with same frequency of occurrence, the metallic element is balanced first followed by non-metallic elements with same frequency of occurrence, the metallic element absolutely free of air is called outer space. A weak acid is the acid in which less than 30% of molecules ionise in water. Milk is a heterogeneous mixture in which fat particles are present in water. (a) zinc (b) copper (c) aluminium (d) iron 12. (d) increasing greenery. Her father told her that it was filled with nitrogen or argon. Sawdust is found over the filter paper. The formula of zincate radical is ZnO2-2 17. (a) chemical change (b) decomposition reaction (c) both physical and chemical change (d) physical change 17. 26. Aluminium B. 1. Preservative action and sour taste. Ozone present in the stratosphere plays a vital role in protecting the life on earth's surface from harmful UV rays. Based on the physical appearance and behaviour, matter can be classified into three different states—solid liquid and gas. (reducing/oxidising) 20. Example: Ca+2 2 OH- 1 1 2 Ca(OH)2 NH4+ 1 CO3-2 2 2 1 (NH4)2 CO3 Nature is associated with a wide variety of chemical substances. Compounds are homogeneous while mixtures can be either homogeneous or heterogeneous. Green vitriol Epsom salt Washing soda Methyl orange Phenolphthalein Turmeric Litmus Column B () a. is the process of mixing of a metal with metal or non-metal to form a homogeneous mixture. Give two examples. Further addition of a base to an acid or an acid to a base to the acidic respectively.  $B \rightarrow c$  Atomic number of oxygen is 8 and electronic configuration 2, 6, valency = 8 - 6 = 2. Increasing order of five layers as per altitude from the surface of earth are B < D < C < A. related topics (i) Troposphere + H2SO4(dil)  $\rightarrow$  CaSO4  $\downarrow$  + H2O + CO2  $\uparrow$  (e) The height and thickness of this layer varies from the equatorCaCO to the 3poles 'A' can be SO2 or NO2 because they pollute air and cause acid rain to pollute water. (b) of the atmosphere being turbulent. (a) X, Y, Z, Cu (b) Cu, Y, X, Z (c) Cu, X, Z, Y (d) Z, Cu, Y, X 11. Solid 13. A molecule of hydrogen is made up of two atoms, and hence, its atomicity is two. H2O2  $\rightarrow$  H2O2 + O2 (X) NO + O2  $\rightarrow$  NO2 (Y) (Z) (reddish brown) O2 (Y) is neutral towards litmus while NO2 is acidic, and hence, turns moist blue to red. (c) of freezing of saliva. a 26. (a) A (b) B (c) C (d) both A and B Atomic Structure and Transformation of Matter 5. (d) A mixture of water and glucose. Air and Oxygen nitrogen, nitrogen oxide 11. 1.27 1.28 Chapter 1 6. Chapter 1 6. Chapter 1 6. Chapter Chapter 1 2 atomic Number Structure and Systems Transformation of matter and its physical forms, understand the importance of interconversion of matter and correlate it with day-to-day activities. Iodine is a lustrous nonmetal. The atoms of different elements may lose or gain different number of electronic arrangement. The compound X is used in white washing. How does the energy of orbits in an atom vary? (a) distillation (b) filtration 73. (c) cohesive forces between water molecules. He was surprised because he was able to see bubbles coming out when a metal rod is dipped in sulphuric acid when the teacher conducted the experiment. Water shows convex meniscus in narrow \_\_\_\_\_\_ and \_\_\_\_\_ tubes. 30. (ii) Potash alum-, K2SO4. The molecules in this layer absorb highly energetic radiations and get ionised. d 13. This acidified water affects the aquatic life which leads to death and decay of aquatic animals. (a) 18 (b) 19 (c) 16 (d) 18 9. As the density of sodium is less than that of water it 1. Find out its valency. X-2 X 11. Decrease 18. (a) H2O2, O2 and NO pRaCTICe QUesTIONs 12. (a) calculation of the number of protons and neutrons. Which among the following pairs of bases do not decompose on heating? sea level, 760 mm of Hg 18. The heightHere and thickness of this layer varies from the to the increase poles. CuO + H2SO4  $\rightarrow$  CuSO4 + H2O Copper sulphate 6. coefficients Multiple choice questions 11. The formula of salt X is KH2PO4. The reaction AgNO3 + NaCl  $\rightarrow$  AgCl + NaNO3 reaction. This is a photochemical reaction. solution (a)  $3Fe + 4H2O \longrightarrow Fe3O4 + 4H2$  (Steam) Ferrosoferric oxide (b)  $3Mg + N2 \longrightarrow Mg3N2$  (c)  $CuSO4 + Zn \longrightarrow Mg3N2$  (c) CuSO4hypothetical art of transmutation of some suitable metals into gold was called alchemy. A pure substance is homogeneous in nature. Distillation flask. H 2O 2 K2SO4.Al2(SO4)3.24H2O Ammonium chloride, NH4Cl Calcium oxychloride, CaOCl2 Sodium nitrate, NaNO3 Sodium thiosulphate, Na2S2O3 Potash alum Salammoniac Bleaching powder Chile salt petre Hypo Zinc sulphate, ZnSO4.7H2O White vitriol Plaster of Paris Purification of water Used as a laboratory reagent Bleaching clothes and purification of water As fertiliser, in glass and fireworks As an antichlor for removing excess of chlorine from the bleached articles in textile industries In medicine as an eye lotion and in making lithopone, a paint base Acids, Bases and Salts Example Why is nitric acid used in the purification of gold? Deliquescent salts change into solution form due to the absorption of water from air. What do you observe when X and Y are exposed to atmosphere? (a)  $Ca(OH)2 + H2SO4 \rightarrow CaSO4 + 2H2O$  (b) NaHCO3 + HCl  $\rightarrow$  NaCl + CO2 + H2O (c) MgCO3 + H2SO4  $\rightarrow$  MgSO4 + CO2 + H2O POINTS TO REMEMBER • Strength of acids and bases depends on the extent of ionisation. Hence, the atoms of these elements have a tendency to gain this configuration either by gaining or losing electrons. (a) 2, 8, 9, 2 (b) 2, 8, 18, 1 (c) 2, 8, 18, 2 (d) 2, 8, 8, 2 7. To separate soluble solids from a liquid the suitable methods are evaporation and distillation. These salts furnish hydroxyl ions when dissolved in water. Nucleus consists of both protons and neutrons and it accounts for the mass of the atom. Arrange the statements in the following order. Hence, it is used in thermometers. (d) ductile The formation of a compound is a physical process. Soap industry A. Give the necessary chemical equations for the following and balance them. (d) Compounds are homogeneous and mixtures can be homogeneous or heterogeneous. Column A 41. After a few days, Neela found that her pickle got spoiled, whereas Leela's pickle did not. Essay Type Questions 70. A gas is collected by the upward displacement of air but cannot be collected either downward or upward displacement of glass Detergents. Fire extinguisher Washing clothes Manufacture of glass Detergents Manufacture of nitric acid, gunpowder, and in fireworks Fertiliser Manufacture of gunpowder, nitric acid Smelling salt Fireworks Relief from common cold Epsom salt Laxative Green vitriol Blue vitriol Making of ink, curing of leather Fungicide in agriculture, dyeing and printing, electroplating Making of statues, setting of broken bones Ammonium carbonate, (NH4)2CO3 Magnesium sulphate, MgSO4.7H2O Ferrous sulphate, FeSO4.7H2O Copper sulphate, CuSO4.5H2O Common names Calcium sulphate, MgSO4.7H2O Copper sulphate, Mg characteristics of air. Hence, generally, pickles are stored in glass vessels or plastic vessels. (a) M2(SO4)3 (b) MSO4 (c) M2SO4 (d) MSO3 6. Which among the following gases do not contribute to greenhouse effect? As a result cotton clothes can be easily made wet than synthetic clothes. With C, X forms a compound which turns red litmus paper blue Explain the formation of sodium chloride. KOH sol. Key Ideas After completing this chapter, you should be able to: • have knowledge of different layers of atmosphere and their importance. d 1. H3PO4 + 3H2O neutral salt NaH2PO4 + 2H2O acidic salt H3PO4 + 2H2O acidic salt H3PO4 + 3H2O neutral salt NaH2PO4 + 3H2O neutral salt NaH2PO4 + 2H2O acidic salt H3PO4 + 2H2O acidic salt H3PO4 + 3H2O neutral salt NaH2PO4 + 3H2O neu → sodium dihydrogen phosphate Na2HPO4 → disodium hydrogen phosphate 28. Tinning B. Example: Water changes to ice at 0°C under normal atmospheric pressure. 4.4 Laboratory preparation of carbon dioxide Laboratory preparation of carbon dioxide cover which is further divided into five distinct layers. True 9 Element 'Z' A B C 10 18 8 Electronic configuration 2, 8 2, 8 4, 8 2, 6 Hence, C is chemically reactive. This is also called skeletal E equation. In summer vacation, one day they wanted to prepare some snacks for eating. During acid rain, the nitric acid formed as a result of lightening process in very dilute form is washed down to earth and reacts with metal carbonates to form nitrates. Freezing point: Water freezes to ice at 0°C under normal atmospheric pressure, i.e., 76 cm of Hg. 3. Which among the following is an element? If the formula of its (a) phosphate (b) hydrogen phosphate (c) chloride 31. Chile salt petre and nitre are sodium nitrate and potassium nitrate, respectively. Coating with oil, grease D. Mercuric nitrate () e. If X- ion has 10 neutrons and 9 protons, then the electronic configuration of the element X is (a) 2, 8, 8 10. In this way, the entire water undergoes evaporation leaving behind fat particles which are converted into powder by adding other ingredients. When a wet cloth is placed on the forehead, water present in the cloth slowly undergoes evaporation, and hence, temperature of the body decreases. h I N T s a N D e x p L a N aT I O N 7. (a) sodium hydroxide (b) calcium hydroxide (c) magnesium hydroxide For Hints and Explanations, please visit: www.pearsoned.co.in/IITFoundationSeries CONCePT APPLICATION Level 1 Directions for questions from 1 to 10 State whether the following statements are true or false. Example: Sn+4 4 O-2 2 2 4 SnO2 5. The formula of chloride of a metal is MCl2. Three elements form their respective oxides A, B and C. Chile salt petre is used in the manufacture of . A mixture of chalk powder and ammonium chlo8. (a) Both A and R are true and R is the correct explanation for A. Sand is left behind in the basin. Hazards caused by carbon monoxide: As the percentage of CO increases in the atmosphere, it affects the respiratory system. The process is decantation as mud being heavier than water settles down at the bottom due to gravity and separates from water. Both Chile salt petre and nitre are used in the manufacture of gunpowder, fertiliser and glass. Litmus when added to an acidic solution gives red colour. Chloroflouro carbons () b. 4HNO3 - 4NO2 + 2H2O + O2 18. The atmosphere holds the air we breathe, moisture and dust particles which are associated with natural processes like formation of clouds, precipitation, etc. Different methods are adopted for the separation of 2, 8, 1. Deliquescent B. Note: This method is not used for laboratory preparation because the rate of evolution of O2 is slow and strong heating is required. 1. Neutralising action. Neela stored the pickle in a tin-coated iron vessel, whereas Leela stored her pickle in a glass vessel. Helium Column B () a. Troposphere (a) The layer of atmosphere which begins at the earth's surface and extends up to 20 km height is called troposphere. B → b Sawdust and water can be separated by filtration. a Acids, Bases and Salts 3.27 Match the following 41. heating gives 4. The acid containing more number of oxygen atoms is called ic acid (Table 3.3). 302 () c. Table 3.11 Comparitive study of acidic and basic salts 1. Liquid oxygen is used for burning fuels in rockets and space ships. (c) millions of molecules of water. xample: During melting of ice, solid ice melts to liquid water. They give the reactions for questions from 1 to 15 Select the correct alternative from the given choices. (i) O2 (ii) SO2 (iv) P2O5 Air and Oxygen 7. False 9. (a) When Fe is exposed to humid air for a long period of time, it gets rusted. The difference between the mass number and the atomic number of neutrons. R eaction with metal oxides: Oxides of less reactive metals react with hydrogen to form the corresponding metal and water. equation. The clear water above it is gently poured off into another beaker with the help of a glass rod. Ammonium chloride undergoes sublimation and Which of the following is a heterogeneous 3. A - e B-c C-b D-a 40. (a) dilute sulphuric acid (b) concentrated sulphuric acid pRACTICe QUesTIONs Directions from 1 to 12 Select the correct alternative from the given choices. states of matter. (a) soda water (b) lime water (c) common salt (d) sugar solution 17. a AssessmeNT Test 1 1. b 19. SO2 when dissolved in water forms sulphurous acid (H2SO3) Test for SO2: When SO2 gas is exposed to acidified potassium dichromate paper, the paper turns green. Basic building block of the matter 39. (d) sublimation, sedimentation and decantation. Atomicity of Element The number of atoms that constitute a molecule of an element. Mass number, (A) = 20 + 20 = 402, 8, x = 3 = x - 22 A B C Atomic numbers 10 18 8  $\Rightarrow x = 6$   $\therefore X \rightarrow 2$ , 8, 8 and  $Y \rightarrow 2$ , 8, 6 12. Ca (OH)2  $\rightarrow$  CaO + H2O (X) Ca (OH)2 HCl -> CaCl2 + H2O (Y) CaO is hygroscopic in nature, absorbs moisture and remains in solid state. Name any two inert gases present in atmosphere of oxygen. Number of atoms on either side of a chemical equation is balanced by keeping appropriate coefficients and not by changing the subscripts of the elements in the formulae. The atmospheric pressure is maximum at and is found to be equal to . Anhydrous CaCl2 FigurePurification 4.5 Purification of hydrogen gas of hydrogen gas Collection of purified hydrogen gas: To obtain pure and dry hydrogen, pure hydrogen gas is collected over mercury. Key Ideas After completing this chapter, you should be able to: • define terms such as acids, bases, indicators, acidity, basicity, etc. Clogging drainage B. 1.3 Chapter 1 Table 1.3 Comparative study of evaporation It is a slow process It takes place from the surface of a liquid The temperature of the remaining liquid decreases during evaporation It can take place at any temperature of the liquid that is undergoing boiling remains constant Every liquid has a fixed boiling point at a particular pressure Factors Affecting the Rate of Evaporation Surface area: The rate of evaporation of a liquid is directly proportional to its surface area. Ca(OH)2 in an example of (a) monoacidic base (b) diacidic base (c) triacidic base ( Water gas, coal gas, semi-water gas, etc. (a) zinc (b) copper (c) aluminium (d) iron 16. Smelling salt 31. d 3. (b) A2B (a) B2A (d) AB (c) AB2 15. (iii) The mixture is poured gently into the filter cone and collected into another beaker which is called a filtrate. 28. Sulphur on heating with oxygen gives sulphur dioxide which on further reaction with oxygen gives sulphur trioxide. When these surface molecules are exposed to atmosphere, they gain energy and escape into atmosphere. Predict the electronic arrangements of M and X assuming that M has three occupied shells and X has two occupied shells. True 4. b 10. Thus, the constituents of gunpowder are separated. It reacts with colourless nitric oxide to form reddish brown fumes of nitrogen dioxide. (ii) The moisture and dust particles present in air help in formation of clouds. Step I The number of times an element occurs on both sides is counted. Nitrogen Carbon dioxide Nascent hydrogen Directions for questions from 30 to 49 Answer the following questions. It provides \_ towards litmus. Hence, UV radiations reach tropospheric layer and cause many undesirable effects like skin cancer, cataract, damage to plants and crops, etc. Examples: Coconut oil and water. During the summer vacation, Arjun's enough temperature for nitrogen and oxygen to combine to form nitric oxide. This etc. Give reason. Oxygen is \_\_\_\_ Mention four important properties of salts. Define atomicity. They remain in the gaseous state in the atmosphere and are known as noble gases. Nitrogen () b. Acids and bases can also be classified on the basis of basicity of acids and bases can also be classified on the basis of basicity of acids and acidity of bases (Tables 3.4 and 3.5). The electronic configuration of the element is K 2 L 8 M 8 N 2 Therefore, the state. H2PO4-1 M+2 M(H2PO4)2 (iii) The valencies of zinc and oxide have common factors, and hence, they are divided by the highest common factor. (a) formation of clouds. Table 1.4 Comparative study of atomic number is 20. c ANsWeR KeYs Test 2 1.26 Chapter 1 CONCepT ApplICATION Level 1 True or false 1. Non-metals usually exist in metals and non-metals Property State Melting and boiling points Hardness Density Conductivity Metals Non-metals Solids at room temperature Mostly gases Exceptions: Some of the solid liquids non-metals are carbon, sulphur, phosphorus, iodine, whereas bromine is a liquid non-metal Very high melting and boiling points Low melting and boiling points. (a) (b) (c) (d) petrol 5L petrol 5L petrol 5L petrol 5L petrol 5L (X) (Y) (Z) X Y Z Cannot be predicted. Nitrogen dioxide present in the atmosphere does not contribute to acid rain. PRACTICe QUESTIONS 1. A  $\rightarrow$  b Sodium is an element as it is made up of same atoms B  $\rightarrow$  c NaCl is a compound because it is made up of sodium and chlorine in a fixed ratio by mass C - d Sulphur in water is a heterogeneous mixture 44. Helium has a duplet configuration. 4.15 4.16 Chapter 4 Table 4.9 Removal of impurities associated with hydrogen gas Impurities (a) AsH3, PH3 (b) H2S (c) CO2, SO2, NO2 (d) H2O (water vapour) Substances used for removal Silver nitrate solution Lead nitrate solution Caustic potash CaCl2 or P2O5 (drying agent) Pure hydrogen AgNO3 sol. As evaporation causes cooling, decrease in temperature in case of alcohol is more. Column B A. Give common names of sodium hydroxide and potassium hydroxide. Natural gas contains methane as the major constituent. He kept both the common salt and sodium chloride in two different watch glasses and left. Tartaric acid is a component of baking powder. True 6. (a) chemical displacement (b) chemical displacement (c) double dis 4.11 Physical properties of hydrogen Physical properties Odour Solubility Density Action on litmus Liquefaction Diffusion Description No characteristic odour for pure hydrogen. Pure HNO3 is colourless, however, it gradually becomes yellow on standing due to . Mention different types of combination reactions with examples. Sugar gets charred when treated with conc. Thus, iron exhibits variable valency. Hence, it is a deliquescent substance. 23. The conversion of a liquid to its solid state on cooling is called . Which among the following is a bad conductor of electricity? (d) rust powder and lime. The N shell has one electron less than the K shell. False 7. ecules possess high kinetic energy and as a result they easily escape into atmosphere, i.e., the rate of evaporation is more. For example, CuSO4.5H2O is blue in colour as it forms white- Acids, Bases and Salts coloured anhydrous CuSO4. D-a Iron trunks and sanitary pipes are coated with zinc to prevent corrosion. Which among the following pairs of substances has strong intermolecular forces of attraction? Mention the action of oxygen with the elements sulphur, phosphorus, sodium and magnesium. (d) it is at very high altitudes. Global warming () e. The other indicators used are litmus, methyl orange and phenolphthalein. Combustibility: As oxygen does not burn on its own, it is a non-use of attraction? combustible gas. Identify the atomic numbers of the pair of electrons in the L and M shells. In a neutralisation reaction, one H+ ion of acid is neutralisation reaction, one H+ ion of acid is neutralisation reaction. CuSO4 B. (b) When a perfume is sprayed on hand, we feel cool. Nature Hence, changes blue litmus to red. Column A (A) Neon (B) Oxygen (C) Potassium (D) Boron (E) Silicon 7. Assertion (A): Copper exhibits variable valency. Reason (R): HNO3 undergoes decomposition and forms NO2. 3.7 3.8 Chapter 3 Types of Salts 1. variable valency 18. All other radicals are negatively charged. Strong acids and strong bases: The acids and bases which undergo complete ionisation when dissolved in water and furnish large concentration of H+ or OH- ions, respectively are called strong bases. Intermolecular space is maximum in gases. Supplied and strong bases which undergo complete ionisation when dissolved in water and furnish large concentration of H+ or OH- ions, respectively are called strong bases. strength. It turns lime water milky and when excess CO2 is passed through the solution, precipitate formed disappears. However, there are some charged species which contain more than one element. This eBook may or may not include all assets that were part of the print version. This excessive intake of oxygen by a person affects and leads to several problems like nausea, dizziness, etc. Tin does not react with the components of food material while Zn reacts and leads to spoilage of food. To ensure high level of accuracy and practicality, this series has been authored by a team of highly qualified teachers with a rich experience, and are actively involved in grooming young minds. Synthesis of ecofriendly chemicals. Derivation of Formulae of Compounds from the Constituent Radicals Whatever be the valencies of the constituent radicals, a chemical compound is always electrically neutral. These impurities have characteristic colours and retain these colours in diamonds, hence, naturally occurring diamonds are found to be in different colours. (b) of the absence of atmosphere. Thus, CaCl2 solution formed does not allow the dust particles and other suspended particulate matter to rise. The atomic number of an element is denoted by the symbol Z. 11. Distillation () a. B does not cause water pollution and its presence in water is essential. Freezing Column B a. Generally, antacids used are magnesium hydroxide and aluminium hydroxide. The energy of the orbit increases with the increase in distance from the nucleus. Assertion (A): Many fuel gases contain hydrogen as a major constituent. Table 3.13 Naming of salts of oxyacids Formula of acids H2SO3 Formula of bases KOH H2SO4 NaOH H3PO4 NaOH Formula of salts K2SO3 KHSO3 Na2SO4 NaHSO4 NaPO4 Na2HPO4 NaH2PO4 Name of the salts Potassium sulphite Potassium hydrogen sulphate Sodium hydrogen sulphate respectively. (a) NaCl + AgNO3  $\rightarrow$  (b) Zn + HCl  $\rightarrow$  59. 2Cu(NO3)2. 66. (a) chemical combination of O2 and H2O. Hence, artificial satellites are used for television transmission. 1 in water Highly Solubility increases with increase in pressure the temperature risesSolubility from -60°C to equator -15°C. Catalytic converter contains catalysts such as platinum on ceramic comb which convert harmful gases to less harmful gases, such as CO to CO2 and oxides of nitrogen to nitrogen. B  $\rightarrow$  c Na2CO3.10H2O is an example of efflorescent substance. (i) (ii) (iii) (iv) HBr + NaOH  $\rightarrow$  NaBr + H2O H2 + Br2  $\rightarrow$  2HBr 2NaCl  $\rightarrow$  2Na + Cl2 2NaBr + Cl2  $\rightarrow$  2NaCl + Br2  $\rightarrow$  2HBr 2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2NaCl  $\rightarrow$  2Na + Cl2  $\rightarrow$  2NaCl  $\rightarrow$  2NaC antacid pair? 2.15 2.16 Chapter 2 Metal reactivity series Potassium Sodium Calcium Magnesium Aluminium Zinc Iron Nickel Tin Lead Hydrogen Copper Mercury Silver Gold Platinum K Na Ca Mg Al Zn Fe Ni Sn Pb H Cu Hg Ag Au Pt (Most reactive metal) Reactivity decreases (Least reactive metal) The more reactive metal displaces the less reactive om its compound. Nitrogen exists in a free state in the atmosphere. Mention the general methods of preparation of CO2 along with the chemical reactions. Explain. (1) acetic acid and ammonium hydroxide (2) oxalic acid and barium hydroxide (3) phosphoric acid and aluminium hydroxide (4) barium oxalate ( aluminium phosphate (a) 14365 (b) 321645 (c) 143526 (d) 341526 Directions for questions from 29 to 31: Match the entries given in Column B. Explain different methods adopted to prevent rusting. X shows uninegative valence. Electronic configuration of neutral atom is L 8 X K (1) Number of valence electrons 8. H3PO4 D. Nascent hydrogen can be used as a rocket propellant. Mention any four physical properties of CO2. 'B' can be CO2 since it does not cause acid rain. In 1762, Henry Cavendish for the first time established the elemental nature of hydrogen. In rainy season, humidity is more. Water vapour changes to water c. (d) The constituents of a compound and a mixture can be separated by physical and chemical methods, respectively. The mass number of carbon is 12. Pure nitric acid on standing for long turns yellow due to its decomposition and the formation of NO2, which imparts yellow due to its decomposition and the formation of soluble salts (b) strong acid (c) good electrolyte (d) good dehydrating agent 10. monobasic 12. X is less reactive and is used to preserve food material, while Y is required for combustion. (b) filtration and sublimation. Germanium has the properties of metals as well as non-metals, hence, it is a metalloid. d 27. elementsText: concepts are compounds and mixtures and also compare metalsexplained in a well compounds and mixtures and also compare metals In the earlier classes, we have learnt that air is a diacidic base. S5. Ca(OH)2 furnishes 2OH- ions in aqueous solution, therefore, it is a diacidic base. Name two metal carbonates from which carbon dioxide cannot be prepared by heating. 32. From 4°C to 0.91 g/cc (ice) 0°C, water undergoes expansion while all other liquids 0°C 0.97 g/cc (water) undergo contraction. While in the thermosphere is not enough to produce friction for the meteorites to burn. 64. H2SO4 is used in the manufacture of fertilisers. d 15. PRACTICe QUeSTIONS 6. The difference in the number of electrons between the K and L and L and M shells is the same for an atom of an element X (M shell is the valence shell). c 7. During boiling of milk, the fat particles being lighter than water rise up when some amount of water vaporises. (b) It holds 19 per cent of the atmospheric gases. Assertion (A): When carbon dioxide gas is passed through lie water, lime water is turned milky. No chemical reaction takes place during the formation of a mixture and all the constituents of the mixture retain their properties. Methyl orange turns lime water . Which among the following is true regarding aqueous solution of sulphur trioxide and sodium oxide? metal 5. Carbon fibre, a recently developed allotrope of carbon is ductile and has high tensile strength. Calcium hydroxide on heating gives a solid product X and on treatment with hydrochloric acid gives another solid product Y. AB + XY  $\rightarrow$  AY + XB () c. Electronic arrangement is 2, 2. Identify the correct sequence of the reactions. Ultimately, the aim is to ingrain the art of problem-solving in the mind of the reader. Atmosphere also protects us from harmful radiations. Evaporation 20. (b) The proportion of constituent elements in a compound is fixed. 'Y' is neutral since it does not respond to either red or blue litmus. X-2H+1 = XH2 13. Later, experiments carried out by scientists like J. Air and Oxygen Delivery tube H2O2 Thistle funnel Thistle tap Oxygen Gas jar Conical flask Water Beehive shelf MnO2 Figure Laboratory 4.2 Laboratory preparation of oxygen from HO2 2 Experiment: MnO2 is taken in a clean and dry conical flask. Table 2.3 Elements with symbols derived from their foreign names Name of the element Sodium Potassium Iron Copper Silver Gold Mercury Lead Tin Antimony Tungsten Parent name Natrium (Greek) Kalium (Latin) Ferrum (Latin) Argentum (Latin) Argentum (Latin) Argentum (Latin) Argentum (Latin) Argentum (Latin) Stannum (Latin) Stibium (Greek) Wolfram (Greek) Wolfram (Greek) Wolfram (Greek) Wolfram (Greek) Wolfram (Greek) Kalium (Latin) Argentum (Latin) Ar its nomenclature. In 100 L of air, volume of nitrogen = 78.10 L 78.1 × 750 Volume of nitrogen in 750 L = 100 = 585.75 L Volume of oxygen in 750 L = 100 = 157.5 L Volume of CO2 in 750 L = 100 = 0.225 L = 225 mL 27. in contact H2SO4 further. What type of reaction is this? However, a mixture of two or more liquids may be homogeneous or heterogeneous depending on the nature of liquids. Which of the following elements is chemically inactive? Oxygen gas is called acid former. Identify X and Y. The various other uses of CO2 are given below. Glass and plastic do not react with the components of pickle. Examples:  $4Na + O2 \rightarrow 2Na2O$  Na $2O + H2O \rightarrow 2NaOH$  2Mg + O2  $\rightarrow 2MgO$  MgO + H2O  $\rightarrow 2MgO$  + H2 change. (a) hydrogen chloride (b) bromine (c) fluorine 34. • learn about diff erent kinds of matter likeerent elements these, air is theis most vital for lifeinto and hence indispensable. Liquid Va 1.4 Sublimation Condensation Solid Gas calledSchematic representation representation of matter If the matter is made up of identical molecules, it is pure substance. For some elements, the symbols are derived from their Latin, Greek or German names. Solids have many free surfaces because the molecules have only vibratory motion, and hence are fixed. The term, acid, (derived from 'acidus' [Latin] used for expressing sour taste) has been given to the substances which are responsible for the sour taste of the food materials discussed earlier. Increase in the levels of these gases results in gradual increase of temperature of earth's surface. The hydroxides of metals are also basic in nature. heavier than air and is highly soluble in water. Acidic and double salts among the following are respectively (a) potash alum and sodium phosphate (b) sodium dihydrogen phosphate (c) Mohr's salt and calcium hydroxy chloride. X + Y → XY B Certain gaseous molecules present in the atmosphere absorb the infrared radiation (IR) and re-radiate the heat in all directions. Pearson IIT Foundation series ?This is an indispensable companion for all aspirants aiming to succeed in key entrance examinations, like Joint Entrance Examination (JEE), National Talent Search Examination (NTSE) Olympiads-Junior/Senior/International, Kishore Vaigyanik Protsahan Yojana (KVPY), etc. Car batteries () d. Then, X and Y may be, respectively (a) blue vitriol and limestone (b) blue vitriol and baking soda (c) nitre and limestone (d) nitre and limestone (d) nitre and limestone (d) nitre and limestone (d) nitre and limestone (b) blue vitriol and baking soda (c) nitre and limestone (d) nitre and limestone (d) nitre and limestone (d) nitre and limestone (b) blue vitriol and limestone (c) nitre and limestone (d) nitre and limestone reducing agent C. Antacid pair among the following is (a) Mg(OH)2, NaOH (b) Mg(OH)2, Al(OH)3 (c) KOH, NaOH (d) Al(OH)3, NaOH 34. (c) is the same in both coastal areas. The electronic configurations of X and Y are, respectively (a) 2, 8, 2 and 2, 8, 6 (b) 2, 8 and 2, 8, 8 (d) 2, 8, 8 and 2, 8, 8 (d) 2, 8, 8 and 2, 8, 8 (d) 2, 8, 8 and 2, 8, 8 PRaCTICE QUESTIONS 12. d 23. Why do metals form cations and non-metals form anions? 50. (d) 1 molecule of hydrogen and 1 molecule of hydrogen and 23 per cent by volume and 23 per cent by mass of the total air. Hints and and Explanation distillation. As ice gets converted to water at 0°C its density increases and this trend continues till the temperature rises to 4°C. NH4OH + HCl → NH4Cl + H2O Ammonium Ammoni and as a result the water level slightly rises in the glass jar. Pollination 8. Yellow () c. After returning home, Vish looking at the bulb keenly asked her father. As we move to higher altitudes, fountain ink pen leaks out because of lower atmospheric pressure. What is the difference between an element and a compound? Molecules of different elements and a compound? may contain different number of atoms. c. Matter can undergo transformation in two different ways as follows: 1. Therefore, the bases are named by suffixing oxide term to the positive radical. Above this, temperature increases with height due to the absorption of highly energetic UV radiations. As a result, explosion takes place. Process: The mixture of iron filings and sand is taken in a flat vessel. a 38. (c) a solid to its liquid state at the melting point of the substance. Identify the ratio of the substance. Identify the ratio of the substance. Identify the ratio of the substance is thermally decomposed. Calculate the ratio of oxygen atoms present in their corresponding sulphates. C o a Conc. Nascent hydrogen can be replenished by using Kipps apparatus. Pure substances are made up of identical molecules, and hence, are homogeneous in nature. Hydrochloric acid is used to clean the metal surface before the metal surface is subjected to galvanisation. d ASSeSMeNT TeST Test 1 1. In order to counterbalance these forces of attraction, the electrons should be in a continuous motion around the nucleus. able to: to:in a the essential able points defineetc. A mixture of two solids is generally \_ while a mixture of any number of gases is \_ . It is denoted by the symbol A. This built up of other gases and suspended particulate 4.19 4.20 Chapter 4 matter is toxic to organisms living on the earth's surface. • learn the cause, effect and different measures to curb air pollution. The electronic configurations of X and Y are, respectively. List out the important uses of CO2. What is atmosphere? (e) Atomic hydrogen torch: When an electric arc is generated in a stream of hydrogen between tungsten electrodes, the hydrogen atoms by absorbing large amount of energy. It is considered as an air pollutant as it results in global warming. solution The gases such as NO2 and SO2 are released in the atmosphere through factory chimneys. c 21. Sublimation of camphor is a physical change. Z on treatment with higher oxide of carbon A gives a milky white precipitate B. (b)  $AB \rightarrow A + B$  (c)  $AB + C \rightarrow CB + A$  (d)  $AC + BD \rightarrow AD + BC$  (a) cadb (b) bacd (c) bdac (d) acbd 5. Rate of evaporation is directly proportional to the surface area of the liquid and temperature, and is inversely proportional to humidity. Nitric acid is a good oxidising agent. In order to identify the neutralisation point, during the experiment, certain substances are added which show different colours in acidic and basic solutions. (b) is more in non-coastal areas than in coastal areas. (X) The electronic configuration of the neutralisation point, during the experiment, certain substances are added which show different colours in acidic and basic solutions. the dinegative ion with 8 electrons in the M shell is K 2 L 8 M X (Y) K 2 L 8 M 6 8-2 1 = 8- X 1 8-X=8-2 X=2 Stable ion of X is X+2 and of Y is Y-2. Discovery of isotopes proved that atoms of the same element may possess different atomic weights, i.e., atoms of same elements may not be identical in all respects. Nature: It is a colourless, odourless, odourless and tasteless liquid. 2Al(OH)3 + 3H2SO4 → Al2(SO4)3 + 6H2O Aluminium sulphate 24. As a result, camphor pellets should be preserved in airtight containers. 74. \_\_\_\_\_\_ show the properties of metals and nonmetals. (c) B y enamelling: The process of coating of mixture of silicates on the surface of iron, at high temperatures is called enamelling. When elements react, the atoms may combine in more than one simple whole number ratio. 3. Complex organic reactions to form varied products. (b) Increase in frequency of floods, soil erosion unseasonal rains, etc. Salt used in purification of water is (a) potash alum (b) epsom salt (c) green vitriol (d) blue vitriol 12. Laboratory method of Preparation (a) Decomposition of hydrogen peroxide in the presence of a catalyst, i.e., manganese dioxide (MnO2) undergoes decomposition to give water and oxygen at room temperature. Hydrogenation of oils: Vegetable oil, which contains carbon and oxygen in greater percentage and contains less amount of hydrogen, cannot be solidified easily due to less percentage of hydrogen. Distinguish between an acid and base with respect to definitions. Petrol is a highly volatile liquid and undergoes evaporation, which causes cooling. Graphite is a non-metal and is a good conductor of electricity. surroundings. Which among the following metal is used in alloying of iron to prevent corrosion? Iron is associated with impurities like oxides and carbonates on its surface. Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's nother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk and after some time, she told Usha, Asha's mother asked her daughter Asha to boil the milk asked her daughter aske sa po tin ee Co el n ris M Matter can also be classified based on its composition in the following way irrespective of the state in which it exists. The outermost shell is called rust. 'ic' acid of sulphur with four oxygen atoms is H2SO4 3. However, TV waves do not get reflected. (a) palmitic acid (b) acetic acid (c) carbonic acid (d) hydrochloric acid 21. Hence, the electronic arrangement in scandium is 2, 8, 9, and 2. e. (d) Liquid hydrogen is used as a rocket fuel. Air and Oxygen S + O2 → SO2 (iv) P2O5 appears as dense white fumes when phosphorus is burnt with oxygen. Hence, a second mixture may be either homogeneous or heterogeneous. Y reacts with a neutral oxide and evolves Z which is composed of reddish brown fumes which turns moist blue litmus red. The most convenient way of separating sawdust from water is (a) distillation (b) evaporation (c) filtration (d) sedimentation and decantation 19. metal carbonates are treated with dil acids. Non-metal with electronic configuration 2, 8, 6 is sulphur. Acids, Bases and Salts Examples: (i) Sodium potassium carbonate (NaKCO3) (Na+, K+ and CO3-2 radicals) (ii) Bleaching powder (CaOCl2) (Ca++, OCl-, Cl- radicals) 6. However, in 1674, Mayow predicted that air consists of two components, and active component and an inactive component. xamples: Ferrous sulphate is green, aqueous copper sulphate is blue and potassium dichromate E is orange red coloured. Tripositive ion of an element has 13 protons and 14 neutrons. Certain statements which describe different types of salts are given below: (1) Two basic and one acidic radicals are given below: present in one molecule of this salt. Actual concentration of H+ or OH- ions in an aqueous solution of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of an acid or base, respectively depends upon the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furnished by one molecule of the number of H+ or OH- ions furn Among the following, a pair of a compound and an element respectively is (a) iron powder and rust powder. (ii) Thermal 2KNO3 - 2KNO2 + O2 † decompose to give metal nitrates in the first shell is called if the first shell is the valence shell. However, ozone formation in aqua purifiers makes drinking water pure and safe. 2. Electrolyte. Liquid hydrogen 15. They float on the surface of water. (a) zinc (b) tin (c) aluminium (d) chromium 31. (nitric acid/nitrous acid) Directions for questions from 21 to 38 For each of the questions, four choices have the mixture. D  $\rightarrow$  a In freezing process, water changes into ice. While showing some common salt. The charge on the ion is corresponding to the number of electronse, water changes into ice. lost or gained. However, a chemical equation should be written based on the principle that atoms can neither be created nor destroyed. Property exploited in the usage of perfumes is \_\_\_\_\_\_. If a dispositive ion of an element X consists of 12 protons and twice the number of electrons of dispositive ion X is the number of neutrons of Y, then, the mass number would be in the ratio of (a) 1 : 2 (b) 3 : 5 (c) 12 : 19 (d) 2 : 3 2.25 2.26 Chapter 2 (a) 2, 8, 8 and 2, 8, 8 (b) 2, 8 and 2, 8, 8 (c) 2, 8 and 2, of carbon and sulphur. b 5. d 6. A → b, c, e B → d, e C→a D→c 4.37 40. (c) effervescence is observed in case of Y but not X. (b) tin is having high reactivity towards food components. These salts undergo complete dissociation in their aqueous solutions. (b) Ripening of fruits. Example: Benzoic acid Sour - Soluble in water Bases Bases are colourlessed in case of Y but not X. except the hydroxides of iron and copper Bitter Slippery Some bases are soluble in water 3.5 3.6 Chapter 3 Some Important Chemical properties of acids Reactions Reactions Reactions Reactions with metals: Some metals displace hydrogen from strong acids (HCl H2SO4, etc.). Examples: NO and CO. (a) A mixture of water and sugar. Arrange the methods of preparation in the order of the substances given. (i) Identification of the atomic number and the mass number of the given element. Ozone present in plays a vital role in protecting the life on earth surface from harmful UV rays. A, B, C and D are four layers of atmosphere. (b) No new substance is formed.  $2KNO3 \rightarrow 2C + O2 \rightarrow SO2 C + O2 \rightarrow SO2 \rightarrow SO2 C + O2 \rightarrow SO2 \rightarrow SO2 C + O2 \rightarrow SO2 \rightarrow SO2 \rightarrow SO2 \rightarrow SO2 \rightarrow$ and 10 electrons. c 4. A metal M shows variable valencies 2 and 3. Such salts are called basic salts. (b) A mixture of sawdust and water is taken in a beaker. (c) sublimation and distillation. D  $\rightarrow$  b, c Nascent hydrogen acts as a good reducing agent. In the above processes of separation, the mixture taken consists of only two components. The characteristic reaction involved in the scrubber is (a) neutralisation (b) oxidation (c) reduction (d) combination followed by decomposition 10. Troposphere is extended up to 6-20 km altitude from the earth's surface but the amount of oxygen is less at higher altitudes, i.e., on mountains or hill tops. Formula M4X3 corresponds to M+3 X-4. The protonsection 10. Troposphere is extended up to 6-20 km altitude from the earth's surface but the amount of oxygen is less at higher altitudes, i.e., on mountains or hill tops. Formula M4X3 corresponds to M+3 X-4. The protonsection 10. Troposphere is extended up to 6-20 km altitude from the earth's surface but the amount of oxygen is less at higher altitudes, i.e., on mountains or hill tops. and neutrons are present in nucleus. A group of atoms possessing either positive or negative charge is called radical. (c) colour only. Percentage composition: chromium - From 12 to 20 per cent Examples: Surgical instruments, tools, utensils, cutlery, etc. Cobalt chloride is a hygroscopic substance, and hence, absorbs moisture and forms pink coloured hydrated cobalt chloride without undergoing any change in its state. (monobasic/ dibasic) 12. ( ) g. Mortar is a mixture of calcium hydroxide, sand and water. burns in oxygen with a brilliant golden yellow flame. Both evaporation and boiling involve the conversion of the same state of matter, but these two phenomena can be differentiated based on the way they take place (Table 1.3). This signifies that the electronic configuration is 2, 8, 6. Generally, most of the non-metals form two types of oxyacids. Gas to liquid b. (d) Both A and R are false. C-b Engine parts are periodically coated with oil grease to have durability. CO2 is dissolved in water at high pressure. (a) distillation (b) evaporation (b) A mixture of water and common salt 9. Identify the container and give reasons in support of your answer. Non-metals possess 4-7 electrons to form negative ions called anions. 67. b 11. b 12. A student named Vivek asked the teacher, What would happen if the percentages of nitrogen and oxygen were interchanged in the atmosphere? Mercuric nitrate is a \_salt. Hydrogen is present in various carbon compounds in the form of proteins, nucleic acids, vitamins, hormones, enzymes, etc., in plants and animals. (e) If the radicals contain more than one atom, they are enclosed in brackets and the appropriate valency (more than one) written as subscripts outside the bracket. MqSO4 7H2O () c. Pure substances are further classified into elements and compounds. What is intermolecular force of attraction? Identify the odd one among the following with respect to tensile strength as well as ductility. Hence, no liberation of hydrogen gas. solidification 9. The process of separation (d) none of the above 28. CO2 + H2O → H2CO3 33. These flames easily melt the metals, and hence, used for cutting or welding them. Sea water is a mixture of large number of salts and water. Among the following, the strong acid is (a) phosphoric acid (b) carbonic acid (c) sulphuric acid (c) sulphuric acid (d) acetic acid 2. b 16. Two atoms of hydrogen and one atom of oxygen combine chemically to form a molecule of water. Explain with appropriate reasons. (a) Passing of steam over red hot coke. Identify the false statement among the following. Compound is a substance which is formed due to the chemical combination of two or more elements in a definite proportion by mass. solution All acids react with alkalies to form salt and water. Process: A mixture of sand and water is taken in a beaker and allowed to stand for some time. If the salt contains hydrogen, then hydrogen is added to the suffix (Table 3.12). Since Na+ and Cl- ions carry opposite charges, a strong force of attraction binds the two ions together. After these two liquids were poured, water drops on the inner walls of X were observed but no mercury drops in Y were seen. Hence, its corresponding hydride is X-3 H+1 = XH3 3. (iii) Oxygen turns alkaline pyrogallol brown. Why is Chile salt petre used in the manufacture of gunpowder? structured and lucid Our is divided five from layersthe onearth the and basisthe of region variations chemical composition, Carbon dioxide which atmosphere becomes thinner with into distance above in the manufacture of gunpowder? methods to separate the manner density, temperature at different heights from the surface of two or more gases are always homogeneous. Glucone-D is soluble in water, hence, it can be separated by distillation and water is collected separately. d 10. Since this trend is opposite to the 0°C 1 g/cc normal trend, this is called anomalous expansion of  $4^{\circ}C$  >4°C False ANsWeR KeYs Fill in the blanks 11. Evaporation  $\rightarrow$  NaCl + water, NaCl is soluble in 28. A substance which is formed by the chemical combination of two or more elements is called a Give two examples of metals which can exist in liquid state below 35°C. pRACTICe OUesTIONs Column A Column B Principle Procedure (A) Evaporation () (a) Purification of drinking water which contains suspended matter (B) Filtration () (b) Earthen pots (C) Sublimation () (c) Odonil used in a washroom (a)  $A \rightarrow a$ ,  $B \rightarrow c$ ,  $C \rightarrow b$  (c)  $A \rightarrow c$ ,  $B \rightarrow b$ ,  $C \rightarrow a$  (b)  $A \rightarrow c$ ,  $B \rightarrow a$ ,  $C \rightarrow c$  11. Ozone present in the troposphere is a major pollutant. 4.30 Chapter 4 10. S +  $O2 \rightarrow SO2$ ; SO2 +  $H2O \rightarrow H2SO3 SO2 + K2Cr2O7 H2SO4 \rightarrow K2SO4 + Cr2(SO4) + H2O$  green 3. Examples: A solution of sugar and water is a mixture in which sugar and water both retain their properties and can be separated by a simple physical process, i.e., evaporation. Draw the geometrical representation of sulphur. N2 + 3H2 2NH3 + heat (c) R eaction with sulphur: On reaction with molten sulphur, hydrogen gas gives hydrog coated with a layer of oil or grease which not only prevents rusting but also lubricates them. (a) Decomposition of HOCl on standing (b) Formation of hydrogen chloride from their constituent elements (c) Decomposition of limestone (d) Both 1 and 2 pRaCTICE QUESTIONS 21. Reason (R): Carbon possesses equal number of all three fundamental particles. One molecule of a dibasic acid furnishes two H+ ions, and hence, H2SO3 is a dibasic mineral acid which is also a weak acid. Stratosphere which extends up to 50 km above the earth's surface is called stratosphere. Hence, it is a dibasic acid. Exception: Carbon fibre, a recently developed allotrope of carbon Non-malleable and non-ductile Exception: Carbon fibres are ductile Non-sonorous Found in a free state as well as in the combined state Metalloids Metalloids are elements which show properties of both metals. Mixture of sand and water Level 2 Directions for questions from 1 to 11 For each of the questions, four choices have been provided. Nascent hydrogen is claimed to reduce nitrites to ammonia or arsenic to arsine even under normal conditions. Also give the names of radicals. Blue () e. Between H2SO4 and H3PO4, which solution possesses greater number of H+ ions in the given volume assuming that the number of both acids is equal? (a) NaCl (b) H2CO3 (c) CaCl2 (d) CO2 7. Among the following, identify an extremely corrosive alkali. (a) acid rain (b) nitrogen fixation by leguminous plants (c) lightening followed by precipitation. Laboratory Tests to Detect Oxygen 1. d 22. Why did Bunny say so? What happens when a paper soaked in acidified potassium dichromate is exposed to SO2 gas? Examples: Calcium chloride, mercuric nitrate, zinc chloride, etc. solution The different layers of atmosphere are (i) Troposphere (ii) Stratosphere (iv) Thermosphere (v) Exosphere (iii) and justify. Mineral acids react with metallic carbonate to form its respective metallic salt, . This is given by basicity of an acid, i.e., the number of H+ ions furnished by one molecule of acid and acidity of a base, i.e., the number of OH- ions furnished by one molecule of base. SO2 + H2O → H2SO3 Burns with dazzling, dense and green H3PO4 turns blue litmus paper P2O5 + 3H2O -> 2H3PO4 to red. The reaction of an acid with a base to form salt and water as the products is called neutralisation. Procedure Carbon disulphide is added to a white fumes  $4P + 502 \rightarrow 2P205 \text{ Ca}(OH)2 + CO2 \rightarrow CaCO3 \downarrow + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 \rightarrow K2SO4 + Cr2(SO4)3 + H2O 3SO2 + K2Cr2O7 + H2SO4 + K2Cr2O7 + H2O 3SO2 + K2Cr2O7 +$ gowder. Basic salt It contains replaceable hydroxyl ions. However, tin cannot react with acids present in food items. MgO + H2O  $\rightarrow$  Mg(OH)2 Sparkles and crackling sound are C + O2  $\rightarrow$  CO2  $\uparrow$  observed. Metals An element is made up of identical atoms, but the nature of the atoms is different in different element element is made up of identical atoms, but the nature of the atoms is different in different element element is made up of identical atoms, but the nature of the atoms is different in different element element is made up of identical atoms, but the nature of the atoms is different in different element element is made up of identical atoms, but the nature of the atoms is different in different element element element element is made up of identical atoms, but the nature of the atoms is different element elemen which invariably results in differences in their characteristics. • know the arrangement of molecules in three different states of matter. Boiling point is the temperature at which is converted to at one atmospheric pressure. (a) H2SO4 (b) Mg(OH)2 73. CO has 200-times more affinity for haemoglobin over oxygen and forms a stable compound called carboxy haemoglobin which causes suffocation and sometimes it is even fatal to human life. Reason (R): Hydrogen is inflammable. (a) 2, 8, 5 and 2, 8, 4 (b) 2, 8, 8 and 2, 6, 6 (d) 2, 8, 8 and 2, 6, 6 (d) 2, 8, 8 and 2, 8, 4 (b) 2, 8 Directions for questions from 11 to 20 Fill in the blanks. Table 4.10 Reasons for not using other metals for the preparation of hydrogen gas Metals Sodium and magnesium Aluminium Iron Lead Reason for not using violent reaction with explosion Expensive metals Formation of protective coating of Al2O3 that renders the metal passive Reversible reaction Formation of insoluble PbCl2 or PbSO4 stops the further reaction (ii) Industrial methods of preparation 1. Compounds (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) SiO2 CuS H2O2 BaO2 MgS NaAlO2 MnO2 LiH KMnO4 CaSiO3 CaF2 HOCl CaCO3 Positive radical 2.17 2.18 Chapter 2 solution Compounds (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (l) (m) SiO2 CuS H2O2 BaO2 MgS NaAlO2 MnO2 LiH KMnO4 CaSiO3 CaF2 HOCI CaCO3 Positive radical Si+4 O-2 Cu+2 H+ Ba+2 Mg+2 Na+ Mn+4 Li+ K+ Ca+2 Ca+2 H+ Ca+2 S-2 O2-2 S-2 AlO2- O-2 H- MnO4- SiO3-2 F-1 ClO- CO3-2 POINTS TO REMEMBER • • • • • • • • • • • ••• An atom contains a small central positive part known as nucleus. 2. Neutralisation Slightly soluble 1. Neutralising action on insoluble excess HCl produced in the stomach. (Na2CO3) is a Reason (R): Sodium retains its property in washing soda. CaCO3 + HCl  $\rightarrow$  CaCl2 + CO2 + H2O (X) (Y) 7. Example: red cabbage juice. If a non-metal forms only two oxides and one oxide on hydrolysis gives an acid, then the non-metal could be (a) sulphur (b) carbon (c) phosphorus (d) nitrogen 33. Zn + FeSO4  $\rightarrow$  () ZnSO4+ Fe Column B a. H2 + S  $\rightarrow$  H2S 3. Meteorites burn up in the mesosphere but not in the thermosphere. 4.21 4.22 Chapter 4 Prevention: Discovery of alternative substance for CFCs used is used for burning fuel in rockets and space ships.  $CO2 + H2O \rightarrow H2CO3 7$ . (c) physical change which involves sublimation. Identify the substance which continues to burn in an atmosphere of N2. vellow 8. What are indicators? This layer of fat becomes thick and  $CuSO4 + Mg \downarrow B CuSO4 + Ag \downarrow MgSO4 + Cu No$ in refrigeration and aerosols. reaction The blue coloured CuSO4 solution in test tube A disappears, and thus, a colourless solution of MgSO4 is formed. Fuels: Oxygen is essential for burning or combustion of fuels. The valence shell has 2n + 1 electrons where n is the number of electrons in the inner shell. N2 + O2  $\rightarrow$  2NO 2NO + O2  $\rightarrow$  2NO2 4NO2 + O2  $\rightarrow$  4HNO3 4HNO3 + MCO3  $\rightarrow$  M(NO3)2 + CO2 + H2O Leguminous plants contain symbiotic bacteria in their root nodules which absorb atmospheric nitrogen and convert nitrogen an principal products of combustion of glucose. Since air consists of an active component, i.e., oxygen, it oxidises tungsten filament or any other metal used as a filament. The constituents of a compound do not retain their properties, and hence, these cannot be separated by physical methods. In phosphide ion, the total number of electrons is equal to 12. After a few minutes, it is observed that these liquid dissolve in each other forming a homogeneous mixture. Examples: HCl HBr HI H2S Hydrochloric acid Hydrosulphuric acid The modern concept of atom envisages the following arrangement of fundamental particles in an atom: 1. Similarly, we are aware of the fact that on the basis of chemical composition, the substances are classified as elements, compounds and mixtures. (b) downward displacement of atom envisages the following arrangement of the fact that on the basis of chemical composition, the substances are classified as elements, compounds and mixtures. is coated with other substances which prevent the exposure of iron to humid air thereby preventing rusting. In most cases, the first letter of the element. The valency of helium is zero. Phenolphthalein is colourless in an acidic solution. Write the reaction taking place between solutions of two salts, AgZ and XCl. Identify the type of reaction. (a) sulphur dioxide (b) carbon dioxide (c) sulphur trioxide (d) nitrogen oxide 9. (e) mixture is filtered and hot water is added to the residue. Observation Mercury vapour condenses on the cooler parts of the test tube to form a mirror-like surface. in humidity increases rate of evaporation. A - c B-d C-b D-a 39. The methods of separation depend on the nature of constituents in the mixture. Furthermore, they cor- Hydrated copper sulphate - CuSO4.5H2O As hydrated sodium sulphate is efflorescent in nature, it loses water of crystallisation. The mixture of an iron filing and sand can be separately. What is the formula of plaster of Paris? Ca(OH)2 is used for white washing because of the formation of white coloured CaCO3 substance. Example: Ca+2, Cl-2. Compare solids, liquids and gases with respect to their physical properties. a 27. (a) 3, 5 (b) 4, 4 (c) 5, 3 (d) 4, 2 9. Calcium oxide is a hygroscopic substance which absorbs moisture without undergoing any change in its physical state. Why is the temperature in the peripheral area relatively lower than that in the heart of the city? pRaCTICE QUESTIONS 19. deliquescent 20. (a) to supply oxygen (b) to supply nitrogen (c) to decrease the rate of combustion (d) absorb temperature produced by combustion 7. pRaCTICE QUESTIONS 23. Separation of sawdust from water can be carried out by the following steps given below. The negative radical is formed from an acid used in soft drinks. Compare physical properties of metals and non-metals. Thermosphere (c) The temperature in this layer increases with height due to the absorption of high energetic radiations. According to the IUPAC system, the gas was named carbon dioxide. Formation of rust is a chemical change in which iron when exposed to humid atmosphere forms hydrated ferric oxide (Fe2O3. 1. Reaction with bases to form soluble salts. Distinguish between melting and boiling. components of a mixture of camphor, iron filings and sand, arrange the following processes in a sequence. petrol 5L (X) petrol 5L (Z) If X, Y and Z containers are placed at 25°C, then the rate of evaporation is more in . Various scientists proposed various ideas regarding the arrangement of fundamental particles in an atom which is called structure of an atom. Matter exists in different states at different ranges of temperature and pressure. Glucone-D is soluble in water; neous in nature. Which of the following can be used to reduce suspended particulate matter in atmosphere in mine areas? Find the atomic number of an element. An atom is electrically neutral due to the presence of equal number of positively and negatively charged particles. Write a short note on different types of salts. (d) tin shows corrosive action. X has two occupied shells K and L and the L shell must have 4 electrons. Formulae of sodium sulphate are, respectively and . Test 2 h I N T S a N D E x p l a N aT I O N X +1e-1 13. NH4Cl(s)  $-\Delta \rightarrow \rightarrow \rightarrow NH4Cl(g) \rightarrow 2CuO + 4NO2 + O2 + 6H 2O \Delta \Delta \Delta$ . • Indicators are used to identify the neutralisation point. Gunpowder is a mixture of KNO3, sulphur and coke. d 29. Explain in detail the modern structure of atom. An element X, in which the difference in electrons present in valence shell and penultimate shell is equal to the number of electrons present in the first shell, undergoes combustion to produce Y. Hence, blue colour of CuSO4 and brown-coloured solid copper is formed. Prevention: Iron is used to make different structures for varied purposes like the manufacture of machinery and tools for industrial purposes, construction of bridges, railway tracks and manufacture of furniture, bodies of cooking stoves, refrigerators, buckets, suitcases and other household goods. Reason (R): Copper loses two electrons from its valence shell and it can also lose one more electron from the second last shell. Sublimation () D. The ion may be monovalent, bivalent, trivalent and tetravalent which correspond to the valencies of 1, 2, 3, and 4, respectively. Active metals like Na and Mg react with carbon monoxide in trace amounts which is a harmful gas and also a supporter of combustion. Galvanisation (a) (b) (c) (d) 6. (a) nitrogen, nitrogen dioxide (b) sulphur, sulphur dioxide (c) phosphorus, phosphorus, phosphorus pentoxide (d) sodium, sodium oxide 17. Column A Reactants A. Name the compound thus obtained. Match the following 42. Arresting deforestation and increasing planting or greenery. Formula of potassium hydrogen sulphite is KHSO3. A mixture of two solids is generally heterogeneous while a mixture of any number of gases is homogeneous in nature. Chromium metal is used in the alloying of iron to prevent corrosion. Soft drinks: It is dissolved in soft drinks under high pressure so as to impart tangy taste. Mixtures Homogeneous mixtures Non-metals Figure 1.2 Classification of matter Heterogeneous mixtures 1.5 1.6 Chapter 1 Element An element is a substance which is constituted of only one kind of atoms and cannot be further divided by any physical or chemical means. pink 15. (c) perfume and odonil. Evaporation can be defined as the change of state of liquid to vapour from the surface of liquid at any temperature below its boiling point. 2.23 2.24 Chapter 2 (c) manufacture of milk powder from milk. (d) all the above floats on water. A → b Atomic number of chlorine is 17, electronic configuration is 2, 8, 7. During lightening, N2 combines with O2 to form NO which further reacts with O2 to form NO2. This gas dissolves in the water droplets of clouds and form HNO3. Write the electronic configurations of the following elements: 69. They have same number of electrons in the L shell which is the shell inner to the valence shell. • CO2 is essential for photosynthesis. Classification of Matter 1.29 Level 3 1. hence it is a sublimable substance. CO2 can be collected by the downward displacement of air. When it is heated, KNO3 undergoes decomposition to produce O2 and KNO2. Give the electronic configurations of their stable ions. Filtration () b. D. (d) sodium phosphate and Mohr's salt 5. Space ships: Liquid oxygen is used for burning fuel in the rockets and space ships. , an inert gas is used to fill weather observation balloons. Iron powder is an element. (1) 40 - 20 = 20 (2) 27 - 13 = 14 K 2 Element Valence shell 12. c 26. 14. d 18. Directions for questions for questions for action of nitric oxide Formation of nitric oxide For nitrogen dioxide Formation of nitric acid Formation of metal nitrates Match the following 38. (a) when iron is exposed to humid air for a long time? The components present in pickles are inert towards glass and plastics. 3.16 Chapter 3 (b) Persons suffering from acidity are given antacid tablets. Sand can be separated by sedimentation and decantation. pRaCTICE QUESTIONS Test 1 2.28 Chapter 2 (a) badc (c) bacd (b) bdac (d) abdc 4. Observation: The oxygen gas evolved passes through a delivery tube and then into the beehive shelf which is placed in a trough of water. Judicial use of natural resources. CO2, H2O 6. Although all active metals liberate hydrogen gas, zinc is the preferred metal and the other metals are not used for this preparation method. In an atom, the number of electrons is equal to the number of silence. NO2 is a reddish brown gas. (a) X is basic while X is acidic (c) Y is basic while X is acidic (d) Y is acidic while X is neutral pRaCTICe QUesTIONs 3. Fe2O3 CO + H 2 + H 2O  $\pm 450^{\circ}$  C  $- 500^{\circ}$  C  $- 200^{\circ}$  C acid rain. Y turns acidified potassium dichromate paper green. Example: Isotopes of hydrogen are protium (1H1), deuterium (1H2) and tritium (1H3). A normal salt like calcium carbonate do not contain either replaceable hydrogen ions or hydroxyl ions. Oxygen, an active component, is considered to be a supporter of life on earth as it is responsible . As the density of sodium is less than that of water, it floats on water. for carrying out the important processes like respiration and combustion. Atoms are of interconversion of matter Classification of Matter Example Earthen pitchers are more effective in Hyderabad than in Chennai. Name of the radical PO-34 is is used as a supporter of combustion in rockets and space ships. (c) A is true and R is false. 3.3 3.4 Chapter 3 Since all the acids and alkalies are soluble in water, the solutions of these substances formed by the dissolution of following oxides in water. Adhesive forces act between water molecules. Electronic configuration X is of 2, 8, 6. What is photolytic decomposition? Global warming 35. MgSO4 not deliquescent () c. Some oxides on dissolution in water give the corresponding acids, and hence, such non-metallic oxides are called acidic oxides. Name any two metals which are poor conductors of electricity. • have basic concept of states of matter. Air and Oxygen Example A combines with B to form C and D. As a result, high temperature is generated. The plants can easily assimilate and also the soil becomes enriched with nitrogen compounds. Dissolution of calcium oxide in water is which type of reaction? (a) The mixture is poured gently into the filter cone and collected in another beaker which is called filtrate. H2SO4 is a stable acid. EC X-2 2, 8, 8 Y-1 2, 8 Y-1 2 dalda/vanaspathi and soap by the process of hydrogenation (e) Manufacture of petrol/gasoline from coal 2. Discovery of alternative substances for CFCs used in refrigeration systems and aerosols can prevent depletion of ozone. (a) neon (b) helium (c) argon (d) nitrogen 27. Physical Properties of Oxygen Physical properties of oxygen are shown in Table 4.4. Table 4.4 Physical properties of oxygen Physical properties Colour, odour and taste Solubility in water It is slightly heavier than air Can be liquefied at high pressures and low temperatures Note: Vapour density of a gas or vapour at a certain temperature and pressure can be defined as the ratio of mass of the certain volume of gas or vapour to the mass of the same volume of hydrogen gas at the same volume of gas or vapour to the mass of the certain volume of hydrogen gas at the same volume of hydrogen unit of atmospheric pressure is Pascal. Define cohesive and adhesive forces. (a) zinc (b) copper (c) aluminium (d) phosphorus 15. Level 3 1. Submariners in a submariners in a submariners in a submariners in a submariner and astronauts in spaceships use lithium hydroxide to neutralise CO2 which is exhaled. In oxyhydrogen flame, hydrogen gas is involved due to its inflammable nature. These are called organic acids due to the fact that their primary sources of origin are living systems. losing two 3. Preparation of Simple Salts 1. This is used for welding of metals and for melting platinum and quartz. In coastal areas like Chennai, moisture is more, and hence, the rate of evaporation of water is less. (a) XH (b) XH3 (c) XH4 (d) XH2 13. In case of alcohol, the surface mol-AssessmeNT TesT 1. Hence, its valency is +2. During the formation of a mixture the constitu15. Anhydrous salt  $A \rightarrow b$ ,  $B \rightarrow c$ ,  $C \rightarrow d$ ,  $D \rightarrow a A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow a$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow d$ ,  $D \rightarrow b A \rightarrow c$ ,  $B \rightarrow d$ ,  $C \rightarrow d$ ,  $D \rightarrow d A \rightarrow c$ , D

from the bulk of liquid by heating is called boiling. Electronic configuration of X is 2, 8, 6 (X) (Y) SO2 + Ca(OH)2  $\rightarrow$  CaSO3  $\downarrow$  + H2O Y (milky white) Z 11. envelope • define have matter, chapter of gases which surrounds the planet earth is called atmosphere. Sulphur gets dissolved in carbon disulphide. (1) aedbc (2) aecbd (3) abcd (4) None of these 30. 21. As a result, the smell of a perfume which is in vapour state reaches quickly to the other corner of the room. These salts undergo dissociation into a complex ion and a simple ion. (d) cannot be predicted. Hence, they can be separated by chemical methods. Explain the naming of salts with examples. (a) 3Fe + 4H2O  $\rightarrow$  Fe3O4 + 4H2 M3(PO4)2 (b) forms a coating over milk upon cooling. (a) layer atmosphere to 50 inelements. The instrument used to measure the atmosphere to 50 inelements. The instrument used to measure the atmosphere to 50 inelements. water (d) ball (1) a, c, b, d (2) d, c, b, a (3) a, b, d, c (4) d, c, a, b 8. Column A 44. Identify the strong acid and weak base, respectively, among the following: (a) HCO3 and Al(OH)3 (c) HNO3 and Al(OH)3 (d) H2CO3 and NH4OH 23. In order to neutralise the +3 charge on the aluminium ion, three Cl- ions are necessary. b 6. Carbon is the non-metal. In a chemistry practical examination, three friends DEAN, BEAN and SEAN were given test tubes A, B, and C, respectively filled with solutions. Antacid is a substance which is used to neutralise the acidity in stomach. Atomic number 7 15 16 18 19 Element Nitrogen Phosphorus Sulphur Argon Potassium Electronic configuration 2, 5 2, 8, 5 2, 8, 6 2, 8, 8 2, 8, 8, 1 Valency 3 3 2 0 1 Since N and P need three more electrons to attain an octet configuration, their valencies are 3. atmosphere. (ii) Stratosphere - e e radiationse and thus protects life on theFormation earth. Column A 39. PRACTICe QUeSTIONS Directions for questions from 1 to 10 Fill in the blanks. Why should a chemical equation be balanced? H3PO4  $\rightarrow$  3H+ + PO4-3 33. Mention the effects of acid rain. However, some salts lose water of crystallisation either completely or partially on exposure to atmospheric air. (c) Absorption of moisture by P2O5. Mercuric oxide upon heating undergoes decomposition to produce a corresponding metal and oxygen gas. d 16. The formula of rust is Fe2O3 X H2O. Example Separation of the components (potassium nitrate [nitre] + carbon + sulphur) of gunpowder. Washing soda is sodium carbonate decahydrate with the formula Na2CO3.10H2O. Directions from 34 to 53 Answer the following questions. (c) Y is basic while X is acidic. As, Z on treatment with oxide A of carbon, gives milky appearance to the solution by forming B, Z is Ca (OH)2, A is CO2, B is CaCO3. Write the formulae of (a) nitride (b) silicate (c) chloride. Gases have maximum intermolecular spaces and beaker hence they diffuse in each other, forming a homo25. Carbon dioxide is used for extinguishing fires caused by petroleum products but not fires caused by metals like Na or Mg. Explain. Identify X, Y, Z, A and B? Heating of reaction mixture should be avoided. Correct balancing is as follows:  $2Fe(OH)3 + 3H2SO4 \rightarrow Fe2(SO4)3 + 6H2O 27$ . Explain the formation of compound by this element and oxygen atom. show the properties of metals and non-metals. In washing soda (Na2CO3), the constituents are 26. protective The planet earth hasprotects endowed withharmful the basic necessities Hence, of life it Thistle like water, food Among funnel • learn about diff kinds of matter 2.29 Test 2 1. • N O2 particles, SO2, excess CO2, N2O, CO, excess dust and other impurities are major pollutants in air which cause hazards like acid rain, global warming, ozone depletion, respiratory problems, etc. A → b B → g, h C→c D→e Level 2 Multiple choice questions 1. A solid residue is observed in the distillation flask. Methane and CO2 contribute to greenhouse effect and both are carbon compounds. DEAN found the blue litmus turning to red, BEAN observed methyl orange turning to yellow but SEAN found no action in the solution provided to him in the test tube. The rust is a brownish flaky substance which easily crumbles from the surface of a metal. Oxygen (Z = 8) has the electronic arrangement of 2, 6 His mother added that diesel was used to run autos in later days. • learn about different kinds of matter like elements, compounds and mixtures, and also compare metals and non-metals. Bicycle handles, rims red lead oxide () b. Hence, this layer consists of ions and free electrons. 1. Phosphorus is an essential nutrient for plants. (a) dilute sulphuric acid (b) concentrated sulphuric acid (c) aqueous NaCl (d) molten NaCl Classification of Matter 24. A filter paper is folded in the form of a cone and fitted into a funnel by moistening it with a few drops of water. (a) Compounds are heterogeneous in nature. (i) P2O5 on dissolution in water gives phosphoric acid. • Metals which are more reactive than hydrogen, on treatment with dilute hydrochloric acid or dilute sulphuric acid, liberate hydrogen. The most convenient way of separation (c) filtration (d) sedimentation and decantation which will help students to develop the problem-solving skills Classification of Matter 1.27 30. (a) acetic acid (b) oleic acid (c) stearic acid (d) ascorbic acid 20. C + O2 → CO2 is an example of synthesis reaction. A homogeneous mixture among the following is (a) milk (b) muddy water (c) smoke (d) air 32. There are different methods Classification of Matter 1.27 30. of separation of the mixture based on the physical state and properties of the constituents. \_\_\_\_\_\_\_ is used in advertisement glow tubes. By gaining one electron, it forms Cl- ion which attains the configuration of a metal nitrite is M(NO2)2, then the formula of its dihydrogen phosphate is (a) M2(PO4)3 (b) MHPO4 (c) M(H2PO4)2 (d) M2HPO4 33. Atomic number = mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, with the increase of temperature, mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, mass number – number of neutrons Atomic number = 23 – 12 = 11 Multiple choice questions 21. Give an example. Baking powder 30. (d) air exerts more pressure. Temperature: With the increase of temperature, mass number – number of neutrons Atomic number – number of neutro the rate of evaporation of a liquid increases. h I N T s A N D e x p l A N AT I O N 5. Atmospheric air is found to contain only trace amounts of hydrogen. The solution turns green due to the formation of FeSO4. PRACTICe QUeSTIONS 25. 2KMnO4 + 3H2SO4 + 5H2C2O4  $\rightarrow$  K2SO4 + 2MnSO4 + 10CO2 + 8H2O 5. Fill in the blanks 27. While petrol and diesel contain N and S which upon combustion produce NO2 and SO2, respectively. The maximum number of electrons in the L shell is two. The aqueous solutions of salts are good conductors of electricity. Which among the following reactions is not balanced? (d) absorption of moisture by CaCl2. (ii)Example Stratosphere Examples given food materials while oxygen is required for burning and respiration. Chlorine (Z = 17) has the electronic configuration of 2, 8, 7. Is it suitable for measuring high temperatures? Once we come out of the swimming pool in summer, water droplets present on the body undergo evaporation (slowly) which causes cooling, and as a result we feel shivering The solid carbon dioxide is commonly called . (i) acidic salt (ii) normal salt (v) mixed salt (a) 25314 (c) 25314 (ii) basic salt (iv) double salt (b) 25413 (d) 54321 10. Examples R P 1. The mixture of an iron filing and sand can be separated by magnetic separated • know the arrangement of in three erent which becomes thinner with distance from the earth and the region above diff the atmosphere whichinisthree different states of matter. H2O2 solution is added dropwise through the thistle funnel which is fitted to a conical flask with the help of a rubber stopper. Shakti's father was recollecting his childhood days and said that in those days, autos were run with petrol only. Mention the uses of the following bases and mention the property exploited in those uses. 8 chlorine atoms g. Generally metals (a) are solids (b) are good conductors of heat (c) have high tensile strength (d) all the above 12. The components of a compound are separated by chemical methods. (c) filtration and distillation. (a) blackening of silverware. Column A A. Constituents of the mixture can easily be separated by physical means. Describe the laboratory method of preparation of hydrogen gas. X, Y and Z containers are placed at 25°C. As a result, moisture present in the atmosphere condenses and forms tiny droplets of water. It is a familiar experience that some fruits such as oranges, lemons and grapes and other food materials, such as tamarind, have a sour taste. Table 3.3 Naming of acids Names of non-metal Sulphur Nitrogen Chlorine Carbon Phosphorus Formulae of oxy acid H2SO3 H2SO4 HNO2 HNO3 HClO3 H2CO3 H3PO4 Names of oxy acid Sulphurous acid Sulphuric acid Nitrous acid Chlorous acid Chlorous acid Chlorous acid Chlorous acid Chlorous acid Phosphorous acid Phosphorous acid Phosphorous acid Chlorous acid Chlor Define basicity of an acid and acidity of a base. FeSO4 7H2O () d. The ozone decomposes into oxygen and nascent oxygen in presence of UV rays. A = ionosphere, D = stratosphere, C = mesosphere, C = mesospher in sequence to draw the geometrical representation of an atom which is represented as ZXA. c aNSWER KEyS True or false 2.32 Chapter 2 Match the following table. Mention the methods for preventing acid rain. 4.5 4.6 Chapter 4 Preparation of Oxygen I. 6. Nitre is the common name of potassium nitrate. It being basic in nature, reacts with an acid to form salt and water (neutralisation reaction). Melting C. A → d B→a C→b D→c CaO is an example of hygroscopic substance. Identify the organic acid (d) stearic acid 22. 31. 4.41 4.42 Chapter 4 Level 3 1. boiling is a bulk(c)phenomenon. Molecules of gas/vapour diffuse easily into each other. Give suitable examples. Calcium hydroxide is prepared from naturally occurring limestone. • define substance, mixture, mass, weight, etc. But magnesium oxide is a compound and each molecule of it is composed of one magnesium atom and one oxygen atom. In a scrubber, lime water is taken which combines with SO2 to form CaSO3 which is removed as slurry. CO2 + H2O → H2CO3 Burns with a brilliant blue flame, SO2 has a suffocating smell. Charcoal can be separated by filtration. Water shows concave meniscus in a narrow glass tube. Define melting and boiling points. Classification of Matter Example 'All pure substances are homogeneous in nature.' Justify. Safe disposal of waste products. Eight is the maximum number of electrons that can be accommodated in the valence shell. These nitrates can be readily assimilated by plants. (c) T he density of the air and temperature gradually decrease with height. (iii) Sulphur burns with a brilliant blue flame to give SO2. While a teacher was teaching her class about air and oxygen in the atmosphere. d 7. The number of hydrogen ions furnished by one molecule of an acid, on dissolving in water, is called balanced chemical equation. Which of the following is a chemical change? The mass of one proton is taken as 1 atomic mass unit (amu). The gas is highly soluble in water. What is meant by neutralisation? Example Establish logically that water is a compound. The reaction of which of the following metal with steam is reversible? 1 Figure Caption 3.2 Chapter 3 INTRODUCTION We are very much familiar with the classification of substances as solids, liquids and gases on the basis of their physical state. 35. The formula of a zincate radical is . The products formed are CO2 and SO2 which dissolve in water to form H2CO3 and H2SO3. Examples: (i) Mohr's salt, FeSO4 . 72. H2SO4 is an example of hygroscopic substance. Meteorites burn up in thermosphere. The components of a mixture retain their properties, whereas the properties, whereas the properties, whereas the properties of a compound are totally different from those of its constituent elements. less. Essay Type Questions pRaCTICe QUesTIONs 69. CO2 can be collected by upward displacement of air as CO2 is denser than air. Contact with flame should be avoided. Both galvanising and tinning are adopted for preventing rusting of iron but only tinned iron containers are used to preserve food material. 34. Dalton's atomic theory is mainly based on the law of compounds and mixture Table 1.5 Comparative study of compar their properties in a compound Constituents can be separated only by chemical methods These are homogeneous or heterogeneous Separation of a Mixture Unlike elements, compounds are made up of more than one type of elements and a mixture is composed of more than one type of elements of the element could be 2, 8, 8, 1. Formula represents a molecule of an element or compound and is a combination of the symbols of the constituents along with the number of atoms of individual elements present in a molecule. (b) The constituents of both a compound and a mixture can be separated by chemical methods only. Sulphur dioxide C. With the discovery of subatomic particles, i.e., the electron, proton and neutron, it was concluded that atoms can be further divided. CaCO3 + H2SO4(dil) → CaSO4 ↓ + H2O + CO2 ↑ Physical Properties of CO2 Physical properties of CO2 are shown in Table 4.6. camphor is formed. The false statement among the following is (a) every pure substance is homogeneous in nature. An element with its atomic number and mass number is represented as ZXA. (b) physical change which involves condensation of water vapour. These metal oxides on dissolution in water give corresponding bases. In one hole, a thistle funnel is inserted and in another hole, a long delivery tube is inserted. ApplICATION 19. Baking soda is the common name of sodium bicarbonate. Which among the following pairs possess low melting points? The sand bath is placed over a wire mesh kept on a tripod stand and then is heated gently with the help of a Bunsen burner. Camphor pellets should be preserved in air-tight containers. problems solid to its gaseous state. Give one application. (b) camphor and incense stick. Ammonium chloride is scrapped off from the wall of the funnel, and thus, the mixture is separated. 9. CaCO3 + 2HCl → CaCl2 + H2O + CO2↑ Process: A conical flask fitted with a two-holed rubber cork is taken. Hydrogen is present in sun's atmosphere up to 1.1 per cent. In each case, identify the positive and negative radicals present in the compound. Distinguish between organic acids are white-coloured solids. bace. Example: NaCl + AgNO3 → NaNO3 + AgCl ↓ In the above reaction, during the exchange of radicals c, D → b 7. (a) Al+3SO4-2 h I N T S a N D E x p l a N aT I O N (a) 2.37 Chapter 2 2.38 (b) Al+3 H2PO4 - (c) Al+3 OH-Al2(SO4)3 3. Water vapour present in the atmosphere gets condensed on dust particles during night time (winter nights) because of low temperature. Mixture of sodium chloride and ammonium chloride b. The increased surface area of the catalyst provides many reactive sites where the less oxidised products like CO and NO are converted to CO2 and N2 which are released into the atmosphere. Water is one of the most important abundant resources which is responsible for sustaining life on this planet alone. Basic salt A. Ice has lower density than water at the same temperature. Element Valence shell No. of valence electrons Elements X K (1) Y L (2) Z M (3) 2 He 8 Ne 6 S Sulphur does not exist in monoatomic state due to its greater chemical reactivity. The maximum number of electrons in the L shell is eight. (a) soda water (b) air (c) milk (d) sugar water 9. Mercury expands on heating and has weak forces of attraction towards glass. Name the techniques that can separate sand and sawdust from water. S and C burn in the presence of O2 producing SO2 and CO2. Mention various methods of minimising air pollution. (a) Formula of its nitride is  $M+2N-3 \rightarrow M3N2$  (b) Formula Structure and Transformation of Matter 29. Composition of water gas is . Acids, Bases and Salts Ca +O2  $\rightarrow$  CaO (X) (Y) CaO+H 2O  $\rightarrow$  Ca(OH)2 Y Z Ca(OH)2 +CO2  $\rightarrow$  CaCO3 +H 2O Z A B 29. Atoms of a given element are identical in all respects. A  $\rightarrow$  c B $\rightarrow$ a C $\rightarrow$ e D $\rightarrow$ b Level 2 1. Reaction with non-metals: Hydrogen reacts with most of the nonmetals forming corresponding hydrides. Explain the reason behind it. : Ratio is 1 : 2 : 3 20. (a) They have variable composition. C → d We can obtain common salt from sea water by evaporation. C → d We can obtain common salt from sea water by evaporation. (a) is more in coastal areas than in non-coastal areas. Assertion (A): Pure H2SO4 is colourless. The symbol of cobalt is \_\_\_\_\_\_. These are called hygroscopic substances. Action of Indicators on Acids and Bases The action of indicators on acids and bases is shown in Table 3.10. But it is not a decomposition reaction. state of matter is incompressible.  $A \rightarrow e \ B \rightarrow c$ ,  $d \ C \rightarrow a \ D \rightarrow b \ 30$ . Water is added to two test tubes, in case of A salt regains its original colour and in case of B water starts boiling. The salts derived from the hydracids are given names ending with 'ide' suffix. Sulphur is the non-metal which burns with a blue-coloured flame.  $A \rightarrow d \ B \rightarrow a \ C \rightarrow b$ ,  $e \ D \rightarrow f \ 29$ . Chapter Chapter 13 Number Acids, Bases Systems and Salts Remember Before beginning this chapter, you should be able to: • classify matter on the basis of physical and chemical properties. False 3. Chemical properties. False 3. Chemical properties. False 3. Chemical and chemical properties. Some Common Acids (Mineral Acids or Inorganic Acids) Used in Laboratories Based on the constituent elements in the acids, they are classified as hydracids and oxyacids. xH2O). X- = 9 protons (Z) 10 neutrons 10 electrons Atomic Structure and Transformation of Matter present is 4 and 12, respectively. Uses of Acids, Bases and Salts 1. (a) What is air pollution? The next day, during lunch break the student went to the laboratory and saw that the common salt brought from home became sticky, whereas the compound sodium chloride remained as it is. H2SO4 + Ca(OH)2 → CaSO4 + 2H2O calcium sulphate 3. Solids have many free surfaces because the molecules (ii) A filter paper is folded in the form of a cone geneous mixture have only vibratory motion and hence are fixed. Types of Chemical Reactions 1. (b) Both (A) and (R) are true but (R) is not the correct reason of (A). The valency of argon is zero. Naturally occurring diamonds are sometimes found in different colours. Identify the false statement among the following: (a) A compound is homogeneous in nature. Odd one among the following with respect to the strength of acids is (a) phosphoric acid (b) carbonic acid (c) sulphuric ac 1. Also write the formulae of its bicarbonate, chromate and phosphide. Examples:  $C + O2 \rightarrow CO2\uparrow + 2H2O + heat (CH4 + 2O2 \rightarrow CO2\uparrow + 2H2O + heat (CH4 + 2O2 \rightarrow CO2\uparrow + 2H2O + heat (D) Decomposition of metal carbonates on strong heating decompose to produce CO2 gas and corresponding metal oxides. (d) a solid to its liquid state below the melting point of the$ substance. Justify the purpose. reducing 20. Since the valency of chlorine is 1, the valency of metal MCl2 is 2. a 3. Cobalt chloride () b. Chemical formula and chemical name of plaster of Paris are and respectively. The orbits are named as K, L, M, N ------ and their energies increase with the increase in distance from the nucleus and 2 : Atomic number of the element = 7. D - a Atomic number of beryllium is 4, electronic configuration is 2, 2. Paper turns green due to the formation of Cr2(SO4)3 chromic sulphate. True 2. (a) copper oxide and magnesium oxide (b) copper oxide and potassium oxide (c) magnesium oxide (d) aluminium oxide and magnesium oxide 29. Role of nitre in the manufacture of gunpowder is Sawdust and water (c) Iodine and sand (d) Common salt from sea water (e) Iron and sulphur A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ d, D  $\rightarrow$ e, E  $\rightarrow$ a A  $\rightarrow$ c, B  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, C  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, D  $\rightarrow$ c, E  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, D  $\rightarrow$ c, E  $\rightarrow$ c, D  $\rightarrow$ a, E  $\rightarrow$ b, D  $\rightarrow$ c, E  $\rightarrow$ c, D  $\rightarrow$ c, D true statement among the following: (a) The constituents of both a compound and a mixture can be separated by physical methods only. • explain the physical followed by negative radical follo explanation for A. It is also found in combined state in plants and animals. After the activity was over, one naughty student took an aluminium rod. Particularly, the lead particles from smoke of motor engines cause damage to the nervous system. Cr2O72- is called dichromate ion. The presence of water vapour in atmosphere influences the climatic conditions. Explain the suitable method of separation of ammonium chloride from common salt. c 12. (c) (A) is correct but (R) is false. (c) Clouds are suspended in the atmosphere while mist settles down on leaves, walls, etc., on earth's surface. This is because (a) of the complete absorption of high energetic radiations by molecules. • understand Dalton's atomic theory and different terms related to the structure of atom like atomic number, mass number, electronic configuration, etc. Give the probable electronic configuration, etc. Give the probable electronic configuration, etc. formulae of the sulphate and sulphite of a trivalent metal? the end of Level 1 (a) Compounds are heterogeneous in nature. Mixture of sodium chloride and water c. In which aspect do they differ from each other? Concentrated H2SO4 D. 16 protons mean that the atomic number of the element (X) is 16. The number of electrons in valence shell is equal to 3.  $\Delta$  Examples: CaCO3 —  $\rightarrow$  CaO + CO2  $\uparrow$   $\Delta$  CuCO3 —  $\rightarrow$  CuO + CO2  $\uparrow$   $\Delta$  ZnCO3 —  $\rightarrow$  ZnO + CO2  $\uparrow$   $\Delta$  ZnCO3 —  $\rightarrow$  ZnO + CO2  $\uparrow$   $\Delta$  ZnCO3 —  $\rightarrow$  ZnO + CO2  $\uparrow$  (c) Decomposition of metal hydrogen carbonate, commonly called baking soda, on heating produces CO2 gas along with the formation of corresponding metal carbonate and water. (5) This salt reacts further with an acid. Red () b. e- 9p 1\_1.indd 1 ds chemical t shells. (c) A filter paper is folded in the form of a cone and fitted into a funnel by moistening it with a few drops of water. Sulphuric acid is a strong acid, as sulphuric acid is a strong acid, as sulphuric acid in the form of a cone and fitted into a funnel by moistening it with a few drops of water. melting point but a high boiling point. D  $\rightarrow$  a Sugar in water is a homogeneous mixture as both the components are uniformly distributed. a 23. H2SO4  $\rightarrow$  2H + SO4-2 As H3PO4 is a weak acid, it produces less number of H+ ions, i.e., partial ionisation. In the building up of an atom, the electrons are added to the shells in increasing order of their energy. Compound A turns red litmus to blue. thermosphere 3. In some cases, the electrons are also lost from the shell inner to the valence shell. X and Y are non-metals in which the M shell is valence shell. X and Y are non-metals in which the M shell is valence shell. observations, it has been finally concluded that elements are the basic constituents of any matter, and the building block of an element is an atom. When an atom loses one or more electrons, the number of protons becomes more than the number of electrons and the ions so formed are left with a positive charge. It is the fifth abundant gas in the atmosphere. In non-coastal areas humidity is less when compared to coastal areas, and hence, rate of evaporation of water is more in a non-coastal area when compared to a coastal areas, and hence, rate of evaporation of water is more in a non-coastal area when compared to a coastal area. Acids, Bases and Salts Example Give an example of dibasic acid. 3.24 Chapter 3 13. Silver, gold and platinum are called noble metals Sonorousness Occurrence Non-metals Do not have lustre. Distinguish between atomic number and mass number with an example: FeCl2, FeCl3 18. Agueous hell to form Fe+2 and loses one more electron from the shell inner to the valence shell to form Fe+3. Example: FeCl2, FeCl3 18. Agueous acid. The percentage of noble gases present in air is more than that of CO2. 2H2O (Addition compound) Bosch process can also be carried out for the preparation of hydrogen from natural gas. The matter which is made up of different types of molecules is called mixture. Ozone present in the stratosphere plays a vital Hydrochloric acid is a role in protecting the life on earth's surface from harmful UV radiations. Dil H2SO4 is added to the flask dropwise through the thistle funnel. Identify the element which does not exist in monoatomic state. Combined state: It is generally found in combined state in the form of carbonate minerals like lime stone, magnesite, dolomite, etc. Sublimation The mixture of sodium chloride and ammonium chloride is taken in a flat basin and a funnel is inverted over it. (a) helium (b) fluorine (c) ozone (d) sulphur 23. Two metals A and B possess the same number of electrons is greater in B than A. 1.7 1.8 Chapter 1 Some common examples of mixtures are given below: 1. A dibasic acid is the one which furnishes two H+ ions by one molecule of an acid. In case of some salts, the colour of the salt is due to the presence of water of crystallisation. Discuss the characteristics of (a) an element (b) a mixture (c) a compound 64. PRACTICe . Carbogen is a mixture of 95 per cent oxygen and 5 per cent carbon dioxide. 10H2O 15. CO2 is also used in the preservation of food stuffs. (1) cabd (2) abcd (3) cdba (4) bcad Directions for questions from 42 to 44 Match the entries given in Column A with the appropriate ones in Column B. (b) of condensation of water vapour. The maximum number of electrons in the various orbits is 2, 8, 18, 32....., respectively. Atomic S tructure and Transformation of Matter Table 2.5 Valencies of different elements Sodium Potassium Chlorine Fluorine Fl Aluminium Chromium Nitrogen Phosphorus Types of ion Monovalent Monovalent Monovalent Monovalent Monovalent Monovalent Bivalent Bivalent Bivalent Trivalent Trivalent Trivalent Bivalent Bivale P-3 Names of ion Sodium Potassium Chloride Fluoride Indide Hydrogen Zinc Calcium Barium Magnesium Oxide Peroxide Sulphide Aluminium Chromium Nitride Phosphide Some metals may lose different number of electrons to form ions with different charges. (b) the constituents can be separated by physical methods. Neon is used in advertisement glow tubes. c Match the following 33. HIGHLIGHTS w Key concepts explained in a l?earner-friendly manner w Application?-based problems, graded by difficulty, leading to conceptual clarity w Solved examples presented in a logical and step-wise manner f?or each concept w 'Test your Concepts' section at the end of every chapter to check progress w Hints and Explanation for key questions along with common mistakes a?nd how to avoid them Class 9 Cla application- in.pearson.com Online resources available at www.pearsoned.co.in/iitfoundationseries 9 789352 866731 Size: 198x254 mm Spine: 8 mm ISBN: 9789352866731 Trishna's ISBN 978-93-528-6673-1 based problems and hints and solutions to master the art of problem solving > Uses a graded approach to generate, build and retain interest in concepts and their applications Territory line mQuest About Pearson Pearson is the world's learning company, with presence across 70 countries worldwide. Sublimation is the process of the conversion of a solid to its liquid state. This is called variable valency. (a) downward displacement of water and downward displacement of air, respectively (b) downward displacement of water in both the cases (d) downward displacement of water in both the cases (d) downward displacement of water in both the cases 4.25 4.26 Chapter 4 48. D → b ZnCl2 is an example of deliquescent substance. What is a chemical displacement of water in both the cases (d) downward displacement of water in both the case (d) downward displacement of water in both the case (d) down refrigerators and air conditioners releases chlorofluoro carbons which don't contribute to SPM. B - c In melting process, ice changes into water. Chapter 3 3.18 72. (a) coke (b) magnesium (c) sulphur (d) phosphorus 19. Hence, hot milk in the saucer gets cooled. These are formed by a neutralisation reaction. Explain the significance of nitrogen oxygen and water vapour present in the atmosphere. (a) troposphere (b) stratosphere (c) mesosphere (c) mesosphe (d) ionosphere pRaCTICe QUesTIONs Directions for questions from 1 to 10 State whether the following statements are true or false. Y turns moist blue litmus paper to red due to the formation of compound Z. But he did not find any bubbles coming out. Molecules of matter are made up of still tinier particles called atoms. D → e Sand being heavier, settles down at the bottom and can be separated by sedimentation. The holes in the ozonosphere is due to the attack of a pollutant that is released from (a) automobiles (b) air conditioners (c) industries (d) volcanic eruptions 2. mixture 2. Since sodium is the constituent of washing soda (Na3CO3), therefore, it does not retain its properties. (a) mobile electrons (b) mobile ions (c) molecules (d) both (a) and (c) 8. Hence, the dinegative ion possesses 18 electrons. Combined state: Oxygen is found in combined state: Oxygen is found in combined state: Oxygen is found in combined state in the most vital components from the mixture involves more than one method of separation. Preparation of Carbon Dioxide 1. 'All pure substances are homogeneous in nature.' Justify. Give balanced equations. (b) Burning magnesium ribbon in an atmosphere of nitrogen. 4.28 Chapter 4 30. Mixed salts: The salts which contain more than one basic or acidic radical are called mixed salts. However, in the case of water, it is different. (e) protons and neutrons are shown in nucleus. Glass is inert towards the organic acids, and hence, the pickle did not get spoiled. The condenser leads to another flask called receiver to collect the liquid that gets separated from the solid during the process of distillation. H2CO3 turns blue litmus paper to red. Pollutants, such as CFCs, upon reaching the stratosphere react with ozone, and thus, deplete the ozone layer in a period of time. This envelope Layers of Atmosphere non-metals. Identify the number of neutrons present in a pair of elements with atomic numbers 20 and 13, if their mass numbers are 40 and 27, respectively. A mixture of alcohol and water is an example of mixture. 25. For example, calcium and argon are found to have the same mass number. is a lustrous non-metal. 1 Figure Caption 1.2 Chapter 1 INTRODUCTION The planet earth is endowed with a large variety of substances like rocks, water, air, coal, petroleum, etc. (ii) A filter paper is folded in the form of a cone and fitted into a funnel by moistening it with a few drops of water. Silicate is a negative radical, i.e., SiO3-2. We believe learning opens up opportunities, creates fulfilling careers and hence better lives. SO3 on dissolution in water forms sulphuric acid. Coating with enamel paint C.  $2Cu(NO3) = 2.6H = 20 - \Delta - 1.1t$  corresponds to Z = 19 and the element is potassium. Carbonic acid Tartaric acid Caustic soda Milk of magnesia Column B () a. Collection of gas: Hydrogen is collected by the downward displacement of water. Generally, a metal gets corroded due to oxidation. Formula Name of the correct explanation for A. General methods of preparation (a) Combustion: CO2 is released into the atmosphere when carbon-containing fuels like coal, natural gas, etc., are burnt. Ultraviolet rays are absorbed by of atmosphere. (NH4)2 SO4 . h I N T s A N D e x p l A N AT I O N 34. solution Fe on treatment with H2SO4 liberates hydrogen gas. of dry ice - At very high pressures when it is allowed to expand suddenly through a small (a) The layer of atmosphere above the Illustrative e nozzle it forms solid carbon dioxide which is known as dry ice.examples - (d) earth's Aeroplanes fly isincalled this layer. 6H2O () b. (ii) Carbon burns with sparklessing a small (a) The layer of atmosphere above the Illustrative e nozzle it forms solid carbon dioxide which is known as dry ice.examples - (d) earth's Aeroplanes fly isincalled this layer. and cracking sound to give CO2. (f) Blackening of silverware. Role of nitre in the manufacture of gunpowder is . The CO that is added up to the atmosphere due to the incomplete combustion of fuels can be decreased by the (a) usage of scrubber. 7H2O. The temperature at which a solid gets converted into a liquid is called melting point Chapter 1\_1.indd 14 13. (a) R eaction with chlorine: Hydrogen reacts with chlorine in the presence of sunlight to give hydrogen chloride. (b) rusting of iron. Elements Ca Cl Atomic numbers 20 17 Electronic configurations 2, 8, 8, 2 2, 8, 7 Ca loses two electrons to attain the same. In this method, only the solid can be obtained, but the liquid gets vaporised. Oxygen is converted to ozone in presence of ultraviolet rays. Number of electrons, protons and neutrons in carbon is 4 : 12 = 1 : 38 and neutrons in carbon is 4 : 12 = 1 : 38 and neutrons in carbon is 4 : 12 = 1 : 38 and neutrons in carbon is 4 : 12 = 1 : 38 and neutrons in carbon is equal, i.e., 6. Examples: CuSO4, FeSO4, etc. Nascent hydrogen () d. duplet configuration 4. Ammonium hydroxide is an alkali. Ratio of oxygen atoms is 4 : 12 = 1 : 38 and neutrons in carbon is equal, i.e., 6. Examples: CuSO4, FeSO4, etc. Nascent hydrogen () d. duplet configuration 4. Ammonium hydroxide is an alkali. Ratio of oxygen atoms is 4 : 12 = 1 : 38 and neutrons in carbon is equal, i.e., 6. Examples: CuSO4, FeSO4, etc. Nascent hydrogen () d. duplet configuration 4. Ammonium hydroxide is an alkali. Ratio of oxygen atoms is 4 : 12 = 1 : 38 and neutrons in carbon is equal, i.e., 6. Examples: CuSO4, FeSO4, etc. Nascent hydrogen () d. duplet configuration 4. Ammonium hydroxide is an alkali. Ratio of oxygen atoms is 4 : 12 = 1 : 38 and neutrons in carbon is equal, i.e., 6. Examples: CuSO4, FeSO4, etc. Nascent hydrogen () d. duplet configuration 4. Ammonium hydroxide is an alkali. Ratio of oxygen atoms is 4 : 12 = 1 : 38 and -1 Therefore, the electronic configuration of an atom is 2, 7. is air, considered as a etc. What is meant by thermal decomposition? Hence, X is sulphur. The number of atoms of a molecule or compound is balanced on either side of a chemical equation by keeping appropriate ... b 7. potassium nitrate 19. On exposure to atmosphere calcium hydroxide reacts with CO2 forming CaCO3 which is a hard substance, and hence, strengthens the construction. Evaporation is the process of conversion of a liquid into a gas. (a) carbon dioxide, nitrogen oxide (b) methane, water vapour (c) carbon dioxide, nitrogen oxide (b) meth prevented by galvanisation, tinning, alloying, coating with enamel paint, etc. combined chemically in a fixed ratio of their (iii) The mixture+ issand, poured gently intosubthe filter 23. Since sodium, magnesium and potassium are active metals, they catch fire when they react with oxygen and continue to burn in an atmosphere of N2, while tungsten (W) which burns in presence of oxygen, does not continue to burn in an inert atmosphere of N2. Column B Name of radical Zincate Stannic Nitride Potassium Charge -3 +1 +2 +4 -2 () () () () () () a. Example: PbS 7. The liberated O2 is the source for the combustion of carbon and sulphur. They absorb moisture from the surroundings and are converted into solution. solution Cotton has the property of absorbing sweat. • prove presence of gases in our surrounding. Burning of meteorites takes place in the ionosphere, aeroplanes fly in the stratosphere, reflection of radio waves takes place in the minerals obtained from the earth's crust are called mineral acids. Atomic number of a metal having 12 neutrons and mass number 23 is \_\_. becda (i) This salt reacts further with a base. Later, he dipped it in a beaker containing dil H2SO4. Sodium burns in oxygen with a brilliant golden yellow flame. This type of mixture can be separated by distillation process. Hence, the base is NaOH and it contains sodium. (a) Z the = 9weather phenomena occur (b) Sodium Z = due 11 Odour (d) Florine Most of in this due layer rapidOdourless variations temperature. Sulphur dioxide on hydrolysis gives sulphuric acid. Physical and chemical changes can be distinguished with respect to the change in molecular composition. (1) stratosphere (2) troposphere (3) mesophere (4) exosphere (5) ionosphere (a) 34512 (b) 21354 (c) 42531 (d) 45312 31. Formula of phosphorous acid H3PO3. Column A (indicator) A. Most of the salts are soluble in water. Pure substances are made up of identical molecules (c) A mixture of water and saw dust properties and hence these cannot be separated by and yellow. Hence, CO2 is acidic in nature. M(NO2)2, hence, valency of metal is 2. Sunny and Bunny are neighbours staying in the same apartment. Distribution of water (30%) Surface water (30%) Swamps (11%) Physical Properties of Water Water possesses certain significant physical properties which are responsible for making it a vital liquid. Rusting of iron is an example of both physical and chemical change. Air and Oxygen 23. Iodine is a lustrous metal. c ANSWeR KeYS Test 2 3.28 Chapter 3 CONCePT APPLICATION Level 1 True or false 1. (b) rust powder and iron powder. Two non-metallic oxides A and B are produced by burning of fossil fuels. Hence, this change is called physical changes to water d. From non-metallic elements, on heating with oxygen, give corresponding oxides. A - b B - c C - d D - a e CONCepT ApplICATION Level 1 True or false 1. Crystals of potassium nitrate melt and decompose to give a colourless gas. (b) Colour change of dil nitric acid upon long standing. Arrange the pairs in sequence in decreasing order of basicity of an acid and acidity of a base followed by the normal salts formed by the given acid-base pairs in the same order, respectively. Prevention: (a) Minimise the usage of fossil fuels. Electrons revolve round the nucleus with high speed to overcome the strong electrostatic forces of attraction by the nucleus in definite fixed paths which are called orbits or shells. Examples: Water and alcohol. Laboratory method of preparation Principle: Dil HCl is made to react with marble chips which contain calcium carbonate to evolve carbon dioxide gas. The solid deposition is called precipitate and this type of reaction. Nickel 13. Common salt from water can be separated by distillation. To prevent rusting of iron, different methods and processes are employed. Which among the following has strong forces of attraction? True 7. a 11. preparations in a compound. 'X' is an acidic gas since it changes blue litmus to red. (a) Dissolution of lime in water. The basin is kept in a sand bath. • understand the chemical reactions. • Aqueous solutions of salts are good conductors of electricity. As the element burns with a brick red flame, it is calcium with electronic configuration 2, 8, 8, 2. (a) C oating with red lead oxide or tar: The bridges, electric poles, etc., are coated with red lead oxide or tar: The bridges, electric poles, etc., are coated with red lead oxide or tar: The bridges, electric poles, etc., are coated with red lead oxide or tar: The bridges, electric poles, etc., are coated with red lead oxide or tar: The bridges, electric poles, etc., are coated with red lead oxide point or tar which protects iron from rusting. salt. Na2CO3 +  $H2SO4 \rightarrow Na2SO4 + H2O + CO2 \uparrow Ca(HCO3)2 + 2HNO3 \rightarrow Ca(NO3)2 + 2H2O + 2CO2 2$ . C  $\rightarrow$  d Atomic number of manganese is 25, electronic configuration is 2, 8, 13, 2. (i) Reaction with carbon: When red hot charcoal or carbon is heated in an atmosphere of oxygen, it forms carbon dioxide (a colourless gas). Examples: Water, carbon dioxide, (a colourless gas). hydrochloric acid, sodium chloride, calcium carbonate, etc. Enamelling C. xample: Magnesium ribbon burns in presence of oxygen to form white-coloured powdery E magnesium oxide. Dil HCl is added dropwise through thistle funnel which is inserted into the conical flask through one hole of rubber cork. ISBN 978-93-528-6673-1 eISBN Head Office 15th Floor, Tower-B, World Trade Tower, Plot No. 1, Block-C, Sector 16, Noida 201 301, Uttar Pradesh, India. 51. Inversion layer, convection currents, auroras, absorbs harmful ionising radiations and burning up of meteorites (1) troposphere (2) stratosphere (2) stratosphere (2) stratosphere (3) exosphere (4) mesosphere (5) ionosphere (a) 45312 (b) 12354 (c) 21534 (d) 12435 40. Fe(OH)3 + H2SO4 (dil)  $\rightarrow$   $Fe2(SO4)3 + H2O 1 - Fe - 2 1 - S - 3 5 - H - 2 7 - O - 13 2Fe(OH)3 + 3H2SO4 \rightarrow Fe2(SO4)3 + H2O 2 - Fe - 2 3 - S - 3 12 - H - 12 18 - O - 18 Depending on the way the products are formed from the reactants, the reactants, the reactants are classified into four$ different types. Gold is purified when treated with HNO3 as it is not soluble in HNO3 and all the impurities are oxidised by nitric acid. Liquid to gas e. Hence, it is a thermal decomposition reaction. (d) large intermolecular space present in solids. A molecule of carbon dioxide is constituted of a carbon atom and two oxygen atoms. (a) CO2 (b) MgO 37 Reason (R): Rate of evaporation is directly proportional to humidity. The temperature can reach a maximum of 2000°C at the top of this layer. Find the number of neutrons. CuSO4 +  $X \rightarrow XSO4 + Cu$ ; XSO4 +  $Y \rightarrow YSO4 + Cu$ ; X note on different types of valencies of cations with examples. (b) Temperature decreases from about -15°C to -120°C. metalloids 7. Shell A Al(H2PO4)3 A 8 2, 8, 8, 1 L Electronic configuration Metal K Formulae (i) KNO3 (ii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO2)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO2)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO2)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al(NO3)3 (iii) K2SO3 (iv) KHSO3 Al(OH)3 B 8 2, 8, 2 Mg Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Mg(NO3)2 Al(NO3)2 Al CaSO3 Al2(SO3)3 (iv) Ca(HSO3)2 Al(HSO3)3 4. Transformation that involves the alteration in certain specific properties of matter like state, colour, texture, electrical conductivity, magnetic behaviour, etc., without the alteration of molecular composition is called physical change. 4.39 4.40 Chapter 4 6. (3) Non-supporter of combustion but allows active metals continue to burn. This is called acid rain. POINTS TO REMEMBER • M ost of the weather phenomena like the formation of clouds, rain, etc., take place in the troposphere, while the stratosphere protects the earth from harmful UV radiation and also aeroplanes fly in this region. The temperature at which a liquid changes into gas from the bulk of the liquid by heating at normal atmospheric pressure is called boiling point of that liquid. which is a hydrated salt is used as a fungicide in agriculture. Next day, their father while teaching 'transformation of matter' to his daughters wanted to relate the given activity. Assertion (A): Mass number of carbon is 12. heterogeneous, homogeneous 19. Generally, hydrolysis of metal oxides gives bases. Salt solutions are good conductor of electricity due to the formation of mobile ions. ZnO2-2 19. Atoms of different elements take part in the chemical reaction and combine in a simple integral ratio to form compounds. (d) Aqueous solutions of SO3 and Na2O turn red litmus to blue and blue litmus to red, respectively. Air is a homogeneous mixture of gases which also contains argon and nitrogen which are used for filling electric bulbs. Example: Table 3.10 Action of indicators on acids and bases Names of indicator Litmus Methyl orange Phenolphthalein Turmeric Colours in acidic solution Red Pink (orange red) Colourless Yellow Colours in basic solution Blue Yellow Pink Red Acid + Base — neutralization — → Salt + Water When a reaction between acids and bases happens in such a way that some of the replaceable hydrogen ions in acid or replaceable hydrogen ions in the base are left unreplaced, then these reactions are called partial neutralisation reactions Hence, they do not require additional nitrogenous fertilisers. (d) Evaporation causes cooling and depends on humidity. (a) reaction of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of a red hot iron with steam to give Fe3O4 (b) burning magnesium ribbon in an atmosphere of nitrogen (c) displacement of copper from the solution of the solutio 35. Name the acid present in (a) lemon (b) vinegar 46. Assume that temperature is recorded in the thermosphere with the help of a thermometer. This layer of Al2O3 (alumina) makes aluminium passive. xample: Mg + O2  $\rightarrow$  MgO is an unbalanced chemical equation. The mass of electron is times that of mass of 1837 a proton. • Water vapour along with dust particles is responsible for the formation of clouds, fog, mist, etc. (a) Na (b) Ca (c) Mg (d) K 24. Preparation of slaked lime (calcium hydroxide) with the liberation of heat. When Rita opened the perfume bottle in the bedroom without the permission of her mother, how did her mother came to know while watching TV in the drawing room? Dogs stretch out their tongues in summer as evaporation of the saliva leads to cooling. Arrange them in a proper sequence. In some cases, atoms of different elements may be identical in this respect. These compounds are the combination of positive and negative ions or radicals. The salt formed by complete neutralisation of calcium bisulphite (d) calcium bisulphite 3. Solids have strong intermolecular forces of attraction, and hence, carbon and potassium possess strong forces of attraction. Magnesium hydroxide is used as an antacid to neutralise the acidity. Hence, it does not undergo decomposition on long standing. d 33. It can lose 2 electrons to attain duplet configuration, and hence, it forms Be+2 ion. The high temperature of the stratosphere does not allow the water vapour to reach the stratosphere due to the absence of convection current. Carbonic acid is a strong acid. Hence, a higher rate of evaporation allows faster cooling of water in the earthen pitcher in Hyderabad when compared to Chennai. () Double decomposition reaction Decomposition reaction Decomposition reaction Decomposition reaction for questions from 1 to 20 For each of the questions, four choices have been provided. The formula of a compound when a positive radical with valency 1 combine is \_\_\_\_\_\_. The electronic configuration of the dinegative ion with 8 in electronic configuration of the dinegative radical with valency 1 combine is \_\_\_\_\_\_. preparation of oxygen gas where hydrogen is obtained as a by-product. Meteorites burn up in the mesosphere due to the presence of relatively thick atmosphere. Note: This method is not employed for laboratory preparation because Hg vapours are poisonous and HgO is very expensive. Exception: Only noble metals are found in the free state. Homogeneous mixture B. 2Al(OH)3 + 3H2SO4  $\rightarrow$  Al2(SO4)3 + 6H2O Aluminium sulphate 3. Generally soils are slightly acidic in nature. (2) Dissolution in water molecules along with the formula of the salt. The ions formed get the configuration of the nearest inert gases namely argon and neon, respectively. The substance left over on the basin does not sublime. 1.17 68. H2O2 + O2 D - c Surgical instruments and cutlery are made of alloys in order to prevent corrosion. a 5. Formula of potassium hydrogen sulphite is (a) KHSO3 (b) K2SO3 (c) K2SO4 (d) KHSO4 37. Anhydrous salt 9. The filtrate, on evaporation to dryness by heating, gives solid nitre. Evaporation of a solid-liquid mixture. Sublimation () d. (b) Writing the electronic configuration of a solid from a solid-liquid mixture. Sublimation () d. (b) Writing the electronic configuration of the atom. In the case of a wax-coated glass and plastic tube, cohesive forces are predominant over adhesive forces, and hence, water shows convex meniscus in a narrow wax-coated glass and plastic tubes. It has temporary bleaching action. The glowing splinter rekindles into flame. • Acidic salts contain neither replaceable H+ nor OH- ions. Mixture of liquid and undissolved solid Funnel Filter paper Filtrate Figure 1.6 Separation insoluble solid from liquid Conclusion: The mixture of sawdust and water is separated through the filtration process. (d) Change in molecular composition. • describe the action of indicators on acids and bases. (a) phosphorus (b) sulphur (c) iodine (d) carbon 28. For Hints and Explanations, please visit: www.pearsoned.co.in/IITFoundationSeries CONCEpT applICaTION pRaCTICE QUESTIONS Level 1 Directions for questions from 1 to 10 State whether the following statements are true or false. What is a metalloid? CuSO4 5H2O () e. Holes are created in the ozone layer due to the attack of CFCs which are released from refrigerators and air conditioners. (ii) Calculation of the number of protons and neutrons. Since the maximum capacity of the K shell is 2, the next electron goes into the L shell till it is filled with 8 electrons. Examples: Cu, Ag, He, etc. A → f 38. Formation of clouds, mist and fog are the examples of . Sand is insoluble in water, hence, it can be separated by filtration. Those salts become colourless on heating. This quick lime combines with SO2 to form CaSO3 which is removed as slurry. During that process, the food material fell on the floor and the beautiful marble flooring became dirty. If hydrogen is present in the salt, hydrogen or bi is added to the name of the radical, i.e., corresponding suffix (Table 3.13). Formation of rust is a chemical change. A  $\rightarrow$  b In distillation process, the non-volatile component B  $\rightarrow$  c Sawdust remains suspended in the water and separated by filtration. Example: Water changes to water vapour at 100°C under normal atmospheric pressure. (d) Aeroplanes fly in this layer. H2SO4 B. liquid, gas 6. Strong acid () c. CaO + H2O  $\rightarrow$  Ca(OH)2 + heat (Quick lime) (Slaked lime) soluble in water and gets settled down at the bottom. The trapping of solar heat energy by certain gaseous molecules present in the earth's atmosphere is called . (c) The vapours are cooled and condensed to form the same solid and sand left behind in the dish. Observation: The water collected in the second beaker is clear and the sand particles are left behind in the first beaker. rated by magnetic separation. (b) Controlling deforestation. information density, temperature at different the is surface the earth. Examples 1. Oxygen (Z = 8) 2. Phosphorus (Z = 15) Electronic arrangement = 2, 8, 5 - e e 8p 8n e - e - - e classification of matter based on its molecular composition with suitable examples. solution (i) The air present in atmosphere is used for breathing. (a) Na (b) Mg (c) K (d) W 37. Hydrated zinc sulphate is in colour. General methods of Preparation General methods of preparation are shown in Table 4.3. Table 4.3 General methods of eparation of oxygen Method Chemical equation (i) Thermal  $2HgO \rightarrow 2Hg + O2\uparrow$  decomposition of metal oxides. MnO2 2H 2O2 -→ 2H 2O + O2 ↑ Note: The substance which alters the rate of reaction but does not take part in that chemical reaction is called catalyst. Method of gas: CO2 being heavier than air is collected by displacement of air. Column B () a. Table 3.14 Uses of acids Name of the acids Uses Hydrochloric acid Cleaning metal surfaces before tinning and galvanising Dyeing Phosphoric acid Carbonic acid Carbonic acid Cleaning metal surfaces before tinning and galvanising Dyeing Phosphoric acid Carbonic acid Cleaning metal surfaces before tinning and galvanising Dyeing Phosphoric acid Carbonic acid noble metals (Au, Pt, etc.) Fertilisers Soda water and soft drinks Acetic acid Additive in food stuffs Baking powder Sulphuric acid Additi depletion: Ozone present in the troposphere contributes to the greenhouse effect. Identify the formulae of the compounds formed when X and Y react with the divalent metal M. Test for CO2: When CO2 gas is passed through lime water, a milky white precipitate of calcium carbonate (CaCO3) is formed. (a) calcium chloride (b) magnesium chloride (c) zinc chloride (d) calcium oxide PRACTICe QUeSTIONS 26. Pure nitric acid on longstanding turns yellow due to the formation of (a) 02, NO2 and H2O (b) 02, NO2 and H2O (c) NO, NO2 and H2O (c) NO, NO2 and H2O (d) 2, 3 10. Identify the correct sequence of steps for the formation of A formation of A formation of (a) 02, NO2 and H2O (b) 02, NO2 and H2O (c) NO, NO2 and H B, C and D. Cloud formation requires convection currents and also dust particles for condensation of water droplets. Cutting and welding: A mixture of hydrogen and acetylene produces oxyacetylene flame which has 3300°C temperature. C6H12O6 + 6O2 → 6CO2 + 6H2O + energy 2. b 14. • know the states matter solid, liquid and gas • know the states of matter solid, liquid and of gas • know the states of matter solid, liquid and of gas • know the states of matter solid, liquid and of gas • know the states of matter solid, liquid and gas • know the states of matter solid, liquid and of gas • know the states of matter solid, liquid and gas • know the states of matter solid, liquid and of gas • know the states of matter solid, liquid and gas • know the states of matter solid, liquid and solid sol should be The students planet earthAfter hasidentify endowed us with the basic necessities of life like should air, water, food etc. Comment on the nature of the three solutions given. For example, Na2CO3.10H2O loses nine water molecules on exposure to air and the remaining one water molecule on heating. The more the humidity, the less is the rate of evaporation. Give reasons. If a non-metal forms only two oxides and one oxide on hydrolysis gives an acid, then the nonmetal could be (a) sulphur (b) carbon (c) phosphorus (d) nitrogen 7. All these impurities being basic in nature are removed by treating it with hydrochloric acid. Ammonium hydroxide decomposes rapidly to give ammonia gas and water upon slight heating NH4 OH  $-\Delta - \rightarrow$  NH3 + H 2O Ca(OH)2  $-\Delta - \rightarrow$  CaO + H 2O 2Al(OH)3  $-\Delta - \rightarrow$  Al 2 O3 + 3H 2O Comparative study of properties of acids and bases is provided in Table 3.9. Table 3.9. Table 3.9 Comparative study Corrosive action on skin: All acids and some alkalies show corrosive action on skin as they form painful blisters when they come in contact with skin. Fountain ink pen leaks at higher altitudes. Representation:  $X + YZ \rightarrow XZ + YX$  is a more reactive element than Y. Potassium chlorate on strong heating gives potassium chlorate on strong heat gas c. Smoke is a mixture of air and carbon particles. a 2. For the separation of the components of a mixture of iodine, iron filings and sawdust arrange the processes in a sequential order. Displacement reaction () b. Sodium oxide dissolves in water to form sodium hydroxide. A  $\rightarrow$  b B  $\rightarrow$  g, h C $\rightarrow$ c D $\rightarrow$ e SO2 + H2O  $\rightarrow$  H2O  $\rightarrow$  HNO2 + H2O  $\rightarrow$  HNO2 + H2O  $\rightarrow$  H2O HNO3 P2O5 + 3H2O  $\rightarrow$  2H3PO4 CO2 + H2O  $\rightarrow$  H2CO3 40. Incomplete combustion of fuels releases CO, NO, etc., that leads to photochemical smog and acid rain but not global warming. b assessmeNT Test 1 1. Only these two hydrogen molecules are replaceable and the other hydrogen is non-replaceable. The reaction of iron with steam is a reversible reaction. Between water and cotton molecules adhesive forces. 2SO3 5. Examples: Groundnut oil and sunflower oil Animal oils, such as ghee, which contain hydrogen in greater percentage get solidified easily under normal conditions. Distillation () B. Ltd, CIN: U72200TN2005PTC057128, formerly known as TutorVista Global Pvt. Examples: NaOH + H2O Disodium hydrogen phosphate (acidic salt) NaOH + Na2HPO4  $\rightarrow$  Na (HCl) which dissolves in water and forms hydrochloric acid. The basic postulate of Dalton's atomic theory which says that 'atoms are the tiniest particles of matter which take part in a chemical reaction'. 52. Acid formed as a result of lightening reaches the earth's surface through precipitation, thus contributing to the acid rain as well as to the growth of plants. Which of the following pairs is a major contributor to global warming? Rajaram has coconut fields near his house. Hence, they are called a residue. Name two elements which have atomicity more than three. Salts are solids at room temperature. The region 25e-2/2/2017 km toair, 40vapour km e - e -layer absorbs harmful UV the earth's- surface is called ozonosphere or ozone layer. Table 2.6 Variable valencies exhibited by some of the metals Elements Iron Iron Copper Mercury Tin Tin Types of ion Bivalent Trivalent Monovalent Bivalent Tetravalent Representation of ions Fe+2 Fe+3 Cu+ Cu+2 Hg+ Hg+2 Sn+2 Sn+4 Names of ion Ferrous Servic Cuprous Cupric Mercuric Stannous Stannic 2.9 2.10 Chapter 2 A group of atoms possessing either positive or negative charge by losing or gaining one or more electrons is called radical. The next 2 electrons go to the N shell and then the M shell gets filled with 10 more electrons because it can accommodate a maximum of 18 electrons as per the 2n2 formula. 4.7 4.8 Chapter 4 Chemical properties of oxygen are listed in Table 4.5. Examples:  $C + O2 \rightarrow CO2 \ CO2 + H2O \rightarrow H2CO3 \ S + O2 \rightarrow SO2 \ SO2 + H2O \rightarrow H2SO3 \ SO3 + H2O \rightarrow H2SO4 \ (b)$  pure HNO3 (c) liquefied hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with highly electropositive metals to form metallic hydrogen reacts with chloride (d) all the above 8. Directions for questions from 21 to 41 For each of the questions, four choices have been provided. 45. (b) relatively thicker atmosphere in the thermosphere. For the formation of a normal salt from one molecules of H2SO4, how many molecules of H2SO4, how many molecules of CFCs. 3. Give the electronic configurations of X and Y. Distinguish between strong acids and weak acids. NaCl is a compound. Ariun's family stays in an area which is in the heart of the city for the sake of convenience. Incomplete combustion of fuels does not contribute to (a) photochemical smog (b) acid rain (c) global warming (d) both (a) and (b) 19. Hence, we can drink the coconut water. (1) b, a, c (2) d, b, a (3) d, c, a (4) a, d, c 7. NO is a neutral oxide and does not respond to litmus test. water and undergoes evaporation on heating 37. Acids act as good conductors of electricity when they are in the ionised state. h I N T S A N D e x P L A N AT I O N Level 2 3.30 Chapter 3 10. • understand the importance of interconversion of matter and correlate it with day-to-day activities. (1) nitrogen (2) carbon dioxide (3) oxygen (4) argon (a) 2431 (b) 1342 (c) 4321 (d) 2134 35. (a) respiration (c) explosion (b) cutting and welding 61. (b) change in the colour of dil nitric acid upon long standing. A metal (M) and a non-metal (X) form a compound with the formula M4X3 2HOCl -> 2HCl + O2 is photolytic decomposition reaction. 3. Since the protons and electrons carry equal and opposite charges, an atom is electrically neutral. Sedimentation () c. Hence, the body temperature decreases. Air Pollution The composition of atmospheric gases changes due to the addition of other gases and suspended particles mainly by human-induced activities. Directions for questions from 11 to 26 For each of the questions, four choices have been provided. Metals are highly ductile but non-malleable. Aqua purifiers consist of energy source which radiates UV rays.  $\rightarrow \rightarrow \rightarrow \rightarrow Y-2$  Y 2, 8 2, 6 (Z), mass number is 16 for X. DEAN added blue litmus, BEAN added methyl orange and SEAN added the litmus solution to the given test tube, respectively. Vish went to an electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purchase a bulb and some electrical shop along with her father to purcha body temperatures are high. h I N T s A N D e x p l A N AT I O N Test 1 1.30 Chapter 1 Test 2 1. Cause of Auroras: When the high energetic electrons from the sun interact with earth's magnetic field, they cause auroras. Name two states of matter which are fluid. Give two examples for sublimable substances. 1 Figure Caption 4.2 Chapter 4 INTRODUCTION The planet earth has endowed us with the basic necessities of life like air, water, food, etc. 1.11 1.12 Chapter 1 Clear liquid Conclusion: Water is separated from the sand through sedimentation and decantation process. The salts of carbonic acid are called carbonates and bicarbonates or hydrogen carbonates. Distinguish sublimate from sublime. Hence, rust does not liberate hydrogen gas with dilute sulphuric acid (d) sulphuric acid (d) sulphuric acid (c) phosphoric acid (d) sulphurous acid 6. catalyst 5. As a result, common salt becomes sticky. It is used by deep-sea divers, submariners, mountaineers, astronauts, aviators, etc. (c) Meteorites burn up in this layer. Predict the observation and justify. Give some examples of bivalent negative radicals. Turmeric shows yellow colour in an acidic solution. What are the human activities that contribute to air pollution? Examples:  $ZnO + H2 \rightarrow Zn + H2O$  white bluish white  $2Fe2O3 + 6H2 \rightarrow 4Fe + 6H2O$  brown grey PbO + H2  $\rightarrow$  Pb + H2O yellow grey CuO + H2  $\rightarrow$  Cu + H2O black red 5. Which among the following is used to remove moisture from the surroundings? Hence, the number of atoms on either side of a chemical equation is balanced by keeping appropriate coefficients. So, he asked them, 'what type of change was involved in the activities performed by you yesterday?' Predict the answer given by them and justify. Decomposition of solid ammonium chloride is associated with change. Arrange the following in a proper sequence for the separation of constituents of gunpowder. It is, however, accepted in modern atomic theory with experimental evidence. Exosophere 4. (b) If the valencies have common factors, then they are divided by the highest common factor. However, the composition of a mixture, i.e., the proportion of its constituents may or may not be uniform throughout. As a result, moisture present in the air gets condensed and forms tiny water droplets on the outer walls of the container. Mass number: Mass number indicates the sum of protons (p) and neutrons (n) present inside the nucleus. 2NaHCO3 Sodium bicarbonate or sodium hydrogen carbonate (d) Action of dilute acids on metal carbonates and hydrogen carbonates. pRaCTICe QUesTIONs Directions for questions from 1 to 20 For each of the questions, four choices have been provided. Leguminous plants do not require the addition of nitrogenous fertilisers because (a) they can fix up atmospheric nitrogen. Describe the chemical reaction of CO2 with (a) lime water (b) metals like sodium, potassium and calcium (c) non-metals like carbon 75. A  $\rightarrow$  c B $\rightarrow$ d C $\rightarrow$ b D $\rightarrow$ a 4SO2 represents four sulphur dioxide molecules of chlorine Charge on of stannous ion is +2 Charge on of bisulphate is -1 Charge on silicate ion is -2 Lead nitrate is decomposed into PbO, NO2 and O2 Zinc displaces iron from FeSO4 Mutual exchange of ions takes place when NaCl and AgNO3 react Sulphur combines with oxygen to form sulphur dioxide Level 2 1. Formula of washing soda is Na2CO3. For Hints and Explanations, please visit www.pearsoned.co.in/IITFoundationSeries CONCepT ApplICATION Directions for questions from 1 to 10 State whether the following statements are true or false. (c) Rate of evaporation is inversely proportional to surface area of a liquid. True 8. c 20. Explain the process of nitrogen fixation. Bromine is a liquid, and hence, it possesses stronger intermolecular forces of attractions. Hence, tin-coated containers are preferred over zinc-coated ones as tin is less reactive than Zn. 12. They both enjoyed swimming hours together. It dilutes the activity of oxygen, and thus, prevents rapid burning. Which among the following is a pure substance? Then, A, B and C may be, respectively (a) SO3, MgO, NO (b) SO2, CaO, CO2 (c) CO,Na2O, SO3 (d) SO2, Ca(OH)2, NO2 4. Solidification or freezing. The liberated oxygen is the source for the combustion of carbon and sulphur. solution The rate of evaporation of water depends on humidity (moisture present in atmosphere). (d) The formation of a compound is a physical process. A drop of water contains (a) 2 atoms of hydrogen and 1 atom of oxygen. Exception: Zinc is neither malleable nor ductile Sonorous Found in a combined state. Table 2.7 Some of the negative radicals Formulas of radical NO2- NO3- SO3-2 SO4-2 CO3-2 PO4-3 HCO3- HSO3- HSO3-Chromate Silicate Zincate In nature, a number of compounds are found. Gases form homogeneous mixture due to their (a) diffusibility (b) high compressibility (c) expansibility (c) expansibility (d) low density 35. b 23. Magnesium is an element and contains only magnesium atoms. (b) In a compound, constituents do not retain their properties. An atom of M possesses 14 electrons in the second last shell and N is the last shell.  $S + O2 \rightarrow SO2 2SO2 + O2 \rightarrow 2SO3 SO3 + H2O \rightarrow H2SO4$  Neutralisation: The reaction between an acid and a base invariably gives salt and water and is called neutralisation. X is a base which is soluble in water. (b) Water gas obtained is made to pass over Fe2O3 or Cr2O3 along with superheated steam at 500°C. Takes the shape of the container b. The increase in the proportion of \_\_\_\_\_\_ in air leads to global warming. Explain hydrogenation of constituents of gunpowder. Excess intake of O2 by a person results in several ill-effects. NaCl + AgNO3 () → NaNO3+ AgCl c. 11 11. Dogs stretch out their tongues generally in summer because (a) evaporation leads to cooling. Mention the postulates and limitations of Dalton's atomic theory. In the ionosphere, a layer of atmosphere, TV waves do not get reflected. (a) Si (b) Al (c) O2 (d) Fe 15. Metal with one electron in valence shell forms a base with the formula MOH. Arrange the components of air in the increasing order of their percentage by volume. Calculate the volume of nitrogen, oxygen and carbon dioxide in 750 L of air. (b) the boiling point of air is greater than that of argon or nitrogen. The liquids which are insoluble in each other are called immiscible liquids. weak acid 13. This reaction is called neutralisation. P2O5 + H2O → () c. Magnetosphere absorbs ionising radiations and most of the weather phenomena occur in the troposphere. The rate of evaporation depends on the surface area of liquids. HNO2 Column B A. K 2, L, 8 M 8 N 2 Hence, the valency of an atom of an element (M) with above electronic configuration is 2 and by losing two electrons it attains an octet configuration. Example: Ice changes to water at 0°C under normal atmospheric pressure. Na2O + H2O → 2MgO Magnesium hydroxide turns red litmus paper to blue. The mixture is poured gently into the filter cone and collected into another beaker. When they came out of swimming pool, both were shivering and fighting for the towel. (X) K 2 L 8 M X (Y) K 2 L 8 M X (Y) K 2 L 8 M X (Y) K 2 L 8 8-2 1 = 8- X 1 8-X=8-2 X=2 Stable ion of X is X+2 and of Y is Y-2. (c) The magnitude of valencies should be interchanged and written as subscripts on the right side of the respective ions. Zinc

can react with acids present in food material and as a result food items cannot be consumed. Marble is made of CaCO3 which gets dissolved when it reacts with acids like H2SO4 or HNO3 of acid rains. There the workers offered her coconut water. (a) formation of clouds (b) formation of clouds (b) formation of clouds (c) manufacture of milk powder from milk (d) formation of clouds (d) format black coating on the walls of a tube light 13. a 15. (d) sedimentation and decantation. True Fill in the blanks 11. Atomic Structure and Transformation of Matter (d) Most of the weather phenomena occur income this layer due towith rapiddilvariations in temperature. A drop of water contains millions of molecules of water. (b) Zinc acts as a preservative. Your feedback plays a critical role in the evolution of our products and you can contact us - [email protected] We look forward to it. Dalton's Atomic Theory In 1808, John Dalton proposed the atomic theory. Evaporation is the process of conversion of (a) a liquid to its gaseous state below the boiling point of the substance. Many fuel gases contain hydrogen as a major constituent because of its high calorific value. Chemical displacement: When a few pieces of zinc are dipped in green-coloured ferrous sulphate solution, the colour disappears after some time and iron is found to be deposited. Ca(OH)2 + CO2  $\rightarrow$  CaCO3 Note: When excess CO2 is passed through the above solution, the precipitate dissolves due to the formation of Ca(HCO3)2 CaCO3 + H2O + CO2  $\rightarrow$  C(HCO3)2 Metals like Na, K and Ca react with CO2 to form corresponding oxides. 2.2 Chapter 2 INTRODUCTION From time immemorial, different scientific researches and studies have been in progress to explore the basic constituents of matter. All organic acids are weak acids. a, c (i) magnetic separation (ii) sublimation C -> c Odonil, used in washrooms, works on the principle of sublimation. Can you explain the principle behind using straw for the above purpose? Meteors Weather balloon Mount Everest Figure 4.1 Layers of atmosphere Nitrogen and oxygen are the two major components of air by volume which make up approximately 99 per cent of the dry atmosphere. Phosphorus - PH3, Potassium - KH Nitrogen - NH3 Sulphur - H2S Argon does not form any compound 26. b 15. 56. Hg + S → HgS It is an element-element combination, i.e., a synthesis reaction. These are the major contributors to global warming. The formula of a compound should be written in such a way that the positive and negative charges are neutralised. c 29. Use the crisscross method to obtain the formulae of the compound that is formed using the given radicals. (a) soda water (b) liquid ammonia (c) milk (d) sugar water 22. • Oxides of metals and non-metals, on hydrolysis, give bases and acids, respectively. Give examples with equations. (1) NaOH + H2SO4  $\rightarrow$  NaHSO4 + H2O (2) 4Na + O2  $\rightarrow$  2NaOH (a) 1324 (b) 2314 (c) 2413 (d) 4213 30. Distinguish between malleability and ductility with examples. A. SO3 of hydrolysis gives H2SO4 which is a strong diverse of the strong diverse o acid. 48. Distinguish between compounds and mixtures. A → b B→a C→d 28. Thus, it indicates that CO2 is soluble in water. (b) Write a short note on (i) hazards of carbon monoxide 77. (c) Tin does not react with the components of food material. Table 1.2 represents the comparative study of physical properties of the different states of matter. Which of the following phenomenon is an effect of acid rain? The protons and neutrons present inside the nucleus are called nucleons. Components of a mixture are separated by different physical methods based on the difference in their physical methods based on the difference in t atmosphere. (a) XCl3 (b) XCl5 (c) X2Cl5 (d) X3Cl2 32. 14 electrons in the N shell and 2 electrons in the N shell correspond to the metal 'Fe.' X is nitrogen which is required for combustion. c 23. Classify the chemical reactions into various types depending on the way the products are formed by giving suitable examples. P2O5 when dissolved in water forms phosphoric acid (H3PO4). magnetic separation 21. Properties height isdecreases called or ozone layer. n 5. Catalytic convertors consist of ceramic honey comb like structures with platinum catalyst spread out. As A turns blue litmus to red, it is acidic in nature. The smallest particle of an element which may or 17. + 5 - X2O5 Since the valency of chloride ion is 1, the formula of the above chloride ion is 1, the formula of the above chloride ion is 1, the formula of the valency of chloride ion is 1, the formula of the above chloride ion is 1, the above chloride ion is 1, the above ch 2 2.34 32. Mention two important uses of the following acids and also mention the property exploited. (a) Nitrogen (b) Neon (c) Hydrogen (d) Copper pRaCTICE QUESTIONS Directions from 1 to 10 Fill in the blanks. Among these, air is the most vital for life, and hence, indispensable. Every liquid exists in its vapour state over its surface at normal temperature and pressure. Reason (R): Properties of NaHCO3 are absolutely different from sodium, carbon, hydrogen and oxygen. b 33. (b) Electrical cells are also designed in which hydrogen gas is used. Nitric acid Multiple choice questions 21. (b) 1 molecule of hydrogen and 1 atom of oxygen. few of water 22. (b) effervescence is observed in case of X but not Y. A gas: X when passed through blue litmus solution turns it to red. An element X on treatment with oxygen gives X when passed through blue litmus solution turns it to red. An element X on treatment with oxygen gives X when passed through blue litmus solution turns it to red. An element X on treatment with oxygen gives X when passed through blue litmus solution turns it to red. the different types of water (hard and soft), causes of hardness and methods of removal of different kinds of hardness. (b) Ferrous sulphate Fe+2 SO4-2 \ Formula is FeSO4. Among completing this After chapter, you the to these, air is the most vital for life and hence indispensable. It also gives good appearance for the articles. (a) K2SO4 (b) Na2HPO4 (c) KH2PO4 (d) Na3PO4 3. (a) chlorofluoro carbons (b) dry ice (c) carbon dioxide gas (d) inert gases 21. Multiple choice questions 4. The mass of one neutron is also taken as 1 amu. Monobasic weak acid among the following is (a) carbonic acid (b) oxalic acid (c) acetic acid (c) and in a hurry, brought some acid to clean the floor. -15°C to region -120°C. The ions included in Tables 2.2 and 2.3 contain only one element. Hence, 100°C is called boiling point of water. A → b Bridges and electric poles are coated with red lead oxide to prevent corrosion. Artificial respiration: It is used for artificial respiration in the places where there is no sufficient supply of oxygen. A  $\rightarrow$  c B $\rightarrow$ d C $\rightarrow$ b D $\rightarrow$ a Formula of green vitriol is FeSO4.7H2O Formula of blue vitriol is CuSO4.5H2O Formula of blue vitriol is CuSO4.7H2O Formula of blue vitriol v that are released into the atmosphere due to various processes and their effects on environment Pollutants Carbon monoxide Sulphur dioxide (ii) Industries (iii) Industries (iii) Industries (iii) Industries (iii) Decrease in forest area Industries (i) Air conditioners, organic chemicals (ii) Refrigeration systems (i) Automobiles (Pb) (ii) Thermal power plants (Pb, Hg, As, Co, Cu) (i) Automobiles (ii) D egradation of organic wastes Thermal power plants (Pb, Hg, As, Co, Cu) (i) Automobiles (iii) D egradation of organic wastes Thermal power plants (Pb, Hg, As, Co, Cu) (i) Automobiles (Pb, Hg, As, Co, Cu) (i) Automobiles (iii) D egradation of organic wastes Thermal power plants (Pb, Hg, As, Co, Cu) (i) Automobiles (Pb, Hg, As, Co, Cu) (i) Automobil smog (SPM) Processes Incomplete combustion of fuels (ii) Incomplete combustion of fuels (ii) Respiratory disorders (i) Formation of smog (ii) Respiratory disorders (i) Formation of smog (ii) Causes acid rain Global warming Global warming Depletion of ozone layer (i) Present in petrol as (i) Nervous disorders anti-knock agents (ii) Cancer Exhaust gas (i) Carcinogenic Combustion of coal Exhaust gas (i) M etal oxides and toxic metals of fly ash cause health problems (ii) Silica causes bronchitis and lung cancer (iii) Contamination of ground water and clogging of drainage (i) Lung and respiratory disorders Air and Oxygen Hazards of Air Pollution and Their Prevention 1. Explain ozone depletion. pRaCTICe QUesTIONs 1. B - a Purification of drinking water which contains suspended matter is based on the principle of filtration. (a) the decomposition of HNO3 and formation of NO Acids, Bases and Salts 9. (4) burning of a non-metal with a brilliant blue flame. (c) the constituents of a mixture can be separated by physical method. Name the gas which absorbs ultraviolet rays. (c) Molecular formula of a compound changes. Match the following. Representation: AB + XY → AY + XB Where B and Y are the negative radicals which are exchanged to give AY and XB. (a) gas carbon (b) diamond (c) graphite (d) carbon fibre 39. (d) during formation of mixtures there is a change in the molecular composition. Though phosphorus acid contains three hydrogen molecules, it is a dibasic acid. (d) Solid retained on the filter paper is called residue. 31.C Column A A. (a) C, CO2, CaCO3 (b) S, SO2, Ca(HSO3)2 (d) C, CO2, CA(HSO3)2 Minimising Air Pollution The following safe measures can be adopted so as to minimise air pollution. In this process, CO2 and H2O combine in the presence of sunlight to form glucose and O2 which is added to the atmosphere. (1) By using moist blue litmus paper, classify the following compounds given below as acids and bases: Ca(OH)2, H2SO4 CH3COOH, NaOH, KOH, Mg(OH)2, HNO3, NH4OH (2) Mention the acidic or basic or neutral nature of solutions by using (a) litmus (b) methyl orange (c) phenolphthalein indicators 75. The usage of refrigerators and air conditioners releases chlorofluoro carbons which does not contribute to SPM. D -> b Atomic number of boron is 5 and electronic configuration is 2, 3, valency = 3. Why is nitric acid used in the purification of gold? Hence, tin-coated containers are preferred over zinc-coated ones as tin is less reactive than Zn. 5. Therefore, it takes 2 electrons from two potassium atoms and forms K2O. Identify the products formed on dissolution. Every compound is a pure substance. Which of the products formed on the purification of gold? Hence, tin-coated containers are preferred over zinc-coated ones as tin is less reactive than Zn. 5. Therefore, it takes 2 electrons from two potassium atoms and forms K2O. Identify the products formed on the purification of gold? following is a physical change? Which among the following statements is true? X on complete reaction with another compound Y gave the product which did not respond to litmus test. a 14. They always form heterogeneous mixtures. Joseph Priestly, an English chemist, prepared oxygen by focusing sun rays with the help of convex lens on mercuric oxide taken in a test tube. gaseous 10. B can be CO2 since it does not cause acid rain. Separation of the mixture constituting two solids (a) One constituent is a sublimable substance. Identify the coefficients of H2SO4 and H2C2O4 in the above equation. Explain the corrosive action of acids and alkalies. acid mixtures. Also calculate the number of protons. Dilutes the activity of oxygen () e. (d) it is heterogeneous in nature. What was her father's correct explanation to her question? There are very few atoms which exist independently. (i) Reaction with sodium (Na): Sodium reacts with O2 vigorously at room temperature to form sodium oxide. Since air consists of an active component that is oxygen, it oxidises tungsten filament or any other metal used as a filament. Preservation of food items B. CO2 + H2O → H2CO3 It reacts with alkali (base) to form salt and water. 8Cl2 () d. Protons Protons are positively charged particles carrying a charge of +1.6 × 10-19 Coulombs or +4.8 × 10-10 esu. The NO2 and SO2 percentage content in the atmosphere can be decreased by using equipment like scrubbers. Identify A and B. (b) The mixture of camphor and sand is taken in the china dish and an inverted funnel is kept on it. Compare three different states of matter with respect to the arrangement of molecules and their related parameters. Hydrogen peroxide Calcium carbonate Zinc granules Nitre ))))) Column B a. 1. Highly soluble nature of nitrate salts. (v) Placement of the electronic configuration. Example Name the different layers of atmosphere. (a) The change is temporary. Meteorites collide with molecules present in this layer, and thus emit, light known as shooting stars. c 18. (a) deep-sea diving (b) mountaineering (c) travelling in an aeroplane (d) walking on the moon 22. (i) (ii) (iii) (iv) (v) (vi) Ferric hydroxide and hydroxide and sulpheric acid Sodium hydroxide and phosphoric acid Sodium chloride Barium sulphate Ferric phosphate 3.29 Match the following 39. (a) XH (b) XH2 (c) XH3 (d) X2H4 3. a 12. Acidic salt It contains replaceable hydrogen ions. The acids which contain hydrogen and another non-metal are called hydracids. Na2CO3 10H2O () b. Bleaching powder () e. Name the salt used for the manufacture of glass. c 3. • Nature of salts or substances Properties exploited Efflorescent Deliquescent Hygroscopic Lose water of crystallisation on exposure to air and undergo change in state Absorb moisture without undergoing any change in state 3.13 3.14 Chapter 3 • Oxyacid Sulphuric acid Sulphurous acid Hydrochloric acid Nitric acid Nitric acid Nitric acid Nitric acid Nitric acid Corresponding salt suffix Sulphate Sulphate Sulphate Nitrite Phosphate • Certain salts are well known by their common names, rather than by their common names, rather  $\rightarrow$  a A  $\rightarrow$  d, B  $\rightarrow$  c, C  $\rightarrow$  b, D  $\rightarrow$  a 14. h I N T S A N D e x P L A N AT I O N 8. Kipps apparatus D. Complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts: The salt which contains one or more simple ions and one complex salts are salts and the salt which contains one or more simple ions and the salt which contains one or more simple ions and one complex salts are salt which contains one or more simple ions and one complex salt which contains one or more salt which contains are salt which contains are salt which contains are salt which contains one or more salt which contains are elements and compounds based on the nature of constituent atoms present in their molecule. 10 H2O Washing soda Sodium nitrate, NaNO3 Chile salt petre Potassium nitrate atmosphere, reacts with air, i.e., O2 and forms Al2O3. 58. Moreover, it maintains the temperature of the earth. (d) (A) is false but (R) is true. Example: In a molecule of aluminium ion is trivalent and carries +3 charge and chloride ions are monovalent and carries +3 charge and chlor  $2Fe(OH)3 + 4H2SO4 \rightarrow Fe2(SO4)3 + 6H2O$  (c)  $2Pb(NO3)2 \rightarrow 2PbO + 4NO2 + O2$  (d)  $2KNO3 + FeSO4 \rightarrow K2SO4 + Fe(NO3)2$  27. Since the salt can react with two molecules of base, the salt can react with two molecules of hydrogen are is present in sun's atmosphere up to 1.1 per cent. (e) Rusting of iron. Give the electronic configuration and geometrical representation of the following elements: (a) fluorine (b) sodium (c) chlorine (d) carbon 72. Burning of present in volcanic gases. (iii) The atmosphere protects us from harmful radiations. What is the action of litmus on oxygen? candle produces CO2 and water. This passive layer prevents the reaction between Al and H2SO4. Liquid hydrogen is used as a rocket fuel. (e) Identification of the atomic number of the atom. (a) edcba (b) edabc (c) abcde (d) cabde 3. Sodium dihydrogen phosphate B. (a) 2, 8, 5 and 2, 8, 4 (b) 2, 8, 8 and 2, 8, 6 (c) 2, 8, 8 and 2, 6, 6 (d) 2, 8, 6 and 2, 8, 4 12. a 30. (a) 2 4 3 1 (b) 2 3 4 1 (c) 4 1 3 2 (d) 4 3 1 2 7. er er Chapter Chapter Number Remember R them to memories to: to: and review the previous • define substance, mixture, mass, weight, etc. Mention the factors on which the existence of matter in a particular state depends. In a science fair, a student took two test tubes labelled A and B filled with copper sulphate solution, then he put magnesium ribbon in test tube A 2.27 and silver foil in test tube B. Soda water contains excess in dissolved state. (c) protons and neutrons. solution KOH has causticising action on skin, and therefore, it is called caustic potash. B-d Bodies of cars and buses are coated with enamel paint to prevent corrosion. • N are helpful for the growth of plants. SO3 + H2O  $\rightarrow$  H2SO4 7. (a) bacde (c) abced (d) ecbad 3. (4) Turns alkaline pyrogallol brown. a 7. Regeneration of oxygen: CO2 present in the atmosphere is used by the plants to prepare their food by the plan composition. pRACTICe QUesTIONs Level 1 1.18 Chapter 1 22. (b) A mixture of water and common salt. The salts of 'ous' acids are given 'ite' suffix and the salts of 'ic' acids are given 'ite' suffix. During the formation of a mixture the constituent substances are mixed physically, and hence, there is no change in molecular composition during the formation of a mixture the constituent substances are given 'ite' suffix and the salts of 'ic' acids are given 'ite' suffix. formation of a mixture. Identify the basic and acidic radicals in sodium nitrates. (a) marble (b) baking soda (c) green vitriol (d) all the above 11. Hence, vapour density is a relative term. (1) formation of metal nitrates (2) formation of nitrogen dioxide (3) formation of nitric oxide (4) formation of nitric acid (a) 3214 (b) 3241 (c) 2143 (d) 4213 Directions for questions from 38 to 40 Match the entries given in Column A with the appropriate ones in Column B. Sodium catches fire easily and chlorine is a harmful gas. (c) The valencies of zinc and oxide ion have common factors, and hence, they are divided by their highest common factor. This condition is called octet and the resultant electronic configuration. Depletion of ozone layer particulate matter () e. A  $\rightarrow$  b B $\rightarrow$ d C $\rightarrow$ c D $\rightarrow$ b 28. Metals contain less number of electrons in their valence shells and non-metals contain more number of electrons in their valence shells. d 14. Water sticks to2; may glass due to independent adhesive acting evaporation. The constituents of a compound do not retain their properties. It also would increase the rate of corrosion of metals and increase on hydrolysis gives only strong acid. S + O2 → SO2 (X) (Y) SO2 + Ca(OH)2 → CaSO3 → + H2O (Y) (Z) (milky white) h I N T s a N D e x p L a N aT I O N 33. If a solid non-metal X forms oxide of type X2O5, then the formula of its (c) water vapour (d) nitrogen dioxide 23. Tellurium shows the properties of both metals and non-metals. . Gases have the maximum intermolecular spaces, and hence, they diffuse in each other, forming a homogeneous mixture. (b) Y is neutral while X is acidic. After a while, the candle is removed and the inverted glass jar is placed in a trough of water. Concentrated acids or bases contain lesser proportion of water in contrast to the dilute acids or bases which contain larger proportion of water. Basic salts: When a diacidic or triacidic base is treated with an acid and less number of OH- ion. a metalloid and hence it showsispropersection with Which among the following a heterogeneous 10. Fill in the blanks 11. In a physical change, molecular composition, i.e., molecular formula remains the same. These mineral acids can be further classified on the basis of various characteristics (Table 3.2). Exceptions: Carbon, silicon Exceptions: Sodium, potassium, mercury have low melting and boron have high melting and boiling points points. Which among the following gases present in atmosphere does not contribute to global warming? The process of conversion of a solid state to a vapour state directly without passing through the intermittent liquid state is called sublimation. mixtures and understand the different methods to separate the mixture. (d) Gases are highly diffusible. Examples: (i) Potassium ferrocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) (ii) Sodium argentocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) (ii) Sodium argentocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) (ii) Sodium argentocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) (ii) Sodium argentocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) (ii) Sodium argentocyanide K4 [Fe (CN)6] 4 – (Simple ion) (Complex ion) ( derived from the acid from D which it is formed. Metals generally possess 1-3 electrons in their outermost shells and they tend to lose electrons for questions from 1 to 18 For each of the questions, four choices have been provided. H2O + CO2 () d. ---Therefore, the electronic configuration of an atom is 2, 7. Define radical. e TAbLe 4.7 Chemical Properties of Carbon dioxide radiations. Sedimentation () E. between water and glass. Electrons revolve round the nucleus in circular paths called orbits or shells. A → b Earthen pots work on the principle of evaporation. Potassium loses one electron to form K+ ion, oxygen requires 2 electrons to complete its octet. This 2/2/2017 2:42:28 PM (e) radiations. C→a Bicycle handles, rims are electroplated to avoid rusting. In the interior of cities, the density of population is more, as a result a large volume of traffic exists which leads to an increase in the gaseous contents such as CO2, methane and nitrous oxides which contribute to global warming. The variation in the composition of atmospheric air due to the release of harmful gases is called air pollution. (d) KNO3 is separated from its aqueous solution by heating it. Reason (R): On long standing H2SO4 undergoes decomposition to form SO2. Electronic configuration of neutral atom is K 2 L 8 M 3 Therefore, the ratio of the electrons present in the K and M shells is 2 : 3. (a) calcium nitrate (b) calcium nitrate (c) calcium hydrogen nitrate (c) calcium hy salts. Cohesive and Adhesive Forces The forces of attraction between the molecules of two different substances. What was the teacher's explanation? takes place from the surface of a liquid mixture? depletes the ozone layer. 2, 8, 8 2, 8, 6 (Z) Mass number is 32 (A) for Y. Hence, the atmospheric pressure is maximum at sea level and is found to be equal to 1 atm or 760 mm of Hg. Significance of Oxygen and Oxygen and Oxygen which are major components of the atmosphere have very important associations with life. As we move to the Layers of density Atmosphere (c) The of the air and temperature gradually 2.8 Note boxes are some upper layers the temperature about 17°C 51°C. The inused temperature about 17°C 51°C. The inus 18°C 51°C. The inused temperatu composition, increase in height atoftheheights rate of from 6°C/km calledofbeing lapse rate. Most of the hydrogen is present in a combined state in nature. solution The presence of water vapour in atmosphere influences the climatic conditions. When a salt is dissolved in water, depending on the amount of salt dissolved in fixed amount of water, three types of solutions can be obtained. He prepared this gas by the action of H2SO4 on zinc. These high energetic electrons from the sun collide with the molecules like N2 and O2 present in the atmosphere. (a) H2 + Br2  $\rightarrow$  2HBr (b) HBr + NaOH  $\rightarrow$  NaBr + H2O (c) 2NaBr + Cl2  $\rightarrow$  2NaCl + Br2 (d) 2NaCl  $\rightarrow$  2Na + Cl2 Arrange the above reactions in order as double displacement reaction, combination reaction, decomposition reaction and displacement reaction. a/anCarbon fibre, a recently developed allotrope of 29. From metals: Metals on heating with oxygen give metal oxides which are basic in nature. Identify physical and chemical changes among the following: (a) Boiling of milk. Fill in the blanks (c) aluminium (d) phosphorus 1.28 Classification (a) dilute sulphuric acid Levelof1; Matter Level 15. solution Ozone present in stratosphere plays a vital role in protecting the life on earth's surface from harmful UV radiations. Therefore, the two type of liquids are miscible liquids. Iodine 15. Atomic Structure and Transformation of Matter 34. Ca 2. Electroplating: The metal iron is coated with another metal by the process called electroplating. (b) This layer absorbs harmful ionising radiations. He dipped it in a bottle containing concentrated nitric acid. FeSO4.7H2O is an example of hydrated salt. b 2. Property responsible for spreading of fragrance of a flower is Chemical formula of white lead is Pb(OH)2. Shakti said that nowadays autos are preferably run with CNG. When all the H+ ions in the acidic solution, it is called complete neutralisation. (c) physically in fixed ratio by weight. Classification of Matter 66. Which of the following processes does not contribute to the increase of suspended particulate matter in the atmosphere? 1 Figure Caption 5.2 Chapter 5 INTRODUCTION The uniqueness of the planet earth in the universe lies in it being inhabited by a wide variety of flora and fauna. These properties of gases allow a gas to diffuse easily into another. (iv) This salt is a combination of two simple salts. Which of 4 (b) 3 (c) 2 (d) 1 (e) 0 (a)  $A \rightarrow b B \rightarrow c, C \rightarrow d, D \rightarrow e, E \rightarrow d$  (c)  $A \rightarrow e, B \rightarrow c, C \rightarrow a, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (e)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (b)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (c)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (c)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (d)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (e)  $A \rightarrow e, B \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c$  (for a b, b \rightarrow c, C \rightarrow d, D \rightarrow b, E \rightarrow c (for a b, b \rightarrow c, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c \rightarrow c (for a b, C \rightarrow d, D \rightarrow c \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c \rightarrow c) (for a b, C \rightarrow c \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, D \rightarrow c, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, C \rightarrow d, D \rightarrow c) (for a b, D \rightarrow c, D \rightarrow c) (for a b, D \rightarrow c \rightarrow c) form carbonic acid. Therefore, it remains as a solid at the bottom of the container as precipitate. Surgical instruments, cutlery () d. Air and Oxygen The atmosphere holds the air we breathe, moisture and dust particles which are associated with • understand the importance of and Oxygen 4.12 theAirimportance • understand of interconversion of of QUesTIONs (1) burning of a non-metal produces dense white fumes. Table 3.15 Uses of bases Name of the Uses bases Sodium hydroxide. What type of reaction is that? Acids, Bases and Salts Examples: Strong acids Strong bases HCl  $\rightarrow$  H+ + Cl- $H2SO4 \rightarrow 2H+ + SO4 - 2 HNO3 \rightarrow H+ + NO3- NaOH \rightarrow Na+ + OH- Weak acids and Weak bases$ : The acids and Weak bases: The acids and bases which ionise partially and furnish less concentration of H+ and OH- ions, respectively are called weak acids and weak bases. balls and camphor undergo h I N T s A N D e x p l A N AT I O N 12. (a) MX2, MY (b) MX MY2 (c) M3X2, M2Y3 (d) M2X3, M3Y2 2. No. 1. Prevention: Reduction in the burning of fossil fuels, cigarettes, etc. Electric precipitator removes the suspended particulate matter which are charged exceptions are carbonates, sulphides and sulphates of some metals. Restricting the usage of plastic. To ensure this, the series has lucid content along with neatly-sketched diagrams and real-life application-based examples. Examples. define terms such as atoms, molecules, atomic numbers, etc. The formula of chloride of a corresponding metal is MCl2. Occurrence: Carbon dioxide is a gas which occupies about 0.003 per cent of the total volume of air. With an increase in the surface area of a liquid, the rate of evaporation . The atoms of all other elements do not possess the octet or duplet configuration. (a) Farmers add slaked lime to soil. Fuel would burn at a faster rate and become dangerous and it will be difficult to extinguish fires. Meteorites burn up in layer C. Freezing 44. In water, all the molecules are made up of two hydrogen atoms and one oxygen atom. Multiple questions 34. Then, the metal present in X may be (a) aluminium (b) copper (c) magnesium (d) manganese 27. Hydrochloric acid (HCl) is a monobasic acid. Naturally occurring diamonds are associated with some impurities. Mass of total positive charge present in an atom is 7348 times to that of the mass of a negativily charged particle. The acids which are obtained from the minerals present in earth are called mineral acids. However, 50 per cent of oxygen is present in the form of minerals, such as, silicates, carbonates and oxides of various metals. However, some substances do not undergo any change in physical state on the absorption of moisture from the atmospheric air. (a) ammonium hydroxide (b) aluminium hydroxide (c) sodium hydroxide 63. • understand the different methods to separate the mixtures. Limitations of Dalton's Atomic number of silicon is 14 and electronic configuration is 2, 8, 4, valency = 4. a 32. This is due to the presence of in solution state. Acidic sal () e. Corrosion of a metal involves change in Compounds of ammonia are used as fertilisers. The element X is sulphur which burns in oxygen to produce compound Y which (SO2) turns acidified potassium dichromate paper to green. The oxygen gas, evolved, appears in the form of bubbles and is collected in the gas jar inverted over the beehive shelf. KClO3  $\rightarrow$  KCl + O2 1-K-1 3-O-2 1 - Cl - 1 2KClO3  $\rightarrow$  KCl + 3O2 2-K-1 2 - Cl - 1 6-O-6 2KClO3  $\rightarrow$  2KCl + 3O2 2-K-2 2 - Cl - 2 6-O-2 3. The formulae of products are written on the left-hand side and the formulae of products are written on the left-hand side and the formulae of products are written on the right-hand side and the formulae of products are written on the right-hand side of an arrow. 44. Molecules of these substances consist of only one type of atoms. (X) (Y) NO + O2 → NO2 (Y) (Z) (reddish brown) O2 (Y) is neutral towards litmus while NO2 is acidic, and hence, turns moist blue to red. M+2 H2PO4-1 M(H2PO4)2 6. Name of the salt formed by treating calcium oxide solution with nitric acid is \_\_\_\_\_ . (a) passing of steam over a red hot coke. Any number of free surfaces e. Mention the factors which influence rusting of iron. During summer vacation Ravi decided to go to her grandparent's place at Delhi. Which among the following is the application? Neutrons are positively charged. INTRODUCTION matter andday correlate it with day to day activities matter and correlate it with day to activities Delivery tube Atmosphere of CO2. Oxides of nitrogen () a. Pure H2SO4 is colourless. It is then transferred to a beaker containing hot water. (a) chloroflurocarbons (b) ozone (c) nitrous oxide (d) water vapour 2. Calculate the number of neutrons in the following. Evaporation is a surface phenomenon, whereas boiling is a bulk phenomenon. a 29. Atomic S tructure and Transformation of Matter Table 2.2 Elements and their symbols using two letters Element Aluminium Symbol Al Arsenic As Argon Ar Barium Ba Beryllium Be Bromine Br Bismuth Bi Calcium Ca Cadmium Cd Chromium Cr Chlorine Cl Cobalt Co Palladium Pd Platinum Pt Selenium Sr 3. (d) very low temperatures in the thermosphere. Physical properties of Hydrogen are discussed in Table 4.11. b 24. xH O). Arrange the following points in a sequence to draw the geometrical representation of 20Ca40. Odonil undergoes sublimation, i.e., solid is converted into vapour state. Two thermometers A and B are dipped in water and alcohol, respectively taken in two containers of AssessmeNT Test 1 1. (d) writing the electronic configuration of the atom. Identify the probable characteristics of the gas. Table 3.4 Classification of acids based on basicity Types of acid Monobasic acid Basicity 1 Examples HCl  $\rightarrow$  H+ + Cl- HNO3  $\rightarrow$  H+ + CO3-2 H2CO3 2H+ + CO3-2 H2C  $Na++OH-KOH \rightarrow K++OH-NH4OH$  NH4++OH-Dibasic acid 2 Ca(OH)2 Ca+2+2OH-Tribasic acid 3 Al(OH)3 Al+3+3OH-Methods of Preparation of Acids and Bases Acids 1. Mass number = Number of protons + Number of neutrons = Mass number = Atomic number + Number of neutrons = A = Z + Number of Number of Number + Nu neutrons  $\therefore$  Number of neutrons = A - Z Example: Na  $\rightarrow$  Z = 11, A = 23 Number of neutrons = A - Z = 23 - 11 = 12 2.5 2.6 Chapter 2 The atomic numbers of three elements A, B and C are 10, 18 and 8, respectively. (b) Use non-conventional sources of energy. (i) Al(OH)3 + HCl  $\rightarrow$  Al (OH)2Cl + H2O (ii) Al(OH)2Cl + H2O (iii) Al(OH)Cl2 + H2O (iii) Al(OH)Cl2 + H2O (iii) Al(OH)Cl2 + H2O (i) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (iii) Al(OH)Cl2 + H2O (i) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (iii) Al(OH)Cl2 + H2O (i) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (ii) Al(OH)Cl2 + H2O (iii) Al(Oand compounds are the substances in which the composition is uniform throughout the matter, and hence, they are said to be homogeneous. CO2 gas dissolves in water to form carbonic acid (H2CO3). mixtures. Air and Oxygen 34. This layer absorbs harmful UVit doesn't support burning of other substances in (c) the Meteorites burn upis in this ozonosphere layer. Pickles are generally not stored in tin vessels as tin reacts with acids present in the pickles. e surface stratosphere. Calculate the ratio of number of electrons present in the K and M shells of the neutral atom. The solid may be soluble or insoluble in the liquid. It ionises in water and gives hydroxyl ions. Atomic S tructure and Transformation of Matter Table 2.8 Examples of different compositions 1 hydrogen atom 1 chlorine atom Nitric acid HNO3 1 hydrogen atom 2 oxygen atoms Carbon monoxide CO 1 carbon atom 1 oxygen atoms Sulphur dioxide SO2 1 sulphur atom 2 oxygen atoms Sulphur atom 3 oxygen atoms Nitrogen atoms 3 oxygen atoms Nitrogen atoms 3 oxygen atoms Nitrogen atoms 3 oxygen atoms 1 oxyg nitrogen atoms 5 oxygen atoms Phosphorus trioxide P2O3 2 phosphorus atoms 3 oxygen atoms 4 hydrogen atoms 4 hydrogen atoms 5 oxygen atoms 6 oxygen atoms 5 oxygen atoms 6 oxygen atoms 7 oxygen number of radicals present in a molecule is more than one. Find out its mass number if it consists of 10 neutrons. The residue obtained contains carbon powder and nitre. Hence, SO2 is acidic in nature. Silicate Column B Three oxygen molecules of chlorine Eight molecules of chlorine Eight molecules of 10 neutrons. The residue obtained contains carbon powder and nitre. sodium ions Column B Charges () () () () () () a. Acids act as good conductors of electricity when they are in ionised state. (b) It holds the maximum percentage of the total massof of collection the atmosphere. The gas rekindles a glowing splinter. Physical Properties of Acids and Bases The physical properties of acids and bases are listed in Table 3.6. Table 3.6 Physical properties of acids and bases Properties Colour Taste Touch Solubility Acids mereat with iron or tin to form harmful salts. c 36. Acidic salts: When a dibasic or tribasic acid is treated with a base and less number of H+ ions are replaced by the metal ions of the base, then the salt formed is still left with at least one hydrogen molecule. (a) sodium, manganese 38. Immediately, the mercury which was spilled over was removed by the lab incharge by sprinkling sulphur on it. (d) both colour and volume only. (a) Reaction of red hot iron with steam to give Fe3O4. 29. In displacement reactions, application of metal reactivity series is involved. The pure substance in which the molecules are made up of two or more different types of atoms is called compound. In the case of container 'Y,' the rate of evaporation is more, and hence, decrease in temperature is more. Auroras appear in the layer of atmosphere which is known as \_\_\_\_\_\_. Identify the coefficient of H2SO4 in the above equation. D - c Suspended particulate matter involved in the formation of smog. Generally, pickles are stored in (a) tin vessels or glass vessels (b) tin vessels or glass vessels (c) glass vessels or plastic vessels (d) aluminium vessels or tin vessels 8. The composition of air does not remain uniform throughout the atmosphere. 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above thenot stratosphere which toofabout 8590 km above theorem 2. The composition of high energetic UV Above theorem 2. The composition of air does not remain uniform throughout the atmosphere. 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 2 eare (a) The layer above theorem 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height about km the -from 4.7. (c) Temperature does toextends a height ab temperature increases with height due to the - is calledthis, mesosphere. • Calcium hydroxide is used for white washing and preparation of mortar. This page is intentionally left blank CLASS 7 Pearson IIT Foundation Series Chemistry Sixth Edition Trishna Knowledge Systems Copyright © 2017 Pearson India Education Services Pvt. Shuttle Aurora Mesosphere Auroras: The auroras (northern and southern lights) appear as luminous bands or streams, which extend to altitudes of 320 km and are visible from the surface of the earth at the higher northern or southern latitudes. If the salt so formed can react with the same base in 1 : 2 ratio, predict the formula of the salt X. The maximum number of electrons that can be accommodated in the outermost orbit is equal to  $B \rightarrow c$  Sawdust remains suspended in the water and separated by filtration. Evaporation, bulk phenomenon 12. atmosphere holds the air we breathe, moisture and dust particles which are associated with (i)The Troposphere F I G U R E 1. (3) heating of one of the binary compound of hydrogen. The electronic arrangement of X must be 2, 8, 18, 2. 3.25 3.26 Chapter 3 TeST YOUR CONCePTS Fill in the blanks 1. Uses of salts are listed in Table 3.16. Classification of Matter 41. Hence, it cannot be collected by the downward displacement of water. A stable neutral atom X contains two completelyfilled orbits. c 19. C?onceptual clarity and gaining mastery over the art of problem-solving are the central theme?s of th?e series. The nucleus consists of (a) proton and electrons. The outermost shell of an atom is called valence shell. (i) The positive ion, i.e., Zn+2 followed by the negative ion, i.e., O-2 are written with their charges. Why are droplets of water observed on the outer walls of a glass tumbler containing ice? Acids, Bases and Salts 12. Major Factors That Contribute to Air Pollution 1. No. (i) (ii) Compounds Positive radical CaSiO3 H2SO3 50. Select the correct alternative. That means n = 2 and the number of electrons in the L shell is 2n + 1 which is equal to 5. No part of this eBook may be used or reproduced in any manner whatsoever without the publisher's prior written consent. Ca+2 NO3-1 3. This on heating loses water of crystallisation and forms anhydrous salt which is colourless. In washing soda (Na2CO3), the constituents are combined chemically in a fixed ratio of their weights, and hence, it is a compound. Example People are advised to wear cotton clothes in summer. (a) The layer of atmosphere which begins at the earth's surface and extends up to 20 km height Physical Properties of Carbon - dioxide(CO2) is called troposphere. c 25. Among the following types of chemical reactions, application of metal reactivity series is involved with which reaction? 41. Na2CO3.10H2O 18. Converted into its liquid state at atmospheric pressure is called the melting point of the solid. 75. (a) bromine, mercury (b) gallium, bromine (c) bromine, sodium (d) carbon, potassium 37. Match the elements in column A with the valency exhibited by the element given in column B. In the following table, some compounds are listed. Salts have high melting points. Since X is used in white washing, X is Ca(OH)2, Y is CO2 and Z is CaCO3 as it is used for construction of monuments. (c) air has impurities like dust particles. Registered Office: 4th Floor, Software Block, Elnet Software City, TS-140, Block 2 & 9, Rajiv Gandhi Salai, Taramani, Chennai 600 113, Tamil Nadu, India. Examples: 2NaOH + H2SO4 → Na2SO4 + 2H2O 2H3PO4 + 3Ca(OH)2 → Ca3(PO4)2 + 6H2O 2. The solid obtained on cooling the vapour is called sublimate and the gas solid vapour formed is called sublime. (a) (b) (c) (d) calcium hydroxide, potassium hydroxide, copper hydroxide, copper hydroxide, copper hydroxide, copper hydroxide, copper hydroxide, copper hydroxide sodium h oxygen, carbon dioxide, nitrogen and hydrogen. Decomposition of limestone takes place at higher temperatures. The comparative study of three different states of matter Parameters is presented in Table 1.1. Table 1.1. Table 1.1. Table 1.1. molecules Intermolecular space Solids Very closely packed Negligible Intermolecular force of attraction Type(s) of movement of molecules Vibrate to and fro about a fixed position Liquids Loosely packed More than that among the solid molecules Vibrate to and fro, rotate around their own axis and move from one place to other within a certain limit Gases Very loosely packed Maximum among the three states of matter Negligible Vibrate to and fro, rotate around their own axis and move from one place to other randomly in all directions with much higher speed than the liquid molecules Classification of Matter Due to the above differences, matter around us exhibits differences in the physical properties. (c) Sawdust is left after iodine separates. As C is neutral in nature, i.e., a normal salt solution. Sublimation: The process by which some solid substances directly change into the vapour state without passing through the intermediate liquid state is called sublimation. 1. Tangy taste imparted to water. d 25. Name the liquid which can be used for the measurement of high temperatures. Causes acid rain C. Table 1.2 Comparative study of physical properties of solids, liquids and gases Parameter Mass Volume Shape Solids Definite mass Definite shape Thermal expansion High density Incompressible Rigid (cannot flow) Any number of free surfaces Very low Diffusion Do not diffuse Density Compressible Fluid (can flow) One free surfaces Very low Diffusion Do not diffuse Density than solids Slightly compressible Fluid (can flow) One free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Compressibility Rigidity Free surfaces Very low Diffusion Do not diffuse Density Rigidity Free surfaces Very low Diffuse Density Rigidity Rigid i.e., only the upper surface Higher than solids Some liquids can diffuse spontaneously into another (e.g., water and alcohol), but others cannot (e.g., oil and water) Gases Definite mass No definite shape Least density Highly compressible Fluid (can flow) No free surfaces Much greater than both solids and liquids Gases diffuse spontaneously and rapidly Interconversion of States of Matter The existence of matter in a particular state depends on two factors, i.e., temperature and pressure. Nascent hydrogen is usually produced by the reaction of metals with acids, e.g., zinc and sulphuric acid. The temperature at which a solid gets converted into a liquid is called melting point. Reason (R): Calcium bicarbonate is soluble in water. What is meant by synthesis reaction? Such substances are called deliquescent substances are called deliquescent substances. Arrange the following equations in the correct sequence to obtain a normal salt. Electronic configuration of X is 2, 8 A - Z = number of neutrons A - 10 = 10 · mass number (A) is = 20 23. H2C = CH2 · mass number (A) is = 2  $H2 \rightarrow H3C - CH3$  Ethylene Ethane This principle is used in the process of hydrogenation of oils or hardening of oils. O2 is collected by downward displacement of air. Identify the acid used in the purification of metals like gold and silver (a) sulphuric acid (b) phosphoric acid (c) hydrochloric acid (d) nitric acid 19. In the following table, some commonly used positive and negative radicals are listed. c 17. These salts are formed by partial neutralisation. What happens when potassium nitrate is subjected to heating? These droplets appear as fog and mist. Match the following Column A A. Preservation of foodstuffs: It is used to preserve food grains. As a result, it forms an oxide layer on Al rod which acts as a passive layer. (3) This salt consists of one basic radical and one acidic radical a (a) calcium oxide (b) sodium oxide (c) common salt (d) calcium chloride 28. (a) 3 2 4 1 (b) 2 3 4 1 (c) 1 4 3 2 (d) 3 4 1 2 4.33 4.34 Chapter 4 Test 2 Directions for questions from 1 to 15 Select the correct alternative from the given choices. b 34. Collection of the gas should be done only after the expulsion of air. Sulphuric acid can form various salts which are soluble in water. A  $\rightarrow$  e Methyl orange shows pink colour in an acidic solution. chemical methods 16. E  $\rightarrow$  d Iron is magnetic and sulphur is non-magnetic in nature. Fr Examples: Camphor, iodine, etc., get converted into their respective vapour states directly under normal atmospheric pressure. Assertion (A): Hydrogen gas is one of the components in both oxyhydrogen flame and oxyacetylene flame. During the formation of a mixture the constituent substances are mixed physically, and hence, there is no change in molecular composition during. Iron is an element and rust is a compound of iron in which iron does not retain its properties. The number of protons present in the nucleus of two elements X and Y and their dinegative ions possess 8 electrons in the L and M shells, respectively. (d) all the above. Write the steps in balancing a chemical equation with an example. Bromine is a liquid, and hence, it possesses stronger intermolecular forces of attractions than gases. The electronic configuration of the of the dinegative ion with 8 electrons in valence shell (L shell) is  $X-2 \times Y \rightarrow \rightarrow \rightarrow 2$ , 8 2, 6 (Z) Mass number is 32 (A) for Y. Deliquescent () c. Y reacts with a mass number is 16, 2, 8, 8 2, 8, 6 (Z) mass number is 32 (A) for Y. Deliquescent () c. Y reacts with a mass number is 16, 2, 8, 8 2, 8, 6 (Z) mass number is 32 (A) for Y. Deliquescent () c. Y reacts with a mass number is 32 (A) for Y. Deliquescent () c. Y reacts neutral oxide and evolves Z which is composed of reddish brown fumes which turns moist blue litmus to red. Hence, they can be separated by distillation. It is used in the manufacture of ammonia. The acids which are obtained from the minerals present in the earth are called mineral acids. (b) Dissolution of CO2 in water at high pressure. (a) Slaked lime and sulphuric acid (b) Sodium bicarbonate and hydrochloric acid is used in soda water and soft drinks. Observations and inferences Chemical equations Burns with a brilliant golden yellow flame. But air is not filled in electric bulbs because (a) the active component of air oxidises the filament. A -> e The major constituent of carbogen is oxygen. Solid state is incompressible as the force of attraction is strong and intermolecular space is less. Distinguish between cations and anions. Which of the following process is not associated with the formation of metal nitrates in soil? The thermal expansion of solids is the least among the three states of matter. Between water and glass molecules, adhesive forces, and hence water droplets are observed on the inner walls of the glass tube X. The clear liquid that is collected in the other beaker is called a filtrate and the solid retained on the filter paper is known as the residue. Weak acid () b. (a) X is basic while Y is neutral. Making of white lead Air and Oxygen 4.29 Level 2 Select the correct alternative 1. km above Give the electronic configuration and geometrical representation of the following wise to apply the earth's surfaceofisthe called stratosphere. d 5. Moreover, it produces a very small amount of O2. Chapter 1 Column A A. Hence, CNG can be a substitute for petrol and diesel. (d) All the above. Give the characteristics (symbol, charge and mass) of all fundamental particles. The components present in gunpowder are KNO3, C and S. 1.23 1.24 Chapter 1 TesT YOUR CONCepTs Fill in the blanks 1. Generally used antacids are magnesium hydroxide. Thus, iron filings are separated from the sand. This is because more chemical methods. Atom B. Ca(OH)2 + CO2 → CaCO3 + H2O X Y Z CaCO3 + H2O + CO2 → Ca(HCO3)2. Air and Oxygen (b) The density of air is lesser than the mesosphere. The entire apparatus should be kept air tight. (a) 4 (b) 3 (c) 1 (d) 2 22. What is the action of litmus on an acid and a base? As we move to higher altitudes, fountain pen ink leaks out because of lower atmospheric pressure. 3O2 B. Name the acid and base from which the following salts are formed. ThiseAcidic. 2/2/2017 3:07:00 PM CO2 + H2O → H2CO3 Chapter Insights 1.14 xiii Classification of Matter TeST YOUR CONCepTS Very Short Answer Type Questions Directions for questions 1 to 10: Fill in the blanks. 8 14. Sublimation is involved in 4.44 Chapter 4 7. Carbon dioxide 7. (a) X (b) Y (c) Z (d) Cannot be predicted. Evaporation takes place from the surface of a liquid, and hence, it is a surface phenomenon. A  $\rightarrow$  b B  $\rightarrow$  c C  $\rightarrow$  d D  $\rightarrow$ a Level 2 Multiple choice questions 1. Then the mass numbers would be in the ratio of (a) 1 : 2 (b) 3 : 5 (c) 12 : 19 (d) 2 : 3 15. 30 mL of water is taken in a beaker and 15 mL of oil is poured into it and the mixture is stirred with the help of a glass rod. These are called hydrated salts. (c) A mixture of water and sawdust. c 37. Solubility increases with increases in pressure Heavier than air, vapour density = 22 Acidic. During precipitation, it reaches soil and reacts with metal carbonates to form corresponding nitrates, and these nitrates are assimilated by plants. Hence, these gases maintain the temperature of the earth's surface. A teacher demonstrated action of acids on metals in a laboratory. Experiments to Show the Miscibility/Immiscibility of Two Liquids 1. In the case of an insoluble solid, it may float on the surface of the liquid or remain suspended in the liquid or settle down. (a) The mixture is covered with an inverted funnel. Fe + H2SO4  $\rightarrow$  FeSO4 + H2  $\uparrow$  Fe + CuSO4(aq)  $\rightarrow$  FeSO4 + H2  $\downarrow$  Fe + CuSO4(aq)  $\rightarrow$  reactants (compounds) exchange their respective radicals and two other new compounds are formed is called double displacement reaction. What is the role of water vapour in the formation of fog? Each substance has a definite molecular composition. Ratio of mass numbers = 16 : 32; 1 : 2 15. Chemical formula of white lead is Among the above-mentioned factors volcanic eruptions, forest fires and pollination are natural ways of contributing to air pollution. Second reaction is wrongly balanced. Therefore, density of water is maximum at 4°C (1 g/cc). b. Aeroplanes usually fly in the zone of stratosphere. Evaporation is a surface phenomenon. Sodium salt. What is the action of heat on the following? PRACTICe QUeSTIONS (b) the decomposition of HNO3 and formation of NO2 (c) oxidation by atmospheric O2 and formation of NO2 (c) oxidation by sulphate is a about the different sources, forms of water and importance of water. h I N T S A N D e x P L A N AT I O N 17. The elements are characterised by their atomic numbers. In X+2, number of electrons = 12 Number of electrons = unit negative charge (-1). The increase in the proportion of CO2 in air leads to global warming. (d) formation of black coating on the walls of a tube light. This is because (a) adhesive force. What is a homogeneous and a heterogeneous mixture? 12n - Chemical Properties - edioxide It holds e Carbon e of (iii) (b) Mesosphere - 10n solved in a logical and step-wise manner - e alter much up Chemical properties of 25 CO shown in Tablesurface. These forces can be of two types, i.e., cohesive forces and adhesive forces ad e concentration of H+ ions are called strong acids. This is because more number of surface molecules are exposed to atmosphere which gain kinetic energy and escape into atmosphere. h I N T S a N D E x p l a N aT I O N aSSESMENT TEST Test 1 1. An atom of an element has two shells with electrons. (a) H2O2, H2 and CO2 (b) H2O2, O2 and NO2 (c) KClO3, Cl2 and O2 (d) HgO, O2 and NO 3. Predict its valency and justify. What do you observe and justify your observations. Air and Oxygen Example Mention any three importances of atmosphere. 54. b 21. By absorbing moisture, they may dissolve in the water absorbed and change into solution. Alloying: The process of mixing uniformly small quantities of different metals with a particular metal in their molten state in order to improve the mechanical properties of the metal is called alloying. In the earlier classes, we have learnt that air is a homogeneous mixture of gases. Impurities Substances used for removal (a) (b) (c) (d) AsH3, PH3 H2O (water vapour) 78. It is an exothermic reaction, and hence, water starts boiling, a 6. It is collected by the upward displacement of air as it is heavier than air. Usage of scrubbers, containing lime, in industries decreases the percentage content of the major air pollutants that contribute to acid rain. Some of Lead nitrate solution Caustic potash the common processes adopted for separation of the mixtures are given below: 1. (c) curdling of milk.  $C \rightarrow d$  Sulphur in water is a heterogeneous mixture as the compound NaCl is formed. What is diffusion? SO2 turns orange-coloured K2Cr2O7 to green due to the formation of Cr2(SO4)3. Write the symbols of the following elements. It is due to (a) relatively thicker atmosphere in the mesosphere. Before and during the 15th century, air was regarded as an element, a aSSESSmENT TEST Test 1 1. Among the following, identify the pair of watersoluble bases. Arrange the following points in a sequence for derivation of formulae of compounds. Our unique insights and world-class expertise comes from a long history of working closely with renowned teachers, authors and thought leaders, as a result of which, we have emerged as the preferred choice for millions of teachers and learners across the world. Petrol is a highly volatile liquid and undergoes evaporation. (a) chemical combination (b) chemical displacement (c) chemical decomposition (d) double decomposition 31. It is equal to the number of electrons in the atom. (b) 3 2 4 5 1 (d) 2 4 1 5 3 4. Short Answer Type Questions 53. usually make in the ofexaminations Millions of molecules water Germanium has the properties of metals as well as nonmetals; hence, it is a metalloid The process is decantation as mud being heavier than water settles down at the bottom due to gravity and separates from water Lime water is a saturated solution of calcium hydroxide; hence, it is a mixture H I N T S A N D e x p l A N AT I O N pRACTICe QUeSTIONS Directions for questions from 11 to 30: For each of Concepts' at choices have beenCONCepT the questions, four provided. and \_ are the suitable separation methods for mixtures of soluble solids in liquids. (a) efflorescent substances (b) deliquescent salts 58. Helium 9. (b) Both compounds and mixtures are heterogeneous. A purehence, substance is be homogeneous nature. Hydrogen being insoluble remains as such. (d) cohesive forces between glass molecules. Test 2 1. a 25. The central part of the atom called nucleus accounts for the mass of an atom. NaOH + HCl → NaCl + H2O (Sodium (Sodium chloride) hydroxide) 2. Water changes to water vapour e. (b) of the presence of rhizobium bacteria in their root nodules. The major pollutants which contribute to acid rain (NO2 and SO2) are released into the atmosphere. The other gases found in the earth's atmosphere include water vapour, carbon dioxide, nitrous oxide, methane, ozone, hydrogen and inert gases like neon, helium, argon which are present in trace amounts. Carbonic acid is a acid Pb(NO3)2 sol (b) in compounds the constituents do not retain properties. Hydrogenation: Catalytic addition of hydrogen to some carbon compounds is called hydrogenation. This is due to the presence of in solution state. 20. Irrespective of the field of study that the student may choose to take up later, it is important to understand that Mathematics and (a) melting point (b) boiling point (c) evaporation (d) condensation 31. c 15. D  $\rightarrow$  e Iron Science form the basis for most modern-day activities. b, a, c (i) A strong bar magnet is moved through the mixture. (c) Magnesium carbonate and sulphuric acid. Identify the element and the radicals. The temperature at which solid changes to liquid is called and sulphur can be separated by the process called magnetic separation as iron gets attracted to the magnet. Fill in the blanks 28. Chemical combination: The reaction in which two substances, i.e., elements, compounds or both combine to form a new compound is called chemical combination. non-sublimable substance Sand bath Bunsen burner Figure 1.3 Separation of sublimable substance from non-sublimable substance when it comes in contact with the colder wall of the funnel. (a) Both (A) and (R) are true and (R) is the correct reason of (A). Gunpowder is a heterogeneous mixture of C, S and KNO3. (d) physically in any ratio by weight. Then the metal present in X may be (a) aluminium (b) copper (c) sodium (d) manganese Test 2 Directions questions from 1 to 15 Select the correct alternative from the given choices. 17. It is a natural raw material available for the plants to synthesise the food material by the process called photosynthesis. (d) no effervescence is observed in both the cases. (i) Identification of the atomic number and mass number of the atomic number and mass number of the atomic number and mass number of the atom. Bases 1. (c) T emperature does not alter much up to a height of about 25 km from the earth's surface. As aqueous solution of sodium oxide is basic in nature, it turns red litmus to blue. (b) People suffering from acidity are given antacid tablets. A and C are gases and B is a solid which on dissolution in water turns red litmus to blue. Hence, changes blue litmus to blue. Hence, changes blue litmus to blue. Solubility in water Vapour density Nature Formation of dry ice Chemical Properties of CO2 are shown in Table 4.7. Table 4 does not support burning of other substances in its atmosphere. Write the electronic configuration of that liquid. Lime water is a saturated solution of calcium hydroxide, hence, it is a mixture. This element can form a radical X with hydrogen and two radicals Y and Z with oxygen, Z has more number of oxygen than Y. Examples: Calcium oxide, sulphuric acid, cobalt chloride, etc. (a) 1 : 3 (b) 3 : 1 (c) 3 : 4 (d) 3 : 2 12. In case of non-coastal areas like Hyderabad, moisture is less, and hence, the rate of evaporation is more. The mixture is then filtered with the help of a filter paper. True 10. Normal salt is formed by complete replacement of the hydrogen ions of an acid with metal ions. Distinguish between evaporation and boiling. Directions for questions, four choices have been provided. Magnesium burns in the presence of B with a dazzling white flame and forms a product X which is basic in nature. Compare the mass of proton, neutron and electron? (a) glass, plastic (b) glass, plastic (c) wax-coated glass, plastic (c) wax-coated glass, plastic (c) wax-coated glass (c) wax-coat C. a 8. True 5. Applications of Nascent Hydrogen 1. (4) This salt is a combination of two simple salts. Water is the essential constituent required for photosynthesis which is the only process that supports life. What is sublimation? The more is the surface area of the liquid, the more is the rate of evaporation of the liquid. (a) sulphur and neon (b) f. A non-metallic element is converted into a compound X after a series of reactions. Mass of a proton is 1837 times that of electron Mass of one proton = 1837 How many protons mass is equal to 7348 7348 = 4 1837 Hence, the atomic number is 4. The beauty of the earth is attributed to the difference in physical appearance and behaviour of these substances. Compare the temperatures shown by these two thermometers giving appropriate reasons. In presence of moisture, A turns blue litmus to red and C is neutral to litmus. Exceptions: Sodium carbonate and potassium carbonate and potassium carbonate. gases. Hence, utmost effort has been made to develop student interest in these basic blocks through real-life examples and application-based problems. Assertion (A): Pure nitric acid on standing for long turns yellow. • N stages of the reaction. (iv) The magnitude of the valencies of the ions should be interchanged and written as subscripts on right side of the respective ions. Here the temperature rises from -60°C to -15°C. What is meant by electrolytic decomposition? 1.19 1.20 Chapter 1 4. Ozone when present in the troposphere is a major pollutant that leads to global warming, while ozone present in the stratosphere acts as a shield from UV rays reaching the earth's surface. The non-metal with 5 valence electrons is phosphorus and 'ic' acid of phosphorus is phosphorus is phosphorus and 'ic' acid of phosphorus is phosphorus and 'ic' acid of phosphorus is phosphorus and 'ic' acid of phosphorus is phosphorus is phosphorus and 'ic' acid of phosphorus a troposphere (c) ozonosphere (d) stratosphere 13. Describe the methods of preparation of acids and bases with the help of examples. Also derive the formulae of (a) sulphate, (b) dihydrogen phosphate and (c) hydroxide of ion of M. A mixture has a variable composition. (d) Absorption of moisture by CaCl2. (b) It holds the maximum percentage of the total mass of the atmosphere. (a) an increase in frequency of floods (b) unseasonal rainfalls (c) harmful effects by UV rays (d) death of aquatic animals pRaCTICe QUesTIONs 34. Hence, it is a neutralisation reaction. (c) cohesive and adhesive forces are equal. Sodium floats on water. Bridges Galvanisation Surgical instruments Enamelling Electric poles Column B Gaseous products ((((()))) a. Thermometer Liebig condenser Mixture Glass jacket Distillation flask Condenser tube Bunsen burner Receiver Cold water vapour obtained is passed through Liebig condenser where it is converted into water due to condensation and collected in the receiver. The most important area of study of an atom is its structure. The mass of a neutron is only slightly greater than that of the proton that is equal to 1.72 × 10-27 kg. MgCl2. Arrange the following sequence in order to derive the formula of zinc oxide. Rust: Fe2O3× H2O agent. An element X, in which the difference in electrons present in valence shell (M shell) and penultimate shell is equal to the number of electrons present in the first shell, undergoes combustion to produce Y. The process due to which an acid completely reacts with a base to form a salt Valency of Fe is 3 34. Nascent hydrogen is a strong and water products is called neutralisation. Ammonium carbonate is a smelling salt. Classification of Matter (b) Separation of a mixture of solid and liquid in which the solid does not dissolve The insoluble solid may float or remain suspended in the liquid. (d) The water droplets of a cloud have a much lower temperature than that of water droplets of mist. Characteristic reactions for four different substances are given below. Which among the following is a heterogeneous mixture? (i) P2O5 (ii) O2 (iv) SO2 (1) Passage through potassium dichromate turns green. Examples: 1. In hydrogen, there is one electron which is present in the K shell and there are two electrons in the K shell of helium. The salt formed by the complete neutralisation of aluminium hydroxide with sulphuric acid is (a) Al2(SO3)3 (b) Al2(SO4)3 (c) Al(HSO3)3 3. Which is a negative radical among the following? This process is called galvanisation and iron coated with zinc is called galvanised iron. HNO3 reacts with skin proteins to form a pulp-like mass. Nitre is KNO3, which on heating gives KNO2 and O2. 5. Which of the following phenomena is an effect of acid rain? Explain the formation of the compound formed by two elements with Z = 20 and Z = 17. Hence, H2SO3 is a dibasic weak mineral acid. Identify the layers A. B. C and D and arrange them in an increasing order of height from the surface of earth. b 36. Atomic S tructure and Transformation of Matter Electrons: Electrons: Electrons: equal to that of a proton, i.e.,  $-1.6 \times 10-10$  esu. SO2 + H2O  $\rightarrow$  H2SO3 Sulphurous acid 22. Calcium hydroxide is added to soils before applying fertilisers. Short Answer Type Questions 50. More than one suitable content of Column B can also be considered correct for an entry in Column A and some content given in Column A. In a scrubber, powdered CaCO3 is taken which undergoes decomposition to give CaO. They give reactions of all ions present in both the simple salts. Hygroscopic () b. The components present in pickles (generally organic acids) are highly reactive towards tin and form harmful compounds. Method of collected by downward displacement of water. Magnesium oxide dissolves sparingly in water to form magnesium hydroxide. Identify the common use(s) of both Chile salt petre and nitre. Dilute sulphuric acid is added to both the containers. Rusting: The process of conversion of iron into its hydrated form of oxide in a humid atmosphere is called rusting. Generally, pickles are not stored in tin vessels because (a) tin is a costly metal. 18. The atmosphere is called rusting at sea level and is found to be equal to 760 mm of Hg. 30. 1.22 Chapter 1 (c) aqueous NaCl (d) molten NaCl 7. 'Y' when used in mines area reduces suspended particulate matter in atmosphere. Later, Joseph Black prepared this gas by heating magnesium carbonate and he named the gas as fixed air. Pure HNO3 is highly unstable which undergoes decomposition giving H2O, O2 and NO2. Later, it was experimentally proved that O2 and N2 are the major components of air. Generally, hydrolysis of metal oxides gives (a) acids (b) bases (c) salts (d) hydrogen gas 35. (b) of the absence of convection current. The splitting up of a substance into ions when dissolved in water is called ionisation. h I N T s a N D e x p L a N aT I O N assessmeNT Test 1 1. M has three occupied shells K, L and M. 12. Cooking gas in a mixture of gases, like propane and butane. As B turns methyl orange to yellow, it is basic in nature. 5H2O) which is blue in colour. (a) Protons and neutrons are shown in the nucleus. X : Y 2, 8, 8 Electronic configurations 2, 8 2, 8, 8 2, 6 Hence, C is chemically reactive. It rekindles a glowing splinter. Two test tubes X and Y are filled with water and mercury, respectively. • The density of air is maximum near the earth's surface, i.e., in the troposphere. (b) carbon powder is separated. Examples: A mixture of alcohol and water is an example of a homogeneous mixture because the constituents of this mixture are uniformly distributed. (b) Both solutions turn red litmus to blue. 15. Give example of elements existing as atoms and molecules. Reason (R): Tin reacts with the acid components of pickles. (c) lime and rust powder. (a) Ammonium nitrate (b) Ferrous sulphate 68. (i) Stratosphere (v) Mesosphere 37. Depending on the relative tendency of one metal to displace another metal from its compound, the metals are arranged in a series of decreasing order of reactivity. 'Test Your 16. Her grandfather told the workers to provide a straw to facilitate drinking the coconut water comfortably. Which among the following is/are poor conductor(s) of electricity? (a) Zinc is less reactive than tin. 71. Reaction is fast for Mg and slow for Al, Zn and Fe. Action of dil acids on metals Zn + 2HCl  $\rightarrow$  ZnCl2 + H21 --- Action of concentrated alkali on metals 2NaOH + 2Al + 2H2O  $\rightarrow$  2NaAlO2 + 3H21 Reaction takes place only on boiling. H2O CuSO4 .5H 2O —heating ---- Action of dil acids on metals Zn + 2HCl  $\rightarrow$  ZnCl2 + H21 --- Action of concentrated alkali on metals 2NaOH + 2Al + 2H2O  $\rightarrow$  2NaAlO2 + 3H21 Reaction takes place only on boiling. H2O CuSO4 .5H 2O —heating ---- Action of dil acids on metals Zn + 2HCl  $\rightarrow$  ZnCl2 + H21 + 2H2O  $\rightarrow$  2NaAlO2 + 3H21 Reaction takes place only on boiling. + Ca(OH)2 -> CaSO4 + 2H2O (calcium sulphate) 6. Give two examples of hydrated salts. In solids, strong intermolecular forces of attraction are present between the molecules due to which they expand less on heating. Except argon, all other elements form hydrides. Reaction with non-metals: Non-metals react with oxygen to form corresponding non-

metallic oxides which are generally acidic in nature. A  $\rightarrow$ d B  $\rightarrow$ c C  $\rightarrow$ b D  $\rightarrow$ a 42. Ammonium hydroxide is an . (iii) Protons and neutrons are shown in the nucleus. (a) an increase in frequency of floods (b) unseasonal rainfalls (c) harmful effects by UV rays (d) death of aquatic animals 10. CaCO3 + 2HNO3 - Ca(NO3)2 + CO2 + H2O. (deliquescent/ efflorescent) 20. The arrangement of these molecules gives rise to the variation in the physical appearance and behaviour of matter. MgSO4 is an example of anhydrous salt. (a) magnesium hydroxy chloride (b) sodium bicarbonate (c) disodium hydroxy chloride (b) sodium hydroxy chloride (b) sodium hydroxy chloride (b) sodium bicarbonate (c) disodium hydroxy chloride (b) sodium bicarbonate (c) disodium hydroxy chloride (b) sodium bicarbonate (c) disodium hydroxy chloride (b) sodium hydroxy c about the volumetric composition of water by means of electrolysis. In layer B, most of weather phenomena take place. Name the pollutants responsible for the following effects. Hydrated sodium sulphate  $\rightarrow$  Na2SO4. Nickel is used as a catalyst in the hydrogenation of oils. (a) iron (b) aluminium 5. (c) the vibratory motion and rotatory motion of molecules of solids. Lead sulphide is a normal salt. Despite this, these simple physical processes find widespread applications in different industries and chemical laboratories. The acids in which less number of molecules ionise in water (iii) argon (iv) dilute acid 2. A gas X when passed through blue litmus solution turns it to red. The acids which are obtained from the minerals are called . d 31. The steps involved in the separation of camphor and sand from a mixture are given below. CO2 gas evolved passes through a delivery tube, which is inserted into the conical flask through another hole of rubber cork into the gas cylinder. (c) The CO2 gas is removed by compressing the gas at 30 atm pressure and passing it through an atomiser and as a result it is converted into small droplets, consequently the surface area increases. 4He D. Explain the changes that take place when phenolphthalein and methyl orange are added to Z separately. Predict the answer given by the teacher. Predict the answer given by the teacher. Predict the answer given by the teacher. H2SO4, respectively. aSSESSmENT TEST Directions for questions from 1 to 15 Select the correct alternative from the given choices. When this is exposed to atmosphere sweat undergoes evaporation which causes cooling, and hence, we feel cool by wearing cotton clothes in summer. The acids which contain oxygen along with hydrogen and nonmetal are called oxyacids. • learn about valencies of different elements and radicals and the method of determining the formulae. When we suck one end of a straw dipped into the coconut water, some air from inside the straw is drawn out. (d) Tin lowers the ambient temperature, and thus, prevents spoilage of food. 2.20 Chapter 2 21. Compound water D. A  $\rightarrow$  f 34. Explain the principle behind the usage of electric precipitators in industries and catalytic converters in automobiles for controlling air pollution. (a) chlorofluro carbons (b) ozone (c) nitrous oxide (d) water vapour Air and Oxygen 24. Level 2 1. Acidic salt is sodium dihydrogen phosphate. Rate of evaporation is directly proportional to the surface area of the liquid. dry ice 8. Above this, temperature increases with height to thetoabsorption of highinenergetic UV Electronic configuration = 2, 8, soluble. False 8. ZnO + H2SO4 → ZnSO4 + H2O Zinc oxide Zinc sulphate 5. It is given for the patients suffering from breathing problems. Acids, Bases and Salts 3.15 TeST YOUR CONCePTS Very Short Answer Type Questions 1. X+2 = 10 electrons = 12 (Z) Neutrons = 12 (Z) Neutr + 2 = 18. CO2 and water vapour are greenhouse gases present in the atmosphere. A  $\rightarrow$  c lodine and sand can be separated by sublimation process as iodine is a sublimable substance. Arrange the following layers of the atmosphere in the decreasing order of their altitudes. essential constituent of an acid he named it as oxygen which means acid former. P3- = 15 + 3 = 18 electrons Fill in the blanks 11. A on reaction with another compound B which turns blue litmus to red gave a compound C which responded to litmus to red gave a compound C which responded to litmus test like compound B which turns blue litmus to red gave a compound C which responded to litmus test like compound B which turns blue litmus to red gave a compound B which turns blue litmus to red gave a compound B which turns blue litmus to red gave a compound C which responded to litmus test like compound B which turns blue litmus to red gave a compound B which turns blue li litmus test. Increased levels of oxygen increase the rate of combustion. Note: Generally, solids expand on melting and liquids contract on freezing. Give the respective chemical reactions involved. Column A 36. True 3. CaO + SO2 → CaSO3↓ Base acid h I N T s a N D e x p L a N aT I O N Hence, it is a neutralisation reaction. It is due to (a) low atmospheric pressure (b) high temperature (c) high atmospheric pressure (d) both (1) and (2) 32. pRACTICe QUesTIONs 1. Nitrogen being an inactive component of atmospheric pressure (d) both 1 and 3 25. Molten NaCl in liquid state, and hence, molten NaCl is also pure substance. X = nitrogen Y = oxygen, Z = water vapour and M = Fe. 29. The salt formed by complete neutralisation of calcium bisulphate (c) calcium bisulphate (d) calcium bisulphat reactions. Ltd, licensee of Pearson Education in South Asia. The constituents of a compound do not retain their (c) filtration (d) sublimation 'Concept 4. Such substances undergo colour change at the neutralisation point which indicates complete neutralisation point which indicates complete neutralisation (d) sublimation 'Concept 4. Such substances undergo colour change at the neutralisation point which indicates complete neutralisation (d) sublimation 'Concept 4. Such substances undergo colour change at the neutralisation point which indicates complete neutralisation and hence are called indicators. changes are reversible because there is no change in the b,  $B \rightarrow c$ ,  $C \rightarrow d$ ,  $D \rightarrow a$  (c)  $A \rightarrow a$ ,  $B \rightarrow d$ ,  $C \rightarrow b$ ,  $D \rightarrow c$  (d)  $A \rightarrow d$ ,  $B \rightarrow c$ ,  $C \rightarrow a$ ,  $D \rightarrow b$  5. Generally of the substance. However, when the M shell is the valence shell, first it is filled with 8 electrons. Action of heat Some hydroxides melt on strong heating. H3PO3 () e. Aeroplanes fly in the stratosphere due to the absence of convection current. Classification of Matter 24. II. (a) chemical composition, curdling of milk is a chemical change. In winters, morning temperature is very low. Justify what purpose did the is the most abundant element in earth's crust. 3. HCl carries out mother's action serve. It gives no colour with phenolphthalein. (d) chemical change which involves absorption of huge amounts of energy. (c) Usage of lithium hydroxide in submarines. Mixture of sawdust and water d. Classify the elements based on atomicity with examples. hydrolysis of starch to glucose. NH4Cl(g)  $\longrightarrow \rightarrow$  NH3 (g) + HCl(g)  $\longrightarrow \rightarrow$  NH3 (g) + HCl(g) - 16 = 18 Hence, number of neutrons = 18 30. CuSO4 + Zn  $\rightarrow$  ZnSO4 + Cu blue colourless 19. CaCl2 in an example of normal salt as it is formed by complete neutralisation of an acid and a base. (c) they possess nitrogen in roots, and hence, do not require external intake. Salt solutions are good conductors of electricity. 4. A list of four different times that of mass of a proton. Nitrogen can form NH4+ radical (x) with hydrogen. Deforestation 3. Galvanisation is the process of coating zinc on the surface of iron by using electrolysis. (a) Fe (b) Mg (c) Cu (d) W Column B () a. The size of the nucleus is very small when compared to the substances is given below. The mass of an electron is size of the atom. pRaCTICe QUesTIONs 10. A mixture of two solids is generally heterogeneous (c) compound (d) ion 12. Cold water is circulated through the glass jacket continuously. As we move to the upper layers, the temperature drops from about 17°C to 51°C. The fall in temperature with increase in height at the rate of 6°C/km is called lapse rate. When a lightened candle is exposed to the atmosphere of CO2, it gets extinguished. Name the acid present in (a) curd (b) tamarind 33. Hence, cloud formation does not take place in the stratosphere. This region of increase in temperature with height is called inversion layer. Baking powder () b. Classification of Acids Based on the Source of mercury (b) mercury, manganese (c) sodium, potassium (d) calcium, manganese 27. The compounds possible are XSO4 and X2(SO4)3. The various orbits or shells are named as K, L, M, N... or 1, 2, 3, 4..... and so on. In gases intermolecular forces of attraction are negligible, and hence, they are highly compressible and diffuse very easily. (b) electrons and neutron. The electronic arrangement could be 2, 4 which corresponds to Z = 6, i.e., carbon. Mass of total positive charge present in an atom is 55110 times to that of mass of electron. When mercury gets spilled on the floor or any surface, it can be collected by sprinkling sulphur powder because Hg reacts with S to form HgS. Example Separation of the components of a mixture of iron filings, sand and camphor. • A fforestation, using CNG as a substitute for petrol and diesel, installation of catalytic converters in automobiles, electric precipitators and scrubbers in industries, etc., minimise pollution. Ice present in a glass tumbler starts melting by absorbing heat from the air around the glass. During this process, acidic or basic salts are formed. 8Cl2 23. • learn about the methods of preparation, properties and uses of acids and bases. X and Y are gases at room temperature. Key Ideas After completing this chapter, you should be able to: • define matter, molecule, atom, etc. 40.components Rate of evaporation is directly proportional to The of a compound are separated by 20. Oxygen is neutral towards litmus. Nucleus contains protons and neutrons which are together called nucleons. a 35. (a) sodium bicarbonate (b) calcium carbonate (c) water (d) copper (1) d, c, b, a, d (3) b, a, d, c (4) a, b, c, d 6. Give reason for the stability of inert gases. 49. A  $\rightarrow$  B  $\rightarrow$  c C  $\rightarrow$  a D  $\rightarrow$  e E  $\rightarrow$  d 43. K shell can have only 2 electrons.  $C + H2O \rightarrow CO + H2$  steam water gas Air and Oxygen Catalytic oxidation of water gas gives hydrogen gas. Examples: Hy traces of carbon monoxide remaining unoxidised can be removed by passing the gas through ammonical cuprous chloride solution. Next day, one of the students brought common salt from home to the laboratory and requested the teacher to show sodium chloride as well. Identify both the acids and explain the method of dilution of the corresponding ic acid. Which among the following gas was called acid formerly? Chile salt petre is the common name of sodium nitrate which is used in manufacture of nitric acid. (ii) Laboratory method of preparation Principle: All the metals present above hydrogen in the reactivity series on reaction with dil HCl or dil H2SO4 liberate hydrogen gas. b Match the following 29. The following example explains the formation of NaCl from its constituent atoms. The element 'X' has only three shells in which the difference in number of electrons between the last shell and the second last she jar is placed over a burning candle. Na2SO3, Na2SO4 8. Example Write a short note on acid rain. Chlorine gains an electron while sodium loses an electron while solution is vaporised leaving behind the non-volatile solid that is copper sulphate in the distillation flask, and thus, constituents of the copper sulphate solution are separated. X is an acidic gas since it changes blue litmus to red. pRaCTICE QUESTIONS 4. Hence, the formula of the compound is Ca+2 Cl-1 CaCl2 28. If the electrons present in I and IV shells is in 1 : 1 ratio, and the ratio of electrons in II and III shells is also 1 : 1. Carbon dioxide B. This dissociates into Fe2+, NH4+, SO4-2 ions and gives their individual chemical test. d 24. solution Sulphuric acid is a dibasic acid. assessmeNT Test 1 Directions for questions from 1 to 15 Select the correct alternative from the given choices. Manufacture of medicines Preparation of metallic sodium Used as a laboratory reagent Properties exploited 1. Reaction with oil 2. Reaction with hydrocarbons of wood Solubility in water Soluble 3.11 3.12 Chapter 3 Calcium hydroxide Magnesium h + lime) Antacid 1. Hardening of mortar on exposure to air. Generally hard Solid non-metals are brittle Exceptions: Sodium and potassium Exceptions: Lithium, sodium and Exception: Diamond potassium have density lower than water (1 g/cm3) Bad conductors of heat and Good conductors of are poor conductors of heat and electricity Exceptions: Bismuth and tungsten carbon are good conductors of electricity el less tensile strength Malleability and ductility Generally malleable and ductile. Zinc metal is preferred for this reaction. for (b) classroom are good conductors of heat (c) The constituent elements retain their properties (c) have high tensile strength 7. Mg +  $O2 \rightarrow MgO 1 - Mg + O2 \rightarrow 2MgO 1 - Mg - 2 2 - O - 2 2 - Mg - 2$ 2-O-2 2.13 2.14 Chapter 2 2. The interconversion involved in usage of 'odonil' in a washroom is ... Match the element in column B. Sulphur has the highest atomicity of eight. Which among the following pairs of elements forms cation and anion, respectively? This is subjected to Bosch process for getting pure hydrogen gas. Metal M gets corroded when it combines with Y in the presence of Z. 4Na + O2 - 2Na2O Sodium hydroxide turns red litmus paper to blue. Element X has fourth shell has valence shell and the number of electrons are in 1 : 1 ratio in the first, fourth and second, third shells respectively. Pure nitric acid is highly unstable, and hence, undergoes decomposition forming NO2, H2O and O2. Fill in the blanks given in the following table. Give its formula. Then (a) effervescence is observed in both the containers. A mixture contains three components namely glucone-D, water and sand. It is the major component of air which is present up to about 78 per cent by volume. Vegetable oils also get solidified when hydrogen gas is passed through them at high pressure and high temperatures.  $S + O2 \rightarrow SO2 d$ . Different types of interconversion of states of matter are given below: 1. As the density of sand is more than sawdust, it settles down and sawdust floats on water. 4.11 4.12 Chapter 4 Delivery tube Thistle funnel Carbon dioxide Laboratory preparation of carbon dioxide Dilute hydrochloric acid Marble chips Figure 4.3 Laboratory preparation of carbon dioxide Laboratory preparation of carbon dioxide Dilute hydrochloric acid Marble chips Figure 4.3 Laboratory preparation of carbon dioxide Dilute hydrochloric acid Marble chips Figure 4.3 Laboratory preparation of carbon dioxide Dilute hydrochloric acid Marble chips Figure 4.3 displacement of air. The smallest particle of an element which may or may not have independent existence is called a/an (a) atom (b) molecule (c) compound (d) ion 16. Which among the following is a hydrated salt? Hence, pickles are stored in glass/plastic vessels. Hence, pickles are used for TV transmission. (b) Damage to the crops. b Match the following 31. The iron filings are attracted by the magnet. Given the balanced chemical equation for the laboratory preparation of oxygen gas. Hydrated Salts In case of some salts, some water molecules are found to be attached to the crystals of salt. This theory, based on the principle of indivisibility of atom, was well accepted throughout the century. That said, we believe that there is always scope for doing things better and hence invite you to provide us with your feedback and suggestions on how this series can be improved further. (i) Oxygen is prepared by heating of hydrogen peroxide. Give examples. They can also be synthesised in a laboratory (Table 3.1). (1) bcda (2) dabc (3) badc (4) cdbac Directions for questions from 31 to 33 Match the entries given in Column A with the appropriate ones in Column B. Identify the soft metal among the following: (a) iron (b) aluminium (c) magnesium (d) potassium 14. It is also found in a combined state in the form of salts like KNO3, NaNO3 and also in organic matter such as proteins, etc. Describe the process of separation of mixture of iron filings, camphor and sand. a 9. • Hydrated salts possess water of crystallisation. (strong/weak) 13. This process supports life on earth. This gives rise to the concept of valency. The outside surface of the funnel is wrapped with a moist filter paper and the mixture is gently heated. Gunpowder C. Identify the formula of the corresponding hydride of a non-metal X which attains an octet configuration by gaining three electrons. Greenhouse effect and global warming: The solar radiation is absorbed by the surface of oceans and vegetation on land. Shakti along with his parents was going to the railway station by an auto to catch a train. Example: In a mixture of sawdust and water, the sawdust floats on water, fine sulphur and in a mixture of sand and water, sand particles settle down if the container is kept still for some time. Auroras appear in this layer of atmosphere. As H2SO4 is a strong acid, it produces greater number of H+ ions, i.e., complete ionisation. For example, inert gases or noble gases namely neon, argon, krypton, xenon, and radon possess the octet configuration. c 38. Mineral acids 2. 4.13 4.14 Chapter 4 Nitrogen Occurrence 1. In a solid, the molecules are closely packed due to strong forces of attraction, and hence, thermal expansion of solids is least among the three states of matter. Which among the following is not a characteristic of a physical change? Sodium chloride is a compound. If the valencies have common factors, they are divided by the highest common factors. The electronic arrangement, i.e., 2, 5 corresponds to nitrogen. However, all these substances, irrespective of their physical appearance and behaviour, have certain things in common, i.e., mass and space they occupy, and are commonly called matter. Normal salt () f. Tartaricacid is used in making cakes for baking process. (a) nitrogen (b) hydrogen (c) carbon dioxide (d) oxygen 29. NH4+1 SO4-2 4. Copper sulphate Multiple choice questions 11. Zinc Silicates Tar Red lead oxide ( ( ( 29. Weak acid among the following is (a) sulphuric acid (b) hydrochloric acid (c) nitric 5 4 2 6 Acids, Bases and Salts Classification of Matter Class 9 Chemistry in Daily Life Atomic Structure Water Chemical Bonding 3 1 5 2 4 Periodic Classification of Elements Nature of Matter Class 9 7 6 8 Organic Chemistry Chemical Kinetics and Chemical Equilibrium Water, Solubility and Hydrogen Mole Concept, Stoichiometry and Behaviour of Gases Series Chapter Flow xv Class 8 Air and Oxygen Classification of Matter 1 3 4 2 Atomic Structure 1 3 2 4 tomic Structure 1 3 4 2 Atomic Structure 1 3 4 Mole Concept, Stoichiometry and Behaviour of Gases 6 4 Organic Chemistry-I Acids, Bases and Salts Metallurgy 9 10 Organic Chemistry-II 5 Periodic Table 11 Chemistry Electrochemistry This page is intentionally left blank Chapter 1 Number Classifi cation of systems matter Remember Before beginning this chapter, you should be able to: • define substance, mixture, mass, weight, etc. CO + H2 (water gas) () g. All hydrated salts lose water of crystallisation on heating and become anhydrous salts. (a) Mg(OH)2, Al(OH)3 (c) KOH, NaOH (d) Al(OH)3, NaOH 13. Leguminous plants consist of nodules in their roots with rhizobium bacteria. The compounds are represented with the help of the shorthand notations called formulae which are derived from the symbols of the constituent elements. (d) Calculation of the number of protons and neutrons. Arrange the tests in the order of the substances given below. (b) Its vapour density is equal to air and is highly soluble in water. The maximum number of electrons in an orbit is equal to 2n2 where n denotes the number of the orbit or shell, i.e., 1, 2, 3, 4, etc. Table 2.4 Electronic configurations of elements up to Z = 30 Element Hydrogen Helium Lithium Beryllium Boron Carbon Nitrogen Oxygen Fluorine Neon Sodium Magnesium Aluminium 13 13 1 2 2 2 2 1 2 Atomic S tructure and Transformation of Matter Element Atomic number Iron Cobalt Nickel Copper Zinc Electronic configuration K 2 2 2 2 2 6 27 28 29 30 L 8 8 8 8 M 14 15 16 18 18 N 2 2 2 1 2 Geometrical Representation The number and the arrangement of fundamental particles present in an atom can be shown diagrammatically by geometrical representation. Condensation: The process which involves the change of matter from gas to liquid on cooling is called condensation. Rate of evaporation is inversely proportional to humidity. Water vapour present in atmosphere gets condensed on dust particles during night time (winter nights) because of low temperature. A - Z = n (1) 40 - 20 = 20 Match the following (2) 27 - 13 = 14 37. These constituents are present in a fixed proportion by weight, and hence, it is a compound. (iii) This salt consists of one basic radical and one acidic radical and one acidic radical and one acidic radical and loss not react further either with an acid or with a base. The process of conversion of atmospheric nitrogen into nitrates is called nitrogen fixation. (a) Both (A) and (R) are true and (R) is the correct explanation for (A). It is neutral, hence, it does not respond to either blue litmus or red litmus paper. This envelope of gases which surrounds the planet earth is called atmosphere. (ii) Reaction with sulphur: Sulphur when heated in an atmosphere of oxygen burns to form sulphur dioxide. Generally metals the chapter (b) The proportion of constituent elements in a (a) are solids True or false compound is fixed. 47. Explain sublimation with a suitable example. Medical purpose: Carbogen, which consists of 5 per cent CO2 and 95 per cent CO2 and 95 per cent O2 stimulates breathing (artificial respiration), and hence, it is used by patients suffering from asthma, pneumonia, etc. Mixture of iron and sulphur e. (b) adhesive force. Fax: 080-30461003, Phone: 080-30461060 www.pearson.co.in, Email: [email protected] Brief Contents Prefacexi Chapter Insights xii Series Chapter 1 Classification of Matter 1.1 Chapter 2 Atomic Structure and Transformation of Matter 2.1 Chapter 3 Acids, Bases and Salts 3.1 Chapter 4 Air and Oxygen 4.1 Chapter 5 Water 5.1 Chapter 6 Chemistry in Daily Life 6.1 This page is intentionally left blank Contents Prefacexi Chapter 1 Matter1.1 Introduction1.2 Arrangement of Molecules in Three Different States of Matter 1.2 Cohesive and Adhesive Forces Interconversion of States of Matter 1.2 1.3 Schematic Representation of Matter 1.2 1.3 Schematic Representation of Matter 1.2 Cohesive and Adhesive Forces Interconversion of States of Matter 1.2 Cohesive and Non-metals 1.6 Mixtures 1.7 Points To Remember 1.13 Test Your Concepts 1.14 Concept Application 1.17 Assessment Test 1.21 Chapter 2 Atomic Structure and Transformation of Matter 2.1 Introduction 2.2 Symbolic Representation of Acids, Bases and Salts 3.1 Introduction 3.2 Classification of Acids Based on the Source of Origin 3.2 Some Common Acids (Mineral Acids or Inorganic Acids) Used in Laboratories 3.2 Methods of Preparation of Acids and Bases 3.6 Comparative Study of Properties of Acids and Bases 3.6 Comparative Study of Properties of Acids and Bases 3.6 Action of Indicators on Acids and Bases 3.7 Types of Salts 3.8 Uses of Acids, Bases and Salts 3.11 Points To Remember 3.13 Test Your Concepts 3.15 Concept Application 3.18 Assessment Test 3.23 Chapter 4 Air and Oxygen 4.1 Introduction4.2 Layers of Atmosphere 4.2 Layers of Atmosphere Oxygen 4.6 Physical Properties of Oxygen 4.7 Chemical Properties 4.8 Other Chemical Properties 4.9 2.4 Structure of an Atom 2.4 Geometrical Representation Physical and Chemical Representation Physical Action Physical Phy 4.10 Preparation of Carbon Dioxide 4.11 Physical Properties of CO24.12 Chemical Properties of CO24.12 Uses of Carbon Dioxide 4.13 x Contents Nitrogen4.14 Water Cycle Uses4.14 Hydrogen4.14 Hydro 4.18 Uses of Hydrogen 4.19 Air Pollution 4.29 Air Pollution 4.29 Test Your Concepts 4.24 Concepts 4.24 Concepts 4.24 Concepts 4.23 Test Your Concepts 4.24 C Water 5.2 Forms of Water 5.3 Sources of Water 5.3 Uses of Water 5.4 Depletion of Water Table Water Management Hard and Soft Water Points To Remember Test Your Concepts Concepts Concept Application Assessment Test 5.4 5.4 5.5 5.6 5.6 5.10 5.11 5.13 5.15 5.18 5.22 Chapter 6 Points To Remember Test Your Concepts Concept Application Assessment Test 6.2 6.4 6.6 6.7 6.7 6.8 6.9 6.9 6.14 6.15 6.18 6.23 Preface Pearson IIT Foundation Series has evolved into a trusted resource for students who aspire to be a part of the elite undergraduate institutions of India. This is an example of (a) physical change (b) chemical change (c) simultaneous physical and chemical changes (d) chemical combination reaction 16. chemical change Multiple choice questions 21. H2SO4. As the density of air is also more. SI unit of atmosphere, the pressure exerted by molecules of air is also more. SI unit of atmosphere to the pressure is (a) Newton (b) Pascal (c) Joule (d) kg/m 28. Identify the atomic number of the element which possesses same number of electrons in the L and M shells. Arrange the layers of the atmosphere as per the following terms related in a sequence, respectively. This is due to higher reactivity of Mg than Cu. Hence, Mg can displace Cu from CuSO4 solution, and hence, blue-coloured CuSO4 slowly turns colourless. 27. Mention the condition required for it. Then the ratio of mass numbers of the two elements is (a) 1:2 (b) 2:3 (c) 3:4 (d) 2:5 15. The valencies of the ions or radicals are written below the radicals without positive and negative signs. We know that mass of a proton is 1837 times that of an electron. Write a short note on naming of acids. (c) the constituents are combined chemically. In the case of container Y the rate of evaporation is more. Test The glowing splinter rekindles into flame. we move to the of Carbon dioxide (a)(c)Flourine (b) Sodium (c) Chlorine Carbon upper temperature drops from Physical about 17°C to 51°C. The fall in temperature with Characteristicsconcepts learned in a (b) It holds a such as HCl and dil H2SO4. Electrolysis of water: Electrolysis of water: Electrolysis of acidulated water liberates oxygen at the such as HCl and dil H2SO4. Electrolysis of water: Electrolysis of acidulated water liberates oxygen at the such as HCl and dil H2SO4. anode and hydrogen at the cathode. d 35. Transformation that takes place due to the alteration of molecular composition of matter is called chemical change. Electrons are negatively charged particles. c 9. alkali 16. Though zinc coating is used for iron containers for storing food materials. Gaseous products formed when gunpowder is subjected to heating are dissolved in water. Define a catalyst. C o A mixture of sodium chloride is sublimable. An atom of an element X has three completely filled shells. Examples: 1. The device used to put off fires is called fire shells. extinguisher. The electronic arrangement could be 2, 8, 3 which corresponds to Z = 13, i.e., aluminium. Assertion (A): Baking soda (NaHCO3) is a compound. The first one is a surface phenomenon and the second one is a surface phenomenon. Due to the increased surface area, rate of evaporation of water becomes more at room temperature. (a) Fuel Many fuel gases contain hydrogen as a major constituent. Molecules of both ice and water are composed of two hydrogen atoms and one oxygen atom. Ammonium chloride undergoes sublimation, and hence, it is a sublimable substance. following examples in the order of matter, compound, element and mixture. What is the difference between symbol and formula? Slaked lime is added to soil to neutralise the acidity of the soil. The processes are described below: (a) Separation of a mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in which the solid remains in the dissolved state Example: Mixture of a solid and a liquid in the dissolved state Example: Mixture of a solid and a liquid in the dissolved state Example: Mixture of a solid and a liquid copper sulphate and water. Name the acid which is produced by the sting of an ant. h I N T s a N D e x p L a N aT I O N 18. Indicators: During the process of neutralisation, a point called neutralisation point is reached when all the H+ ions of an acidic solution are neutralised exactly by the OH- ions of a basic solution. Certain naturally occurring substances can act as indicators as they change colour based on the nature of a substance. Ag, being less reactive than Cu, cannot displace Cu from CuSO4, and hence, the solution remains blue in colour. In MSO3, the valency of sulphite is 2. The relative amounts of acid and base required for complete neutralisation depend upon the total number of H+ and OH- ions produced by the respective acid and base. Respiration: Oxygen is necessary for respiration of living beings. An element X burns with a brilliant blue flame in the presence of oxygen to form Y. Highly compressible d. b 18. Identify the correct reason. A - Z = number of neutrons. Generally, the components of a compound are \_\_\_\_\_ radical. (acid/alkali) 16. The iron filings get attracted by the magnet. Melting: The process which involves the change in state of matter from solid to liquid by heating is called melting or fusion. Baking soda (NaHCO3) is a compound because (a) the constituents retain . The charge possessed by permanganate is the same as separated by their properties. b 30. When moist blue litmus paper is introduced to SO2, it turns red due to formation of compound Z which is H2SO3. Therefore, they form positive and negative ions, respectively. Iodine is a lustrous nonmetal. CO + H2 14. However, this idea remained hypothetical and could not be realised in practice. Layers of Atmosphere Our atmosphere is divided into five layers on the basis of variations in chemical composition, density and temperature at different heights from the surface of the earth. Multiple choice questions 5. Y turns lime water milky due to the formation of Z. It turns red litmus to blue. Stratosphere has a temperature range of -60°C to -15°C, troposphere has a temperature range from 17°C to -51°C, mesosphere has a temperature of the content is not only student-friendly but also designed in such a manner that it motivates students to go beyond the usual school curriculum, and acts as a source of higher learning to strengthen the fundamental concepts of Physics, Chemistry, and Mathematics. Articles like bodies of cooking stoves, refrigerators, plates, wash basins, ovens, etc., are given this type of coating. She asked him why the bulb could not be filled with air which is readily available, as nitrogen is obviously a part of air? at room temperature. Major constituent of carbogen () f. The number of neutrons is equal to the number of protons present in the L and M shells, respectively. Which among the following is/are poor conductors of electricity? Explain the observable change taking place during reaction of iron with the aqueous solutions of H2SO4 and CuSO4, respectively. A  $\rightarrow$  c B $\rightarrow$ g B $\rightarrow$ c D $\rightarrow$ e D $\rightarrow$ a Level 2 Multiple choice questions 1. Example: Mg + O2  $\rightarrow$  MgO Hydrogen and oxygen react to form water. Filtration () C. (a) Calcium oxide (b) Common salt (c) Ozone (d) Water 17. If a solid non-metal 'X' forms an oxide of type X2O5, then the valency of X is (a) 3 (b) 5 (c) 6 (d) 4 Atomic Structure and Transformation of Matter 2.31 TEST yOUR CONCEpTS Fill in the blanks 1. Cotton clothes can be made more easily wet than synthetic clothes. The gases which absorb these IR are called greenhouse gases and the process is called greenhouse effect. Procedure The mixture of iron filings, sand and camphor spread evenly in a basin. Table 4.1 gives the average atmospheric composition. You will be extremely low. HOCl on standing in presence of light decomposes to give HCl and O2. Common salt Silver Gold Tin Lead Figure 2.1 Examples of alchemist symbols Symbols can be defined as the shorthand notations which represent a single atom of an element. B is a supporter of combustion. This is called positive valency. hydrogen 1 7. The pressure built up in the ink pen is more when compared to the outside pressure. Weather observation balloons () d. process of sedimentation and 59. It turns alkaline pyrogallol solution brown. Identify the coefficients of the products CuO and NO2 formed respectively when hydrated copper nitrate is thermally decomposed. Representation: X + Y → XY Table 2.11 Types of chemical combinations with examples Types Examples Element - element (synthesis) H2 + Cl2  $\rightarrow$  2HCl Element - compound 2SO2 + O2  $\rightarrow$  2SO3 Compound - compound CaO + H2O  $\rightarrow$  Ca(OH)2 Atomic S tructure and glass. phosphate 7. Observation: The liquid gas. Volcanic eruption 4. Consequently, the names of the elements were abbreviated to symbols in order to represent them in an easier and a more convenient way. FIGURE1.73. A substance when added to atmosphere producing adverse effects to collected is clear and transparent. Zinc on reaction with dilute sulphuric acid liberates . Al+3 C-4 60. (c) Curdling of milk. X+2 : 2, 8 Y-2 : 2, 8, 8 M 6 h I N T S a N D E x p l a N aT I O N 1e X -+ -- - X -1 (9 electrons) (10 electrons) 2.35 2.36 Chapter 2 18. The basic building block of matter is known as a molecule. Element M 3 Z M (3) 2 He 8 Ne 6 S human kind and surroundings is called air pollutant. During freezing, heat is 14. Atomic Structure and Transformation of Matter 20. Theelement X is Zn which can form Zn+2 ion by losing 2 electrons from the N shell. (d) Perspiration is greater in coastal areas than in non-coastal areas. A → b, c, e Oxides of nitrogen contribute to acid rain, global warming and formation of smog. He then approached the teacher and asked what is wrong with his activity. (b) C oating with enamel paint: Doors and windows, bodies of cars, buses and other automobiles, etc., are first given coat of red lead oxide paint followed by enamelled paint so as to enhance the appearance of the structure. These impurities are removed in stages. Its presence in water is essential for aquatic plants. ozonosphere 2. (a)  $2SO2 + O2 \rightarrow 2SO3$  (b)  $C + O2 \rightarrow CO2$  (c)  $CaO + H2O \rightarrow Ca(OH)2$  (d)  $2H2O \rightarrow 2H2 + O2$  28. Give schematic representation of classification of matter based on its composition. common mistakes that students A drop of water contains. The symbol of calcium is \_\_\_\_\_\_. b 28. • learn about neutralisation, different types of salts, their methods of preparation, properties and uses. Define double decomposition reaction. What are neutral oxides? The nucleus being positively charged exerts a force of attraction on the electrons. Examples: Buckets, tubs, iron trunks, etc. Intermolecular forces of attractive forces that exist between the adjacent molecules of matter are called intermolecular forces of attraction. 30 atm H 2O(1) + CO2(g)  $\rightarrow$  H 2CO3 (d) The water vapour present in the gas can be removed by cooling the gas to -20°C. b 31. (a) NaCl (b) CaO (c) CaCl2 (d) All the above 13. (c) Supersaturated solution: If more amount of salt is made to dissolve in the saturated solution under some conditions, the solution is said to be supersaturated. (a) liquid hydrogen (b) liquid oxygen (c) coke (d) liquid carbon dioxide 18. Identify the salt which does not contain either replaceable hydrogen ions or hydroxyl ions. SO2 + H2O → Column B () a. Identify a useful change among the following chemical changes. But Bunny stopped him and said that it will spoil the flooring permanently. Therefore, this is a precipitation reaction. a 4. In these salts, a fixed number of water molecules gets attached to each molecules get Na2HPO4 + H2O 231 (b) 123 321 (d) 312 11. Give the formulae of the following salts: Acids, Bases and Salts (a) blue vitriol (c) potash alum (b) green vitriol 40. Example: Ca+2, Cl-21 3. (d) the large intermolecular space present in solids. The mass 1 of an electron is times that of the proton. b 32. Which of the following is not a chemical change? (b) dissolution of carbon dioxide in water at high pressure. Fe2O3.XH2O 10. A  $\rightarrow$  b Sodium is an element as it is made up of same atoms. The ratio of electrons in 1 and 4 shells is 1 : 1. light H 2 + C2  $\rightarrow$  2HCl (b) R eaction with nitrogen and hydrogen react in 1 : 3 ratio at high temperature and high pressure to form ammonia. Air and Oxygen Lavoisier named this gas as acid carbonique and he established it as an oxide of carbon. Explain the reason for their shivering immediately after they came out of the swimming pool. (2) burning of a non-metal with sparkles and crackling sound. Identify the component which when present in the troposphere is a pollutant and when present in is used as catalyst in the hydrogenation of oils. d 32. B  $\rightarrow$  d, e CFC contributes to the depletion of the ozone layer and global warming C $\rightarrow$ a fly ash causes clogging of drainage. This Chapter 4.indd onfiguration. Magnesium oxide and potassium oxide are soluble in water and forming alkalies upper layers of atmosphere is a protector of life. namely magnesium hydroxide and potassium hydroxide, respectively. This oxygen was found to support combustion, hence, he named it as fire air or vital life. This layer absorbs harmful UV radiations, and thus, protects life on the earth. Let the metal be X. Write formulae and names of the various salts formed when magnesium hydroxide is treated with sulphurous acid. (b) A strong bar magnet is moved through the mixture of coal, petroleum jelly and liquid oxygen is called cartridge and is used for blasting rocks. Atomic Structure and Transformation of Matter 2.19 TEST yOUR CONCEpTS Very Short Answer Type Questions 1. B-c Enamelling is done to washbasins and ovens to prevent rust and provide smooth appearance. B-c C-b D-a 1. H2 and O2 D. 4.3 4.4 Chapter 4 Table 4.1 Percentage composition of air Components of air Percentage composition of air Percentage by volume 78.084 20.947 0.934 0.033 Variable (0 - 4) The atmospheric layers composed of air possess weight and they exert pressure. Explain the following methods of separation with a suitable example. Due to stronger adhesive forces, water shows concave meniscus in a narrow glass tube. (a) 12, 18 (b) 19, 20 (c) 18, 16 (d) 17, 18 pRaCTICE QUESTIONS 24. Mention two types of intermolecular force of attraction acting between molecules. The water collected over the slaked lime is called lime water. A partial vacuum is created within the straw and as a result coconut water is pushed up by the atmospheric pressure to fill up the vacuum and reaches the persons mouth. (iii) Protons and neutrons are shown in nucleus. (b) Both (A) and (R) are true but (R) is not the correct explanation for (A). Persons suffering from acidity is given antacid tablets containing Mg(OH)2 to neutralise acidity. Cutting and welding () c. What are the causes and effects of it? Identify X, Y and Z and write the corresponding balanced chemical equations for the dissociation of the following compounds in their solutions and write the formulae of the salts formed from them. Hence, its valency is zero. Define the following and give an example for each. HNO3 () h. 2. Insoluble nature of Au and Pt in HNO3. Most of the naturally occurring substances such as wood, cotton, paper pulp, rubber, etc., contain hydrogen. Hence, it leaks out. SO3 in presence of moisture turns blue litmus to red. Why are people advised not to sleep in a closed room where coal is burnt in chulhas? The process of cloud formation takes place throughout the year while the formation of mist takes place throughout the year while the formation of mist takes place only at certain times at particular temperatures. (d) The magnitude of valencies of the ions should be interchanged and written as subscripts on right side of the respective ions. Zinc chloride () d. properties solution increase in height at the rate of  $6^{\circ}C/km$  is called lapse rate. increases 8. X : 3 : 2, 8, 8 Y 2 2, 8, x 8-2 3 = ; X=6 x+2 2 : X → 2, 8, 8 and Y → 2, 8, 6 8. Sublimation is the process of the conversion of a solid to its gaseous state. The valencies should be interchanged and written as subscripts on right side of the respective ions. Reason (R): Sodium loses only one electron from the second last shell. Boiling point is the temperature at which \_\_\_\_\_\_ is converted into \_\_\_\_\_\_ is converted into \_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_\_ is converted into \_\_\_\_\_\_\_. temperature, the water vapour produces snow, fog, mist, etc. Acid rain () b. c 6. (c) Solids are highly compressible. S Iron filings stick to magnetic substance 1.9 1.10 Chapter 1 2. Table 5.1 Density of water at Beyond 4°C, water shows normal trend of decrease in different temperatures density with increase in temperature. Only the physical appearance or behaviour changes This change is called permanent or irreversible because the previous form of the matter can easily be revived Chemical changes. because the previous form of the matter cannot be revived by physical processes Atomic S tructure and Transformation of Matter Table 2.10 Examples of physical and chemical changes (ii) Boiling of milk (vi) Condensation of steam (vii) Sublimation of camphor Chemical changes (i) Burning of froid (vi) Respiration (ix) Blackening of silverware (x) Burning of LPG Representation of a Chemical Change in Short Form with the Help of Symbols and Formulae The substances which undergo chemical change are called reactants and those formed as a result of the neutral atom. Other metal hydroxides the number of electrons present in the M shell of the neutral atom. undergo decomposition on strong heating NaOH, KOH 3. 65. (d) of the absence of adhesive force. Such metals are more active than hydrogen since they have the ability to displace hydrogen from acids. In the process of galvanising, zinc is coated on the iron. 69. Superior learning experience and improved outcomes are at the heart of everything we do. • R ust is formed when iron articles get exposed to humid air. Hydrochloric acid is a monobasic acid. ent substances are mixed physically and hence, they are classified on the basis of ionisation. The nascent oxygen has ability to kill the harmful microorganisms present in water, and hence, water gets purified. Since camphor is insoluble in water, therefore, it can be separated by filtration. Atomic Structure and Transformation of Matter 8. The atoms recombine to form hydrogen molecules by evolving the absorbed heat energy. Y is NO2- and Z is NO3-. (b) chemically in any ratio by weight. Nitric acid Column B () a. Nascent hydrogen is a strong reducing agent. 2KMnO4 + H2SO4 + 5H2C2O4  $\rightarrow$  K2SO4 + 2MnSO4 + 10CO2 + 8H2O Potassium permanganate oxidises oxalic acid in an acidic medium as per the above chemical reaction. Hence, it involves only a physical change. h I N T s a N D e x p L a N aT I O N 21. Examples: Germanium, arsenic, antimony, selenium and tellurium. Identify X, Y and Z. A  $\rightarrow$  b B $\rightarrow$ d C  $\rightarrow$  a, e D  $\rightarrow$  a, e 27. physical, molecular composition 9. d 2. (b) close packing of molecules in solids. The outer surface of the funnel is wrapped with a watersoaked filter paper and the open end of the stem of the funnel is plugged with a piece of paper or cotton to prevent vaporisation. Iron trunks, sanitary () b. Atomicity of ozone is  $A \rightarrow b$  In distillation process, the non-volatile component sodium chloride can be separated from water. This signifies the fact that there is a vast empty space in the atom. Pure H2SO4, pure HNO3 and liquefied HCl do not ionise, and hence are bad conductors of electricity. The pollutants released from air conditioners and aerosols deplete layer D which also gets depleted by nitrous oxide. XH2O. Concentrated and pure H2SO4 concentrated and pure HNO3, liquid HCl do not ionise, and hence are bad conductors of electricity. Sedimentation and Decantation in the mixture of sand and water, the heavier solid particles settle at the bottom and can be separated by this process. Representation: AB  $\rightarrow$  A + B Table 2.12 Types of chemical decompositions with examples Types Examples Thermal decomposition (in the presence of heat) 2 Pb(NO3)2  $\rightarrow$  2PbO + 4NO2 + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + O2 Photolytic decomposition (in the presence of light) 2HOC  $\rightarrow$  2HC + or alkaline taste and to remove yellow colour, tartaric acid is used. (a) to supply nitrogen (c) to decrease the rate of combustion 15. X should possess five valence electrons since its valency is 3. A and D are major contributers for global warming and both are carbon compounds Positive radicals Al+3 Negative radicals PO4-3 2. The 'ous' suffix is added to the name of the ion which exhibits lower valency, whereas the ion with higher valency, whereas the ion with higher valency is named by adding 'ic' suffix. It is a greenhouse gas but leads to global warming if the amounts of CO2 increase due to human-induced activities such as deforestation, excess usage of petrol, diesel, etc. Reason (R): Calcium carbonate is soluble in water. When copper is added to the ferrous sulphate of a trivalent metal that is M+3? A blue flame is also observed. (d) both (1) and (2) 20. This increased effect caused due to increase in the air pollutants is called global warming. Heating of a mixture consisting of potassium nitrate, carbon and sulphur involves which of the following chemical changes? Calculate the number of electrons and protons in its corresponding atom. Agricultural activities 6. The heavier sand particles settle down at the bottom. Nitrogen has an inert nature, hence, it is used to preserve food items. (iii) Sawdust is left after iodine separates. A strong bar magnet is brought close to the mixture repeatedly. The filtrate obtained is taken in a flat vessel and exposed to air till carbon disulphide vaporises leaving sulphur behind. 43. Acids Acetic acid Ascorbic acid Tartaric acid Lactic acid Maleic acid Oleic acid Stearic acid Palmitic acid Formic acid Uric acid Oxalic acid Butyric acid Sources Vinegar Lemons All citrus fruits Tamarind, grapes Curd Grapes Olive oil Mustard oil Palm oil Sting of ants and insects Urine Tomato Rancid butter Table 3.2 Mineral acids S. As the pollutants increase in atmospheric air, they affect both plant and animal life, cause respiratory problems, result in damage to monuments and so on. The number of electrons present in the K shells of hydrogen and helium are (a) 2 and 1, respectively (b) 2 in both the elements (c) 1 and 2, respectively (d) 1 in both the elements (c) 1 and 2, respectively (d) 1 in both the elements 12. Sodium chloride is prepared by the neutralisation of sodium hydroxide with hydrochloric acid. PbCO3. 46. Acids, Bases and Salts 9. released 5. Significance of Inert Gases and Water Vapour The significance of other components of air Components Helium Argon Neon Water vapour is described in Table 4.2. Table 4.2 observation balloons To fill electric bulbs at low pressure Used in advertisement glow tubes Help in the formation of fog, mist, clouds, etc. Occurrence It occurs both in free and combined states. (i) (ii) (iii) (iv)  $4Na + O2 \rightarrow 2NaOH NaOH + H2O 38$ . Note: Iron does not get rusted in dry atmosphere. Intermolecular space: The space between the constituent molecular space. Hence, acids being marble flooring. And the difference of value is the number of valence electrons in the M shell of the other element Y. As X is soluble in water, X is an alkali. white 3. (c) of the presence of very few molecules or ions. If the formulae of respective chlorides of X and Y are (a) 3 and 2 (c) 1 and 4 14. The distillation flask is placed on a tripod stand and heated with the help of a Bunsen burner. Ca+2 2 CaCl2 on hydrolysis gives a strong acid. of temperature - 2:42:28 PM above Vapour density extends from Heavier Cl- 1 2.11 2.12 Chapter 2 4. Tartaric acid is one of the components in baking powder. Acids, Bases and Salts 3.23 ASSeSMeNT TeST Test 1 1. c 2. Filling up of electrons in the shells follows certain rules. It varies from place to place. than density = 22 with height is called inversion layer. Pb(OH)2.PbCO3 17. A + BC  $\rightarrow$  AC + B, In this equation, compare the reactivities of A and B. Formation of HCl takes place in presence of light. The molecule is the smallest constituent particle of matter which retains all the properties of the matter and has independent existence. (b) filtration, sedimentation and decantation. 2Na C. False 10. b 4. and fitted into a funnel by moistening it with a 35. of properties of acids and bases H2SO4 absorbs water from skin tissues. (a) reduction in intake of oxygen (b) cause of acid rain (c) greenhouse effect (d) formation of smog (e) depletion of ozone layer (f) problems of digestion (g) contamination of ground water (h) respiratory disorders For Hints and Explanations, please visit: www.pearsoned.co.in/IITFoundationSeries Air and Oxygen 4.27 CONCepT appLICaTION Level 1 1. c 41. (b) Gases possess strong intermolecular forces of attraction. Sodium hydroxide is used in soap industry. mixture? • O decomposition of H2O2 while CO2 is prepared by the reaction (d) acid on marble chips. Air is a homogeneous mixture of different gases. (a) magnetic separated by the reaction (b) distillation (c) sublimation (d) sedimentation (d) acid on marble chips. electron. Thomson, Goldstein, Chadwick, etc., proved the presence of subatomic or fundamental particles in an atom. How is milk? They always form homogeneous mixtures. Washing soda Directions for questions from 32 to 51 Answer the physical method. In the formation of sodium chloride, each chlorine gains following questions. Curdling of milk involves partial conversion of lactose sugar into lactic acid. Antacid is the substance which is used to neutralise the acidity in stomach. ublimation of camphor is a physical change. Colourless () d. Its corresponding oxide Y on hydrolysis gives Z. A helps in long-distance radio communications. solution All pure tances contain particles of only one kind having definite set of properties and they are uniformly distributed. (i) (ii) (iii) (iv) AB + C  $\rightarrow$  CB + A A + B  $\rightarrow$  AB AC + BD  $\rightarrow$  AD + BC AB  $\rightarrow$  A + B Coefficients of CuO and NO2 are, respectively 2 and 4. From this, we can infer that cobalt chloride is (a) hygroscopic (b) deliquescent (c) efflorescent (d) none of these 20. Nitre () c. 7H2O D. When blue-coloured CoCl2 is introduced into the two containers, there is colour change in one containers, there is colour change in one containers. A student has a mixture consisting of charcoal and sulphur powder. Suspended () d. (c) of the absence of dust particles and convection current. Sodium 43. d 4. 76. C. complex ion is made up of group of atoms which does not undergo further dissociation into A individual atoms or ions and acts as a complete unit. A form of which of the following non-metal is the hardest substance? X is blue vitriol (CuSO4. Double salt is Mohr's salt. The chemical formula of rust is . Assertion (A): Generally pickles are stored in glass vessels and plastic vessels. The processes of separation of mixtures discussed above are simple and convenient to carry out, however, complete separation of the constituents is not possible through these processes. The role of MnO2 is to speed up the reaction and also to make the reaction take place at room temperature. 16. Gases have maximum intermolecular spaces. Air and Oxygen Other Chemical Properties 1. The end of the thistle funnel should almost touch the bottom. (a) atom (b) molecule (d) molten NaCl 18. d 37. (ii) The mixture is covered with an inverted funnel. What is meant by an alkali? 8. Liquid to solid d. Among the following, which substance turns phenolphthalein to pink? False 2. Iodine is separated. Hence, the valency of M is also 2. Atoms of different elements are different from each other in all respects. Impure compound () () () () () Column B a. The liquids which completely dissolve in each other are called miscible liquids. The characteristic reaction involved in the scrubber is (a) neutralisation (b) oxidation (c) reduction (d) combination followed by decomposition 8. Purification of hydrogen gas: Since impure zinc is used for hydrogen gas preparation, the hydrogen gas collected is found to contain some impurities such as H2S, SO2, PH3, AsH3 and CO2. Oxygen is an element which consists of only oxygen atoms. Helium possesses stable duplet configuration with 2 electrons in the first shell. In the same way, the substances which possess bitter taste like bitter Table 3.1 Organic acids gourd and slippery touch like soaps are called bases. In the case of mercury cohesive forces, and hence, mercury droplets are not observed on the inner walls of 'Y.' 15. Magnetic separation () Column B a. As Y is prepared by treating X with oxygen, X is Ca. 3.31 3.32 Chapter 3 ASSeSMeNT TeST Test 1 1. Rigid f. h I N T S A N D e x P L A N AT I O N rode the composition reaction if one of the products formed is an insoluble solid, it is called precipitation reaction. c 1. Monobasic weak acid among the following is (a) carbonic acid (b) oxalic acid (c) acetic acid (d) nitric acid 13. The element which appears the least number of times is balanced first. Examples: NaOH - sodium hydroxide NH4OH - ammonium hydroxide The bases which are soluble in water are called alkalies. Bosch process Principle: Water gas is a mixture of carbon monoxide and hydrogen. Dibasic weak mineral acid among the following is (a) acetic acid (b) sulphuric acid (c) phosphoric acid (d) sulphurous acid 32. How do you distinguish metals and non-metals with respect to electronic arrangement? (1)  $2SO2 + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4 + 2H2O$  (3)  $SO3 + H2O \rightarrow H2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4 + 2H2O$  (3)  $SO3 + H2O \rightarrow H2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4 + 2H2O$  (3)  $SO3 + H2O \rightarrow H2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4 + 2H2O$  (3)  $SO3 + H2O \rightarrow H2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4 + 2H2O$  (3)  $SO3 + H2O \rightarrow H2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4)  $S + O2 \rightarrow 2SO3$  (2)  $H2SO4 + 2KOH \rightarrow K2SO4$  (4) H2SO4 (4) H2SO2 (a) 1342 (b) 4132 (c) 2314 (d) 4321 28. The electric spark produced during lightening helps nitrogen to combine with oxygen to form nitric oxide. The major pollutants which contribute to acid rain NO2 and SO2 are released into the atmosphere. X+2: 2, 8 Y-2: 2, 8, 8 h I N T S a N D E x p l a N aT I O N Y L (2) Sulphur (S) does not exist in monoatomic state due to its greater chemical reactivity. 4.23 4.24 Chapter 4 TesT yOUR CONCepTs Very Short Answer Type Questions from 1 to 10 Fill in the blanks. In this chapter, we would be learning about another important categorisation of some chemical compounds into acids, bases and salts. (a) 2 (b) 1 (c) 3 (d) 5 Assertion (A): Sodium forms a monovalent ion. Carbonic acid is a weak acid. d aNsWeR Keys Test 2 4.38 Chapter 4 CONCepT appLICaTION Level 1 True or false 1. Chapter 4 CONCepT appLICATION Level 1 True or false 1. Chapter 4 CONCepT appLICATION Level 1 True or false 1. Chapter 4 CONCepT appLICATION Level 1 True or false 1. Chapter 4 CONCepT appLICATION Level 1 True or false 1. Chapter 4 CONCepT appLICATION Level 1 True or false 1. Chapter 4 CONCepT a makes an acid dilute. Ca(OH)2 + SO2  $\rightarrow$  CaSO3 + H2O base acid gas 10. In presence of oxygen and water vapour (Z) metal iron (M) gets rusted to form a compound, i.e., Fe2O3. h I N T s A N D e x p l A N AT I O N 19. The mixture is stirred well with the help of a glass rod. 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 4NO2 + O2 + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 4NO2 + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 4NO2 + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 .6H 2O  $\rightarrow$  2CuO + 6H 2O 2Cu(NO3 )2 . 2CuO + 4NO2 + O2 + 6H 2O Coefficients of CuO, NO2 and H2O are respectively 2, 4 and 6. Classification of Matter 35. (d) electrolysis of water. a 16. Mixture is a substance which is formed by mixing two or more substances (elements, compounds or both) physically in any proportion. Formation of Smog D. Fire extinguisher: CO2 is a nonsupporter of combustion, non-combustible and being heavier than air it can be used to put off fires. b 3. However, it is a supporter of combustion as it allows burning of other substances. Aeroplanes usually fly in the zone of mesosphere. Give balanced equations showing neutralisation reactions of the following. pRACTICe QUesTIONs 40. It turns blue litmus to red. As a result, it has become one of the best-selling series, providing authentic and class-tested content for effective preparation—strong foundation, and better scoring. Tellurium is a metalloid, and hence, it shows properties of both metals and non-metals. When the names of two or more elements have the same initial letter (E.g., carbon and calcium), another letter from the name of the element is written in small letter along with the initial letter written in capital. HNO3 is a strong acid and Al(OH)3 is a weak base. In a double decomposition reaction, one of the products is insoluble. In layer of atmosphere TV waves do not get reflected. (c) dissolution of concentrated acid in water. If excess of carbon dioxide is passed through lime water, it becomes transparent due to the formation of Ca(HCO3)2. Examples: (i) CuSO4. The temperature at which a solid changes into a liquid on heating at normal atmospheric pressure is called the melting point of that solid. TNT, TNG. (c) Oxyhydrogen blow torch: A mixture of hydrogen and oxygen is burnt to give a high temperature of  $2800^{\circ}$ C. CuSO4 + X  $\rightarrow$  XSO4 + Cu  $\therefore$ X is more reactive than Cu CuSO4 + Y  $\rightarrow$  No reaction  $\therefore$ X is more reactive than Cu  $\therefore$ V is more reactive than Cu  $\therefore$ X is more wax coating. A  $\rightarrow$  e Atomic number of neon is 10 and electronic configuration 2, 8, valency = 0. They are also generated during the burning of fossil fuels, eruption of volcanoes, etc. electricity? as per divided (c) milk (d) sugar water (a) zinc (b) copper complexity: 22. Due to acid rain, sculptures and monuments get damaged and also water bodies like rivers, oceans get acidified. Due to the absorption of highly energetic radiations, i.e., UV radiations by the stratosphere, the temperature is high when compared to the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements in the troposphere. By direct combination of elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elements: Acids can be prepared by taking two elements in the troposphere. By direct combination of elem packed. If the solid particles are heavier, then they settle down. The reagent is carbon disulphide which dissolves sulphur. (a) The valencies of the ions or radicals are written below the radicals without positive and negative sign. Nascent hydrogen can reduce compounds that do not readily react with normal hydrogen. pRACTICe QUesTIONs 7. (a) C, CO2, CaCO3 (b) S, SO2, CaSO3 (c) S, SO2, Ca(HSO3)2 (d) C, CO2, Ca(HCO3)2 6. (ii) CO2 is a non-supporter of combustion, but allows burning of active metals. Equipment like scrubbers and precipitators are to be used in industries to prevent the emissions of harmful gases. (a) Leaves of plants appear to wilt in summer afternoons. The formula of the acidic salt should be Ca(HCO3)2, a 22. Calcium hydroxy chloride () b. One molecule of the salt 'x' reacts with one molecule of a base. Dilute solution of NO2 appears as vellow colour. 38. (c) vibratory and rotatory motions of molecules of solids, 53. In an atom, the L and M shells have the same number of electrons. The mass of an electron is very negligible and has a value of 9.1 × 10-31 kg. Chile salt petre and nitrate (c) ferrous sulphate (d) copper sulphate and ferrous sulphate (d) copper sulphate (d) coppe percentage increase in atmosphere (a) a strong acid.  $-60^{\circ}$ C to  $-15^{\circ}$ C,  $-15^{\circ}$ C to  $-120^{\circ}$ C and maximizing up to 2000°C (1) troposphere (2) stratosphere (3) mesosphere (4) exosphere (5) thermosphere (a) 2 1 3 5 (b) 1 2 3 5 (c) 2 1 3 4 (d) 3 1 2 5 4. Zn+2 2 HCO3-1 Zn(HCO3)2 Zn+2 2 1 CrO4-2 2 1 ZnCrO4 Zn+2 2 P-3 3 Zn3P2 2. b 25. O2 and CO2 prepared in the laboratory can be collected by . Sublimation  $\rightarrow$  Iodine + sand, iodine undergoes sublimation on heating Filtration  $\rightarrow$  Sawdust + water, sawdust floats on water Evaporation  $\rightarrow$  NaCl + water, NaCl is soluble in water and undergoes evaporation on heating 24. Conversion of a liquid to its gaseous state is called vaporisation which can be accomplished by two processes namely boiling and evaporation. Stannous C. When Vasu was running high temperature, her mother was nursing him by placing a wet cloth on his forehead till the temperature had gone down. Column A Column B () a. (a) The process of cloud formation takes place in summer, whereas the process of mist formation takes place in winter. (b) Gases are highly compressible and possess strong forces.  $2KMnO4 + 3H2SO4 + 5H2C2O4 \rightarrow K2SO4 + 2MnSO4 + 10CO2 + 8H2O 9$ . There are two different methods of separation, i.e., filtration and sedimentation for the separation of the above mixture. Smallest particle of the matter c. Give the chemical equations. Marble chips (a) The layer of atmosphere which begins at the earth's surface and extends up to 20 km height Atmosphere protects us from harmful radiations. Boiling B. (c) of the decrease in temperature with altitude. How is it obtained from the corresponding non-metal? Assertion (A): Pickles are generally not stored in tin vessels. 39. This is due to increased number of surface molecules. This product is the result of one such effort. Identify X, Y, Z and M Symbolic Representation of Elements In ancient days, alchemists were under the impression that some metals like iron could be converted into gold. Hence, electric bulbs are filled with an inert gas like argon or chemically inert nitrogen. photolytic 20. Mixture of iron filings and sand can be separated by . Two molecules of sulphur trioxide are . Based on the molecular composition, the ratio of number of atoms of the constituent elements is indicated by a chemical formula. Burning up of meteorites, flying of aeroplanes, reflection of radio waves, absorption of harmful ionising radiations and occurrence of most of the weather phenomena. Such a salt is called an acidic salt. indicated by b 8. (a) both solutions turn blue litmus to red. Define valency? Carbon powder is left on the filter paper as a residue which is collected after drying. Examples: Bicycle handles, rims, bumpers of car, etc. Acetic acid has only one replaceable H+ ion, and hence, it is a monobasic acid and also it is a weak acid. Give an example of a dibasic acid. Examples: Weak acids Weak bases CH3COOH CH3COO- + H+ Ca(OH)2 Ca+2 + 2OH- H2CO3 2H+ + CO3-2 Al(OH)3 Al+3 + 3OH- H3PO4 3H+ + PO4-3 Naming of acids: Hydracids are named as hydro .....ic acid by including the name of the non-metal. The metals used for coating are chromium or nickel. Hydracids are named as hydro .....ic acid by including the name of the non-metal. The metals used for coating are chromium or nickel. Hydracids are named as hydro .....ic acid by including the name of the non-metal. The metals used for coating are chromium or nickel. Air and Oxygen Preparation of Hydrogen (i) General methods of preparation General methods of preparation of hydrogen are shown in Table 4.8. T  $H2\uparrow$  Fe + H2O Fe3O4 + H2↑ Na and K → Reaction is violent. 7 H2O (iii) Na2SO4. The metallic radical in salt should be Ca+2. So, we can say that all pure substances are homogeneous in nature. h I N T S a N D E x p l a N aT I O N 21. 2Cu(NO → 2CuO + 4NO2 + O2 + 6H 2O NH4Cl(s)  $\longrightarrow$  NH4Cl(s)  $\longrightarrow$ involves both sublimation (physical change) and chemical decomposition (chemical change) 2. (c) residue is filtered. (iv) Writing electronic configuration of the atom. When water vapour condenses on dust particles and remains suspended in atmosphere, it is called fog. Arrange the following pairs in a sequence of decreasing order of acidity of base and increasing order of basicity of an acid and the salts formed between an acid and base with equal basicity and acidity in their increasing order, respectively. Since it was summer, therefore, Ravi's mother advised him to carry only cotton clothes. Identify Y. A B Electronic 2, 8, 8, 2 configuration 2, 8, 3 AgNO3 + NH4Cl → AgCl + NH4NO4 Metal Ca Al Formulae (i) Ca(NO2)2 Al(NO2)3 This is a double decomposition reaction where silver chloride being insoluble settles at the bottom. Carbonic acid (H2CO3) is a weak acid. Action with litmus: Oxygen is neither acidic nor basic in nature.  $X + YZ \rightarrow XZ + Y$  Column B () a. In a compound, constituents do not retain their properties. (b) Rate of evaporation is directly proportional to temperature. Ca  $\rightarrow$  Brisk reaction and metal sinks in water. d 26. The symbol of cobalt is Co. 1 12. Metal carbonates when treated with dilute acids liberate CO2 gas with the formation of corresponding salts. 2. HCl reacts with complex organic compounds and forms coloured compounds. The constituent substances of a mixture may be more than one element or compound or both elements and compounds. is the non-metal which is a good conductor of electricity. The core objective of the series is to be a one-stop solution for students preparing for various competitive examinations. This system of writing symbols was suggested by Berzelius in the year 1814 to represent an atom of an element. (a) X (b) Z (c) Y (d) X and Y 14. Gases like nitrogen dioxide, sulphur dioxi ammonium chloride can be separated by . The number of oxygen atoms 12. Ratio of mass number is 16 : 32 = 1 : 2 15. A thermometer and a condenser, known as Liebig condenser, are attached with the help of adapters. 33. Classification of Matter 5. As calcium hydroxide is basic in nature, it neutralises the acidity of soils. Blackening of silverware is a chemical change. Distinguish between an atom and a molecule. (b) identification of the atomic number of the given element. Reason (R): The components of pickles are highly reactive towards glass/plastic. Which of the following activities leads to excess intake of O2? The salt can further undergo neutralisation to form a normal salt. Arrange the following substances in the ascending order of the number of constituent element(s) present in them. Air and Oxygen 22. Test 2 Directions for questions from 1 to 9 Select the correct alternative from the given choices. • understand basic properties of matter. Bluecoloured CoCl2 present in industry: It is used in the preparation of H2SO4 and HNO3. (a) Both (A) and (R) are true and (R) is correct explanation for (A). Tin does not react with the contents of food material while Zn reacts and leads to spoilage of food. Justify. Thus, the formula can be written as AlCl3. Burning of fossil fuels 2. In the laboratory preparation of oxygen from is used as a catalyst. -1 +3 +2 +4 -2 39. Y turns acidified potassium dichromate paper to green. (b) Its vapour density is equal to air and it is highly soluble in water. Explain the factors affecting the rate of evaporation. Mention various constituents of air and write their percentage by weight. Solid C. As a result, the iron hvdrogen peroxide. sheets get coated with zinc metal. The formula of a compound can be derived by using a shortcut method known as criss-cross method. • understand causes of water. If the molecules of a pure substance contain identical atom(s), then it is called an element. Certain metals like Fe, Cu, Sn, etc., exhibit

more than one valency in their compounds called variable valency. pRaCTICE QUESTIONS 37. Being a non-supporter of combustible and heavier than air, it can be used to extinguish fires. He adds a certain reagent where he observes that one of the components goes into the solution state. M etallurgy: Hydrogen is used as a good reducing agent in the extraction of some metals from their oxides. Name the different layers of atmosphere. Exosphere (a) It is the outermost layer of the atmosphere which extends up to 10,000 km above the earth's surface. We hence collaborate with the best of minds to deliver you class-leading products, spread across the Higher Education and K12 spectrum. a 31. Both protons and neutrons possess the same magnitude of charge but opposite signs.  $2H2 + O2 \rightarrow 2H2O$  2. Valency The number of electrons gained or lost by an atom of an element for attaining the stable octet or duplet configuration is called valency. Ca(OH)2 + 2HCl  $\rightarrow$  CaCl2 + 2H2O Calcium hydroxide Calcium chloride 4. 3.33 This page is intentionally left blank Chapter Chapter 14 Number air and Oxygen systems Remember Before beginning this chapter, you should be able to: • know the concept of atmosphere. Sublimation - Iodine iodine undergo weights and hence it is a compound. Gas particles move with high speeds and the intermolecular spaces in gases are very large. A non-metal X with electronic configuration 2, 8, 6 forms corresponding -ous and -ic acids. Combination reaction b. NaOH and KOH are called caustic potash, respectively due to their causticizing action on skin. the different methods tohydrochloric separate the absolutely free of airunderstand is called outer space. (c) The constituent elements retain their properties in a compound. The positively charged radicals are ammonium radical (NH4+) and hydronium radical (H3O+). Then, decrease in temperature is more in \_\_\_\_\_. Definition of an acid and a base: An acid is defined as a substance which on dissolution in water furnishes H+ ions as the only positively charged radicals are ammonium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (H3O+). Then, decrease in temperature is more in \_\_\_\_\_. Definition of an acid and a base: An acid is defined as a substance which on dissolution in water furnishes H+ ions as the only positively charged radicals are ammonium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (H3O+). Then, decrease in temperature is more in \_\_\_\_\_. Definition of an acid and a base: An acid is defined as a substance which on dissolution in water furnishes H+ ions as the only positively charged radicals are ammonium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (H3O+). Then, decrease in function of an acid and a base: An acid is defined as a substance which on dissolution in water furnishes H+ ions as the only positively charged radicals are ammonium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (NH4+) and hydronium radical (H3O+). Then, decrease in hydronium radical (H3O+). The

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