CHEMISTRY

SCIENCE Paper – 2

(Two Hours)

Answers to this Paper must be written on the paper provided separately.

*You will **not** be allowed to write during the first **15** minutes.*

This time is to be spent in reading the Question paper.

The time given at the head of this paper is the time allowed for writing the answers.

Section I** is compulsory. Attempt **any four** questions from **Section II

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION – I (40 Marks)

*(Attempt **all** questions from this Section.)*

Question :1

(a) Choose one correct answer to the questions from the given options: **[15]**

1. Balancing of chemical equation is based upon
   A. Law of gravitational forces
   B. Newton law of motion
   C. Law of conservation of mass
   D. None of these

2. Which of the following is a chemical change?
   A. Tearing of paper
   B. Melting of ice
   C. Digestion of food
   D. Cutting fruits

3. Valency of calcium is
   A. 3
   B. 1
   C. 2
   D. 4

4. Chemical formula for zinc sulphite is
   A. ZnS
   B. ZnS
   C. ZnS

D. Zn

5. If the atomic number of an atom is 18 and mass number is 40 then number of neutrons will be
   A. 23
   B. 14
   C. 22
   D. 11

6. The process by which steam changes into water is
   A. Melting
   B. Sublimation
   C. Condensation
   E. Vaporisation

7. Assertion (A): Rusting of iron is a chemical change.
   Reason (R): Rusting involves the formation of a new substance, iron oxide, which has different properties from iron.
   A. Both A and R are true, and R is the correct explanation of A.
   B. Both A and R are true, but R is not the correct explanation of A.
   C. A is true, but R is false.
   D. A is false, but R is true

8. Maximum number of electrons in the M shell of an atom
   A. 2
   B. 18
   C. 8
   D. 32

9. Oil and water can be separated by can be separated by
   A. Distillation
   B. Separating funnel
   C. Chromatography
   D. Decantation

10. Valency of sulphate (SO_4) radical is
   A. 4
   B. 2
   C. 3
   D. 1

11. Assertion (A): During evaporation, a liquid changes into gas at its boiling point.
Reason (R): Evaporation occurs only at the surface of the liquid and can happen at any temperature.
A. Both A and R are true, and R is the correct explanation of A.
B. Both A and R are true, but R is not the correct explanation of A.
C. A is true, but R is false.
D. A is false, but R is true.

12. Which of the following is heterogeneous mixture?
A. Water and alcohol
B. Water and oil
C. Water and salt
D. Water and sugar

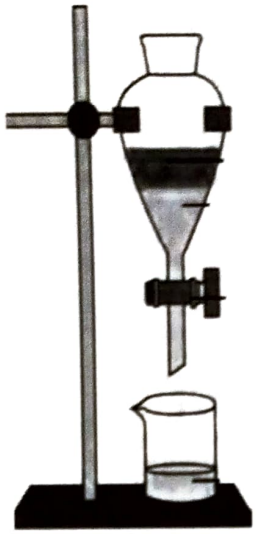
13. Valency of Aluminium in $Al_2(SO_4)_3$ is
A. 1
B. 3
C. 2
D. 6

14. Maximum number of electrons in the M shell of calcium is
A. 32
B. 8
C. 18
D. 1

15. The forces of attraction between particles are minimum in
A. Sugar
B. Oxygen
C. Salt
D. Water

Question 2.

(a) You are in a laboratory where you come across a figure depicting a technique used for the separation of mixtures. This process allows for the separation of mixture into its components. **[5]**



i. Identify this technique of separation of mixtures.
ii. Which types of mixtures can be separated by this method?
iii. State the principle behind this technique.
iv. Explain this technique with the help of an example of mixture.

(b) Fill in the blanks: **[5]**

1. A chlorine atom has _____electrons in its valence shell.
2. The _____shell has minimum energy.
3. Nucleus of an atom contains _____and _____subatomic particles.
4. Unbalanced chemical equation is also called as _____equation.
5. _____is the smallest particle of an element.

(c) Complete the following table by identifying A, B, C, D, E, F [5]

Element	symbol	no of protons	no of neutrons	no of electrons	Electronic configuration
Argon		18			
Sodium			12	11	
				15	

(d) Name the following [5]

1. The process in which substances changes directly from solid state to gaseous state.
2. The change in which the chemical composition of the substance changes.
3. Method through which two immiscible liquids can be separated.
4. Protons and neutrons collectively present in the nucleus of an atom.
5. The method for balancing of chemical equation.

(e) Match the following column A with Column B. [5]

COLUMN- A	COLUMN -B
i) Common salt and sand	a) Separating funnel
ii) Potassium nitrate and common salt	b) Distillation
iii) Iodine and ethyl alcohol	c) Fractional crystallization
iv) water and kerosene oil	d) Magnetic separation
v) iron and sand	e) Solvent extraction

SECTION – II [40 Marks]

*Attempt **any four** questions from this Section*

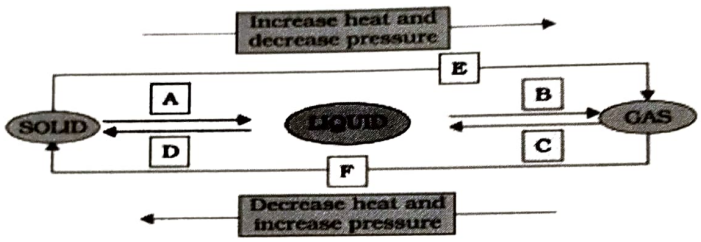
Question: 3

(i) Define [2]
(a) Diffusion
(b) Liquefaction

(ii) Write the differences between evaporation and boiling (any four). [2]

(iii) State the law of conservation of mass. What do you observe when barium chloride solution is mixed with sodium sulphate solution. Give the relevant chemical equation. [3]

(iv)) Name the labels A, B, C, D, E, F in the following flow chart for inter conversion of states of matter. [3]



Question: 4

(i) Differentiate the following into physical and chemical changes. [2]
a) Cutting of fruits
b) Burning of coal
c) Switching an electric bulb
d) Respiration by cows

(ii) Is photosynthesis a physical or chemical change? Justify your answers with relevant reasons. [2]

(iii) How is burning of a candle an example of both physical and chemical change? Give reasons. [3]

(iv) (a) Classify the following substances into compounds and mixtures. [3]
A. Ammonia
B. Gun powder
C. Smoke

(b) Classify the following substances into homogeneous and heterogeneous mixtures.

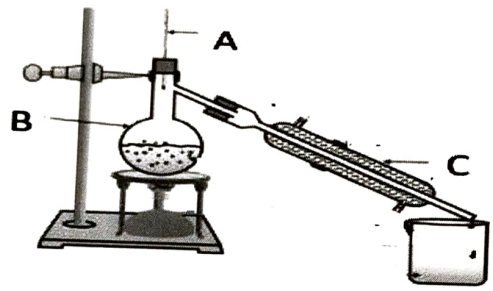
A. Brass
B. Sugar in water
C. Carbon dioxide in water

Question: 5

(I) Why distillation is preferred over evaporation to separate the components of a solid-liquid mixture.[2] Give reasons.

(ii) Write down the differences between compounds and mixtures.(any four) [2]

(iii)The diagram given below is the apparatus used for the separation of components of solid- liquid [3] mixture. Observe the diagram and answer the following questions:



(i) Name the separation method.
(ii) Name labels A, B, C
(iii) Give an example of the mixture which can be separated by using this method.

(iii) How does sodium chloride differ from constituent elements? Explain. [3]

Question: 6

(i) State and explain the rule according to which electrons are filled in various energy levels . [3]

(ii) Draw the atomic orbital diagram for the following elements showing the arrangement of numbers of electrons, protons and neutrons in the different parts of an atom. [4]

(a) Sulphur(mass no = 32)
(b) Potassium(mass no = 39)

(ii)Write down the conclusions of Rutherford's alpha scattering experiment. [3]

Question: 7

(i) Define
(a) Chemical formula
(b) Valency [2]

(ii) Why is there need to balance the chemical equation? [2]

(iii)Balance the following chemical equations. (No need to show your working out): [3]

a) $Mg + HCl \rightarrow MgCl_2 + H_2$
b) $Ca + O_2 \rightarrow CaO$
c) $N_2 + H_2 \rightarrow NH_3$
d) $NH_3 + HCl \rightarrow NH_4Cl$
e) $CH_4 + O_2 \rightarrow CO_2 + H_2O$
f) $N_2 + O_2 \rightarrow NO$

(iv) Write the molecular formula of the following compounds: (No need to show your working out) [3]

a) Iron (II) chloride
b) Sodium sulphate
c) Ammonium phosphate
d) Baking soda
e) Silver nitrate
f) Zinc hydroxide

Question :8

(i) Define alpha particles. How are they formed? [2]

(ii) Write differences between : [2]

a) Electrons and protons

b) Duplet rule and octet rule

(iii) Write down features of Rutherford's atomic model. [3]

(iv) What information do you get from the following chemical equation: [3]
(minimum 3 points, points should be different)

$$\underset{(s)}{C} + \underset{(g)}{O_2} \quad \underset{(g)}{CO_2} + \text{heat}$$