Multiple-Choice Questions

(QUESTION BANK)

Chapter 2: IS MATTER AROUND US PURE?

1. In the chemical classification, matter is classified into
   a. solids, liquids and gases.
   b. pure substances and mixtures.
   c. elements and compounds.
   d. metals, non-metals and metalloids.

2. Which of the following is not a characteristic of pure substances?
   a. Pure substances are made up of only one type of particles.
   b. Pure substances have variable compositions.
   c. Pure substances are perfectly homogeneous.
   d. Pure substances have definite melting and boiling points.

3. A/An ..... is the simplest form of matter that cannot be broken down further into simpler substances by chemical methods.
   a. mixture
   b. compound
   c. element
   d. alloy

4. Name the metal which exists as a liquid at room temperature.
   a. Sodium
   b. Aluminium
   c. Thallium
   d. Mercury

5. ..... is the only non-metal which exists as a liquid at room temperature.
   a. Carbon
   b. Hydrogen
   c. Bromine
   d. Iodine

6. A substance which is made up of two or more elements chemically combined together in a definite proportion by mass is known as a/an
   a. alloy.
   b. compound.
   c. homogeneous mixture.
   d. heterogeneous mixture.

7. What is the ratio of hydrogen and oxygen by mass in H_2O_2?
   a. 1 : 8
   b. 8 : 1
   c. 1 : 16
   d. 16 : 1

8. Which of the following is not a homogeneous mixture?
   a. Mixture of sodium chloride and water
   b. Mixture of sugar and water
   c. Mixture of glucose and water
   d. Mixture of clay and water

9. Which of the following is a heterogeneous mixture?
   a. Mixture of acetic acid and water
   b. Mixture of ethanol and water
   c. Mixture of acetone and water
   d. Mixture of kerosene oil and water

10. Which of the following statements is false?
    a. Pure substances are further classified as elements and compounds.
    b. The components of a mixture do not retain their individual properties.
    c. A compound has a definite chemical composition.
    d. A mixture has a variable chemical composition.

11. The particles of a solution are less than ..... in diameter.

a. 1 nm b. 0.1 nm c. 0.5 nm d. 0.05 nm

12. Bronze is an alloy of

a. copper and zinc.
b. copper and tin.
c. iron and aluminium.
d. iron and chromium.

13. A solution is prepared by dissolving 10 g of sodium chloride in 40 g of water. What is the mass by mass percentage of this solution?

a. 25 %
b. 20 %
c. 50 %
d. 80 %

14. A 15 % (*m*/*m*) aqueous solution of glucose is prepared by dissolving 13.5 g of glucose in *x* g of water. Calculate the value of *x*.

a. 103.5 g
b. 100 g
c. 90 g
d. 76.5 g

15. The volume of a 20 % (*v*/*v*) aqueous solution of ethanol is 80 mL. Calculate the volume of ethanol present in this solution.

a. 40 mL
b. 20 mL
c. 16 mL
d. 4 mL

16. A solution which contains more quantity of the solute that it can dissolve at a particular temperature is called a/an ..... solution.

a. dilute
b. unsaturated
c. saturated
d. supersaturated

17. Which of the following is a suspension?

a. Vinegar
b. Milk
c. Mixture of clay and water
d. Sodium amalgam

18. Which of the following substances will not show Tyndall effect?

a. Milk
b. Ink
c. Brine
d. Fog

19. Shaving cream is a/an

a. aerosol.
b. emulsion.
c. sol.
d. foam.

20. Identify the correct statement from the following.

a. A solution does not scatter light.
b. A colloid is a homogeneous mixture.
c. The particles of a suspension cannot scatter light.
d. The particles of a colloid are larger than the particles of a suspension.

21. ..... is an emulsion.

a. Butter
b. Milk of magnesia
c. Foam
d. Milk

22. In a/an ....., both the dispersed phase and the dispersion medium are in liquid state.

a. aerosol
b. foam
c. emulsion
d. gel

23. A mixture of ..... can be separated by magnetic separation.
   a. naphthalene and common salt
   b. sulphur and common salt
   c. iodine and sulphur
   d. iron filings and sulphur

24. What is the random zig-zag motion of colloidal particles called?
   a. Tyndall effect
   b. Rayleigh's scattering
   c. Brownian movement
   d. Adsorption

25. The components of a mixture of ammonium chloride and sodium chloride can be separated by
   a. filtration.
   b. sublimation.
   c. evaporation.
   d. crystallisation.

26. In which of the following substances, both the dispersed phase and the dispersion medium are in solid state?
   a. Face cream
   b. Milky glass
   c. Jelly
   d. Pumice

27. Name the process which is used for separating the different components of air.
   a. Chromatography
   b. Simple distillation
   c. Fractional distillation
   d. Centrifugation

28. Salt obtained from seawater is purified by
   a. evaporation.
   b. crystallisation.
   c. distillation.
   d. centrifugation.

29. Which of the following is the principle of separating a mixture of two immiscible liquids by using a separating funnel?
   a. Denser particles of a mixture are forced to the bottom while lighter particles stay at the top when the mixture is spun rapidly.
   b. Immiscible liquids separate out in layers depending on their densities.
   c. Different liquids boil at different temperatures.
   d. A substance has different solubilities in different solvents.

30. The components of ink can be separated by
   a. simple distillation.
   b. centrifugation.
   c. crystallisation.
   d. chromatography.

ANSWERS

1. b.	**2.** b.	**3.** c.	**4.** d.	**5.** c.	**6.** b.	**7.** c.
8. d.	**9.** d.	**10.** b.	**11.** a.	**12.** b.	**13.** b.	**14.** d.
15. c.	**16.** d.	**17.** c.	**18.** c.	**19.** d.	**20.** a.	**21.** d.
22. c.	**23.** d.	**24.** c.	**25.** b.	**26.** b.	**27.** c.	**28.** b.
29. b.	**30.** d.					

Chapter 3: ATOMS AND MOLECULES

1. According to the ....., during a chemical reaction, mass can neither be created nor be destroyed.
   a. law of conservation of mass
   b. law of constant proportions
   c. law of multiple proportions
   d. law of combining volumes

2. The ratio of hydrogen and oxygen in a sample of water collected from a well was found to be 1 : 8 by mass. When a sample of water was collected from a pond and analysed, the ratio of hydrogen and oxygen in it was also found to be 1 : 8 by mass. This data is in accordance with the
   a. law of conservation of mass.
   b. law of constant proportions.
   c. law of multiple proportions.
   d. law of combining volumes.

3. Barium chloride reacts with sulphuric acid according to the following reaction:

   $$BaCl_2 + H_2SO_4 \longrightarrow BaSO_4 + 2HCl$$

   The masses of $BaCl_2$ and H_2SO_4 solutions used were 6.3 g and 8.7 g respectively. If the mass of HCl formed was 5.8 g, what would be the mass of $BaSO_4$ formed?
   a. 9.2 g
   b. 10.2 g
   c. 10.8 g
   d. 11.2 g

4. Calcium carbonate on heating forms calcium oxide and carbon dioxide. If 25 g of $CaCO_3$ on heating formed 14 g of CaO, calculate the amount of CO_2 that escaped into the air.
   a. 22 g
   b. 14 g
   c. 11 g
   d. 5.5 g

5. What is the Latin name for sodium?
   a. Ferrum
   b. Kalium
   c. Cuprum
   d. Natrium

6. One atomic mass unit is equal to
   a. 1/16th of the mass of an O-16 atom.
   b. 1/17th of the mass of an O-17 atom.
   c. 1/12th of the mass of a C-12 atom.
   d. 1/13th of the mass of a C-13 atom.

7. Name the smallest particle of an element or a compound which can exist independently and shows the properties of that substance.
   a. Atom
   b. Molecule
   c. Anion
   d. Cation

8. What is the atomicity of a phosphorus molecule?
   a. Two
   b. Three
   c. Four
   d. Eight

9. Which of the following is a monoatomic element?
   a. Fluorine
   b. Sulphur
   c. Argon
   d. Ozone

10. ..... is an ionic compound.
    a. CCl_4
    b. H_2S
    c. N_2O_5
    d. K_2SO_4

11. The ..... ion is a monoatomic ion.
    a. sulphate
    b. ammonium
    c. calcium
    d. carbonate

12. Which of the following is a polyatomic ion?
    a. Sulphide
    b. Chloride
    c. Nitride
    d. Nitrate

13. The ratio by mass of hydrogen and chlorine in hydrogen chloride is
    a. 3 : 35.5. b. 35.5 : 3. c. 1 : 35.5. d. 35.5 : 1.

14. Hydrazine is a compound of nitrogen and hydrogen. The ratio by mass of nitrogen and hydrogen in this compound is 7 : 1. If the mass of hydrogen in hydrazine is 4 g, what is the mass of nitrogen?
    a. 7 g b. 11 g c. 28 g d. 56 g

15. What is the chemical formula of magnesium phosphate?
    a. $Mg_2(PO_4)_3$ b. $Mg_3(PO_4)_2$ c. $Mg_3(PO_4)$ d. $Mg(PO_4)_2$

16. The chemical compound of sodium hydrogen carbonate is
    a. $NaHCO_3$. b. Na_2HCO_3. c. $NaCO_3$. d. Na_2CO_3.

17. Which of the following compounds has the chemical formula $ZnSO_3$?
    a. Zinc sulphite b. Zinc sulphide c. Zinc sulphate d. Zinc hydrogen sulphate

18. The chemical formula of ethanol is C_2H_5OH. Calculate its molecular mass.
    a. 34 u b. 38 u c. 46 u d. 52 u

19. Calculate the formula unit mass of $MgCl_2$.
    a. 46 g b. 59.5 g c. 83 g d. 95 g

20. Calculate the mass percentage of carbon in methane (CH_4).
    a. 75 % b. 33.3 % c. 25 % d. 20 %

21. 1.08 g of a sample of a compound of nitrogen and oxygen on analysis gave 0.28 g of nitrogen and 0.80 g of oxygen. What is the percentage of nitrogen present in this compound?
    a. 74.07 % b. 35 % c. 25.93 % d. 15 %

22. What is the value of Avogadro's constant?
    a. 1.66×10^{-24} b. 9.1×10^{-31} c. 6.022×10^{20} d. 6.022×10^{23}

23. What is the number of atoms of oxygen present in 0.5 moles of O_2?
    a. 6.022×10^{23} b. 3.011×10^{23} c. 6.022×10^{20} d. 3.011×10^{20}

24. What is the mass of 3.011×10^{23} atoms of hydrogen?
    a. 2 g b. 1 g c. 0.5 g d. 0.25 g

25. Calculate the mass of 0.25 moles of Cl_2 gas.
    a. 284 g b. 71 g c. 35.5 g d. 17.75 g

26. ..... mole(s) of Br_2 contain 6.022×10^{23} atoms of bromine.
    a. 2 b. 1 c. 0.5 d. 0.25

27. What is the number of moles present in 62 g of P_4 molecules?
    a. 0.25 moles b. 0.5 moles c. 1 mole d. 2 moles

28. What mass of calcium contains the same number of atoms as present in 2.3 g of sodium?
    a. 40 g b. 13.8 g c. 9.2 g d. 4 g

ANSWERS

1. a.	**2.** b.	**3.** a.	**4.** c.	**5.** d.	**6.** c.	**7.** b.
8. c.	**9.** c.	**10.** d.	**11.** c.	**12.** d.	**13.** c.	**14.** c.
15. b.	**16.** a.	**17.** a.	**18.** c.	**19.** d.	**20.** a.	**21.** c.
22. d.	**23.** a.	**24.** c.	**25.** d.	**26.** c.	**27.** b.	**28.** d.

Chapter 4: STRUCTURE OF THE ATOM

1. The term 'electron' was first coined by
   a. Michael Faraday.
   b. G J Stoney.
   c. J J Thomson.
   d. Ernest Rutherford.

2. An electron has mass equal to ..... times that of a hydrogen atom.
   a. 1837
   b. 1/1837
   c. 1528
   d. 1/1528

3. Which of the following postulates of Thomson's model of an atom is not true?
   a. Thomson's model of an atom is similar to that of Christmas pudding.
   b. An atom consists of a positively charged sphere with electrons embedded in it.
   c. In an atom, the magnitude of positive charge is equal to the magnitude of negative charge.
   d. An atom carries a net positive charge.

4. In Rutherford's alpha-particle scattering experiment, a thin ..... foil was bombarded with a stream of fast moving alpha particles.
   a. iron
   b. aluminium
   c. gold
   d. silver

5. In the alpha-particle scattering experiment, most of the alpha particles
   a. passed undeflected through the gold foil.
   b. were deflected by small angles.
   c. were deflected by large angles.
   d. were deflected by 180°.

6. Which of the following postulates of the Rutherford's model of an atom is incorrect?
   a. An atom contains a positively charged centre called the nucleus.
   b. Nearly all the mass of the atom is concentrated in the nucleus.
   c. The electrons revolve around the nucleus in circular paths.
   d. The size of the nucleus is comparable to the size of the atom.

7. Rutherford's model of an atom could not explain the
   a. electrical neutrality of an atom.
   b. distribution of electrons in an atom.
   c. distribution of positive charge in an atom.
   d. stability of an atom.

8. Who discovered the neutron?
   a. E Goldstein
   b. E Rutherford
   c. J J Thomson
   d. J Chadwick

9. Which of the following is the correct representation of a neutron?
   a. ${}^{0}_{0}n$
   b. ${}^{1}_{0}n$
   c. ${}^{0}_{1}n$
   d. ${}^{1}_{1}n$

10. What is the maximum number of electrons that can be accommodated in the fourth orbit of an atom?
    a. 8
    b. 16
    c. 32
    d. 50

11. What is the valency of argon?
    a. 8
    b. 6
    c. 2
    d. 0

12. What is the electronic configuration of carbon?
    a. 2, 4
    b. 2, 3
    c. 2, 2
    d. 2, 1

13. Which of the following elements has the electronic configuration 2, 5?
    a. Boron
    b. Nitrogen
    c. Oxygen
    d. Fluorine

14. The electronic configuration of potassium is
    a. 2, 8, 9.
    b. 2, 9, 8.
    c. 2, 8, 8, 1.
    d. 2, 8, 8, 2.

15. ..... has completely filled outermost shell.
    a. Carbon
    b. Nitrogen
    c. Fluorine
    d. Neon

16. The maximum number of electrons that can be accommodated in the outermost orbit of an atom is
a. 2. **b.** 4. **c.** 6. **d.** 8.

17. The electronic configuration of an element is 2, 8, 3. What will be the valency of this element?
a. 2 **b.** 3 **c.** 5 **d.** 8

18. What is the valency of an element whose electronic configuration is 2, 8, 7?
a. 8 **b.** 7 **c.** 2 **d.** 1

19. Which of the following species does not have the electronic configuration 2, 8, 8?
a. Ar atom **b.** K^+ ion **c.** Cl^- ion **d.** K atom

20. The total number of protons present in the nucleus of an atom is equal to its
a. atomic number. **b.** atomic mass. **c.** mass number. **d.** valency.

21. The mass number of an element X with the electronic configuration 2, 8, 1 is 25. The number of neutrons present in element X is
a. 11. **b.** 14. **c.** 25. **d.** 37.

22. An element has three electrons in its third shell which is also its valence shell. If the number of neutrons present in the element are 14, what is the mass number of the element?
a. 3 **b.** 13 **c.** 14 **d.** 27

23. Atoms of the same element having different mass numbers are known as
a. isotopes. **b.** isobars. **c.** isotones. **d.** isodiaphers.

24. Protium, deuterium and tritium are the isotopes of
a. hydrogen. **b.** carbon. **c.** oxygen. **d.** sulphur.

25. Which of the following statements about isotopes is incorrect?
a. Isotopes are the atoms of the same element. **b.** Isotopes have the same atomic number.
c. Isotopes have different mass numbers. **d.** Isotopes have different chemical properties.

26. The atomic number of an element is 18 and its mass number is 40. Which of the following elements has the same number of neutrons as X?
a. $^{40}_{20}Ca$ **b.** $^{40}_{19}K$ **c.** $^{41}_{20}Ca$ **d.** $^{41}_{19}K$

27. The average atomic mass of chlorine is
a. 35 u. **b.** 35.5 u. **c.** 37 u. **d.** 39 u.

28. The isotope of ..... is used in the treatment of goitre.
a. hydrogen **b.** cobalt **c.** iodine **d.** phosphorus

29. What are the atoms of different elements having the same mass number called?
a. Isotopes **b.** Isobars **c.** Isotones **d.** Isodiaphers

30. The elements given in which of the following options are isobars?
a. $^{12}_{6}C$, $^{13}_{6}C$ **b.** $^{35}_{17}Cl$, $^{37}_{17}Cl$ **c.** $^{40}_{18}Ar$, $^{40}_{20}Ca$ **d.** $^{36}_{16}S$, $^{39}_{19}K$

ANSWERS

1. b.	**2.** b.	**3.** d.	**4.** c.	**5.** a.	**6.** d.	**7.** d.
8. d.	**9.** b.	**10.** c.	**11.** d.	**12.** a.	**13.** b.	**14.** c.
15. d.	**16.** d.	**17.** b.	**18.** d.	**19.** d.	**20.** a.	**21.** b.
22. d.	**23.** a.	**24.** a.	**25.** d.	**26.** d.	**27.** b.	**28.** c.
29. b.	**30.** c.					