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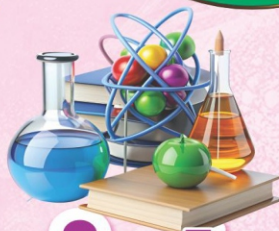
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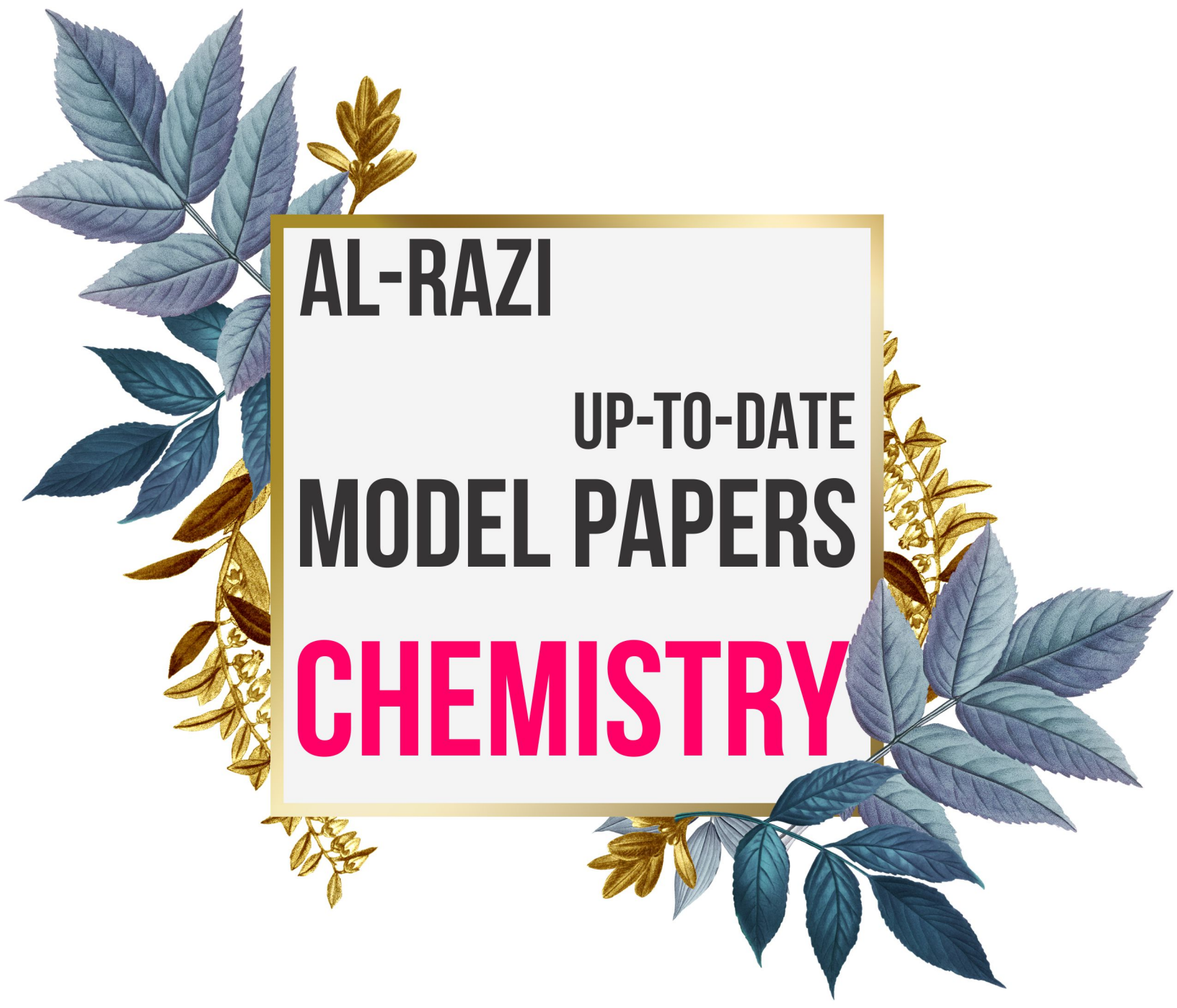
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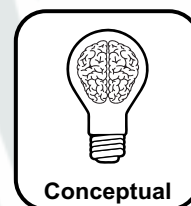
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For Exam Preparation 2026

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**Written & Composed by AL-RAZI
Academic Development Unit (ADU)**

Chapter 1: States of Matter and Phase Changes

1.1 What is Chemistry?

Multiple Choice Questions (MCQs)

- Which branch of chemistry helps in understanding life through chemical processes?
A Biochemistry
B Medicinal Chemistry
C Polymer Chemistry
D Analytical Chemistry
- Radioactivity and reactions occurring in the nuclei of atoms are studied in:
A Polymer Chemistry
B Medicinal Chemistry
C Environmental Chemistry
D Nuclear Chemistry
- Which branch of chemistry is primarily concerned with the analysis of substances?
A Medicinal Chemistry
B Environmental Chemistry
C Analytical Chemistry
D Astrochemistry
- The study of chemical composition and processes occurring on Earth and its minerals is called:
A Geochemistry
B Astrochemistry
C Physical Chemistry
D Environmental Chemistry

Short Answered Questions

- What is chemistry and what does it study?

Ans. Chemistry is the branch of science focused on the properties, composition, and structure of substances. It explores physical and chemical changes in matter and the principles that govern these changes.

- Why are the branches of chemistry important?

Ans. The branches of chemistry allow scientists to specialize in distinct areas of study, making it easier to explore complex topics.

- What does organic chemistry study?

Ans. Organic chemistry focuses on carbon-containing compounds, including hydrocarbons and their derivatives. It examines their structure, properties, and reactions, which are essential for understanding life and creating various products.

- What is biochemistry?

Ans. Biochemistry explores life at the molecular level by studying proteins, carbohydrates, lipids, and nucleic acids. It reveals vital processes in organisms, bridging biology and chemistry for medical and scientific advancements.

1.2 States of Matter

● Multiple Choice Questions (MCQs) ●

5. **The state of matter has particles that are very widely apart:**
A Solid B Liquid C Gas D Plasma
6. **The state of matter has particles fixed in position but able to oscillate is:**
A Gas B Solid C Plasma D Liquid
7. **The state of matter composed of particles with very high kinetic energy is:**
A Plasma B Gas C Liquid D Solid
8. **The property common between gases and supercritical fluids is:**
A High density B Fixed shape
C Weak intermolecular forces D Strong intermolecular forces

● Short Answered Questions

- ## 1. What is matter?

Ans. Matter is anything that carries weight and occupies space. Unlike energy, which is non-material, matter exists in various forms and surrounds us in everyday life.

- ## 2. How are liquids unique among the states of matter?

Ans. Liquids have closely attached particles with significant intermolecular forces, allowing random movement. They are not easily compressible, have higher densities than gases, and take the shape of their container.

- ### 3. What are crystalline solids?

Ans. Crystalline solids have a perfectly arranged particle structure and strong bonding, making them incompressible. Their high density and rigid structure are characteristic of this form of solid.

- #### 4. What is plasma, and where is it found?

Ans. Plasma is a high-energy state of matter composed of electrons, ions, and photons. It exists in phenomena like fluorescent tubes, lightning, and welding arcs, representing a partially ionized gas.

1.3 *Element, Compound and Mixture*

● Multiple Choice Questions (MCQs) ●

9. What is the simplest form of matter?
A Compound B Element C Mixture D Molecule
10. The form of matter is the most abundant among elements:
A Solid B Liquid C Gas D Plasma
11. The type of substance made up of two or more different elements combined in a fixed ratio is:
A Mixture B Element C Isotope D Compound
12. The type of element exists as a noble gas:
A Sodium B Silicon C Iron D Helium

Short Answered Questions

1. **What is an element?**

Ans. An element is the simplest form of matter, made up of only one kind of atom. It is a pure substance that cannot be broken down further by ordinary chemical reactions. Elements exist in solid, liquid, and gaseous forms, with solids being the most common.

2. **What are examples of elements?**

Ans. Examples of elements include metals like iron and gold, non-metals like oxygen and chlorine, and noble gases like helium. Elements can exist as atoms, molecules, ions, or isotopes.

3. **What are examples of compounds?**

Ans. Examples of compounds include water (H_2O), carbon dioxide (CO_2), sodium chloride (NaCl), and ammonia (NH_3). These compounds may be organic, inorganic, molecular, or ionic.

4. **What are homogeneous mixtures?**

Ans. Homogeneous mixtures have uniform composition and properties throughout. An example is a saltwater solution.

1.4 Allotropic Forms of Substances**Multiple Choice Questions (MCQs)**

13. **The phenomenon of elements existing in more than one structural form called:**

- A Isomerism B Allotropy C Crystallization D Polymerization

14. **The allotrope of sulphur is more stable:**

- A Monoclinic sulphur B Amorphous sulphur
C Liquid sulphur D Rhombic sulphur

15. **Which allotrope of sulphur has a monoclinic crystalline structure?**

- A Rhombic sulphur B Liquid sulphur
C Amorphous sulphur D Monoclinic sulphur

Short Answered Questions

1. **What is allotropy?**

Ans. Allotropy is the phenomenon where elements exist in more than one structural form with distinct physical and chemical properties. Examples include oxygen existing as O_2 and O_3 (ozone).

2. **What are the allotropic forms of oxygen?**

Ans. Oxygen has two allotropic forms: oxygen (O_2) and ozone (O_3). O_2 is essential for respiration, while O_3 is a triatomic molecule found in the ozone layer, protecting us from harmful UV radiation.

3. **How does diamond differ from graphite?**

Ans. Diamond has a giant macromolecular structure with strong covalent bonds, making it extremely hard. In contrast, graphite has a layered structure, allowing its layers to slide, making it soft and a good conductor of electricity.

1.5 Differences between Elements, Compounds and Mixtures**Multiple Choice Questions (MCQs)**

16. The following is an example of a compound:
A Sodium B Air C Water D Iron
17. A type of mixture is rock
A Homogeneous mixture B Colloidal solution
C True solution D Heterogeneous mixture

Short Answered Questions

1. What is an element?
Ans. An element is the simplest form of matter, made up of the same kind of atoms. It cannot be broken down into simpler substances by ordinary chemical reactions. Examples include sodium (Na), oxygen (O₂), and helium (He).
2. What is a compound?
Ans. A compound is a pure substance formed by the chemical combination of two or more different elements in a fixed ratio. For instance, water (H₂O) consists of hydrogen and oxygen in a 1:8 weight ratio.
3. What are the types of mixtures?
Ans. Mixtures can be homogeneous, like saltwater, where components are evenly distributed, or heterogeneous, like rocks, where composition varies across the sample.

1.6 Solution, Colloidal Solution and Suspension**Multiple Choice Questions (MCQs)**

18. The following is a true solution:
A Salt in water B Chalk in water C Oil in water D Dust in air
19. A type of solution is chalk in water:
A Homogeneous mixture B Suspension
C True solution D Colloidal solution
20. How can the components of a suspension be separated?
A Evaporation B Chemical reaction C Filtration D Distillation

Short Answered Questions

1. What is a solution?
Ans. A solution is a homogeneous mixture where the solute particles are completely dissolved in the solvent. The solute particles in a solution cannot be seen with the naked eye. Examples include sodium chloride or copper sulphate dissolved in water.
2. What is a true solution?
Ans. A true solution is a type of solution where the solute particles are completely dissolved in the solvent. These particles are so small that they cannot be seen by the naked eye and pass through the filter paper. An example is the dissolution of salt in water.

3. What is a colloidal solution?

Ans. A colloidal solution is a mixture where the solute particles are larger than those in a true solution but smaller than those in a suspension. These particles do not settle down over time and pass through filter paper. An example of a colloidal solution is milk.

1.7 Formation of Unsaturated and Saturated Solutions**Multiple Choice Questions (MCQs)****21. When a saturated solution of sugar is heated then:**

- A Sugar precipitates out B The solution becomes unsaturated
C More sugar can dissolve in the solution D Both (b) and (c)

22. A saturated solution is converted to an unsaturated solution:

- A By adding more solute B By cooling the solution
C By removing some solvent D By increasing the temperature

Short Answered Questions**1. What is an unsaturated solution?**

Ans. An unsaturated solution is one that can dissolve more solute at a given temperature. For example, when sugar is added to water and dissolves completely, the solution remains unsaturated until it reaches its solubility limit.

2. What happens when more solute is added to a saturated solution?

Ans. When additional solute is added to a saturated solution, it does not dissolve and settles at the bottom of the container. This indicates the solution has reached its maximum solubility limit.

1.8 Effect of Temperature on the Solubility of Solutes**Multiple Choice Questions (MCQs)****23. The solubility of calcium hydroxide _____ with an increase in temperature.**

- A Increases B Decreases
C Remains constant D Becomes unpredictable

24. The following is most soluble in water at low temperatures:

- A Sodium chloride B Potassium nitrate
C Calcium hydroxide D Carbon dioxide

25. The effect of temperature on the solubility of calcium chromate (CaCrO_4) is:

- A Increases B Decreases
C Remains unchanged D Becomes random

Short Answered Questions**1. What is solubility?**

Ans. Solubility is the amount of solute that can dissolve in 100g of a solvent at a specific temperature. It varies with the type of solute, solvent, and temperature.

2. What happens to the solubility of gases with temperature?

Ans. The solubility of gases in water decreases as temperature increases. For example, carbon dioxide is more soluble in cold water than in warm water.

Analytical/Conceptual MCQs

26. Which of the following best describes the difference between a compound and a mixture?
- A Compounds have variable composition; mixtures have fixed composition
B Compounds can be separated by physical means; mixtures cannot
C Compounds have fixed ratios of elements; mixtures do not
D Mixtures are pure substances
27. Which state of matter has a definite volume but no fixed shape?
- A Solid B Liquid C Gas D Plasma
28. Which statement best explains why diamond and graphite are different despite both being made of carbon?
- A Their atomic masses are different B Their molecular formulas are different
C They are allotropes with different atomic arrangements
D One is a compound, the other is a mixture
29. Which of the following is NOT a branch of chemistry?
- A Physical chemistry B Organic chemistry
C Nuclear chemistry D Astronomical chemistry
30. Which type of solution scatters light and appears cloudy?
- A True solution B Suspension
C Colloidal solution D Homogeneous solution
31. Which factor most significantly affects the solubility of a solid solute in a liquid solvent?
- A Volume of container B Shape of solute particles
C Temperature of the solvent D Color of solute
32. What is the best method to separate a mixture of sand and salt?
- A Filtration followed by evaporation B Distillation
C Crystallization D Decantation only
33. Which of the following statements is true about saturated solutions?
- A They can dissolve more solute at given temperature
B They contain no solute
C They have undissolved solute in equilibrium with dissolved solute
D They are always colored solutions
34. Why is water considered a compound?
- A It can be separated by filtration B It contains physically mixed elements
C It has two elements chemically combined in a fixed ratio
D It exists in three states of matter
35. Which of the following best represents a chemical property?
- A Melting point B Solubility
C Ability to react with acid D Boiling point
-

Analytical/Conceptual Short Questions

1. What is the difference between a compound and a mixture?

Ans.

Compound	Mixture
A compound is a substance formed when two or more elements are chemically combined in fixed proportions, resulting in new properties different from the original elements (e.g., water, H ₂ O). In a compound, the components cannot be separated by physical means, only by chemical reactions.	A mixture is a combination of two or more substances that are physically blended but not chemically bonded, so each retains its own properties (e.g., salt water). Mixtures can be separated by physical methods such as filtration, evaporation, or distillation.

2. Define allotropes with an example.

Ans. Allotropes are different physical forms of the same element, such as carbon existing as diamond and graphite.

3. What is a colloidal solution?

Ans. A colloidal solution is a type of mixture where very small particles of one substance are evenly dispersed in another but are not dissolved. The particle size in a colloid is larger than in a true solution but small enough to remain suspended without settling down. For example milk, fog, and jelly.

4. How does temperature affect solubility?

Ans. Temperature affects solubility differently for solids, liquids, and gases. For most solids dissolved in liquids, solubility increases as temperature rises because particles gain more energy to break bonds and mix. For gases, solubility usually decreases with increasing temperature since gas particles escape more easily into the air. This is why warm soda goes flat faster than cold soda.

5. What are the three main states of matter?

Ans. The three main states of matter are solid, liquid, and gas. In a solid, particles are tightly packed and vibrate in place, giving it a fixed shape and volume. In a liquid, particles are close but can move past each other, so it has a fixed volume but no fixed shape. In a gas, particles are far apart and move freely, so it has neither a fixed shape nor a fixed volume.

6. How do saturated and unsaturated solutions differ?

Ans. A saturated solution contains the maximum amount of solute that can be dissolved at a given temperature, and any extra solute will remain undissolved. An unsaturated solution has less solute than the maximum capacity, so more solute can still be dissolved. In a saturated solution, the rate of dissolving and crystallization is equal, creating a dynamic balance. Unsaturated solutions can become saturated by adding more solute or changing the temperature.

7. Name any two branches of chemistry.

Ans. Organic chemistry deals with carbon compounds, while physical chemistry explains chemical systems using physics.

8. Why is chemistry called a central science?

Ans. Chemistry is called the central science because it connects and overlaps with many other fields of science, such as physics, biology, geology, and environmental science. It explains the composition, structure, and changes of matter, which are fundamental to understanding all physical and biological processes. For example, biology relies on chemistry to explain cell functions, while geology uses it to study minerals and rocks. This central role makes chemistry a bridge between the physical and life sciences.

9. What is a suspension?

Ans. A suspension is a heterogeneous mixture where large, visible particles are dispersed in a liquid or gas but are not dissolved. These particles are heavy enough to settle down over time due to gravity if left undisturbed. Unlike solutions, suspensions can be separated by filtration, and unlike colloids, they do not remain uniformly dispersed. Examples include muddy water and flour in water.

10. How can you separate a salt solution into its components?

Ans. A salt solution can be separated into salt and water through evaporation or distillation. In evaporation, the solution is heated until the water changes into vapour, leaving the salt behind. In distillation, the water is boiled, and the vapour is collected and condensed back into liquid form, separating it from the salt. Distillation allows both components to be recovered, while evaporation only recovers the salt.

MCQ's Key

1	A	2	D	3	C	4	A	5	C	6	B	7	A	8	C	9	B
10	A	11	D	12	D	13	B	14	D	15	D	16	C	17	D	18	A
19	B	20	C	21	D	22	D	23	B	24	D	25	B	26	C	27	B
28	C	29	D	30	C	31	C	32	A	33	C	34	C	35	C		

Exercise**1. Tick (✓) the correct answer.****(i) Matter is present in neon signs in the state of:**

A Supercritical fluid B Plasma C Gas D Liquid crystal

(ii) Hazardous effects of shopping bags are studied in:

A Geochemistry B Inorganic chemistry
C Analytical Chemistry D Environmental chemistry

(iii) The man-made polymer is:

A Starch B Polystyrene C Protein D Cellulose

(iv) The crystals of which substance have a rhombic shape?

A Brass B Sulphur C Graphite D Bronze

(v) Which liquid among the following is a colloidal solution?

A Milk B Slaked lime used for white wash
C Vinegar solution D Mixture of AgCl in water

(vi) Which of the following is a heterogenous mixture?

A A solution of calcium hydroxide in water
B A solution of potassium nitrate in water
C Hot chocolate D Concrete mixture

(vii) A state of matter whose properties are between those of liquids and crystalline solids:

A Liquid crystal B Supercritical fluid C Plasma D Dark matter

(viii) When the tiny visible particles of a substance are dispersed through a medium, the mixture is named as:

A True solution B Colloid C Suspension D Saturated solution

(ix) A solution of KClO_3 has a solubility of about 13.2g per 100cm³ at 40°C. How its solubility will be affected, if you decrease the temperature?

A The solubility will increase B The solubility will decrease
C The solubility will remain the same
D The solubility will first increase with temperature and then it will decrease

- (x) You are studying the rate of hydrolysis of starch under different conditions of temperature. In which branch of chemistry this topic will fall?

A Organic Chemistry B Analytical Chemistry
C Biochemistry D Physical Chemistry

MCQ's Key

i	B	ii	D	iii	B	iv	B	v	A	vi	D	vii	A	viii	B	ix	B	x	C
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2. Questions for Short Answers

- i. Why is there a need to divide Chemistry into many branches. Give three reasons.

Ans. Chemistry is divided into branches to:

- ☆ Focus on specific aspects of its vast and complex field.
- ☆ Address interdisciplinary challenges like those in biochemistry or environmental chemistry.
- ☆ Enhance scientific advancements by specializing in areas like nuclear chemistry or analytical chemistry.

- ii. Reactions may take place due to electrons present outside the nucleus or they may take place inside the nucleus. Which branches of Chemistry cover these two types of reactions.

Ans. ☆ Reactions involving electrons outside the nucleus are studied in Physical Chemistry and Inorganic Chemistry.

☆ Reactions involving changes inside the nucleus are studied in Nuclear Chemistry.

- iii. What types of problems are solved in analytical chemistry?

Ans. Analytical chemistry addresses problems like determining the composition of substances, identifying unknown compounds, and measuring the concentration of elements or compounds in mixtures using advanced techniques.

- iv. Both graphite and graphene have hexagonal layered structures. What is the difference?

Ans.	Aspect	Graphite	Graphene
	Structure	Made up of layers of hexagonal rings of carbon atoms.	Made up of a single layer of hexagonal rings of carbon atoms.
	Thickness	Composed of multiple layers stacked together.	Composed of One single layer (monolayer).
	Use	Used in pencils, lubricants, and batteries.	Used in flexible electronics, supercapacitors, and advanced materials.

- v. Why are supercritical fluids important?

Ans. Supercritical fluids, like supercritical carbon dioxide, combine the properties of gases and liquids. They are widely used in industrial processes like extraction, cleaning, and chemical reactions due to their efficiency and eco-friendliness.

- vi. In which state does matter exist in the Sun?

Ans. Matter in the Sun exists in the Plasma state, a high-energy state where electrons are separated from nuclei, creating a soup of charged particles.

- vii. What is the importance of graphene?

Ans. Graphene is incredibly strong, lightweight, and an excellent conductor of heat and electricity. Its properties make it highly valuable in electronics, material science, and energy storage applications.

viii. Which form of matter do most of the material things in this world belong to?

Ans. Most material things in the world belong to the Solid state, characterized by fixed shapes, strong intermolecular forces, and high density.

3. Constructed Response Questions

i. How does a supercritical state look like?

Ans. In a supercritical state, a substance exists where the distinctions between liquid and gas disappear. It appears as a dense gas with liquid-like properties, filling a container uniformly without any phase separation.

ii. In what way is plasma created in a fluorescent tube?

Ans. Plasma in a fluorescent tube is created by ionizing a gas, such as argon or neon, using an electrical current. This ionization produces a mixture of charged particles (ions and electrons) that emit light when recombining.

iii. Most of the molecules we study in biochemistry are organic in nature. Where does the difference exist in organic and biochemistry branches of Chemistry?

Ans. Organic chemistry focuses on the structure, properties, and reactions of carbon-containing compounds. Biochemistry, however, specifically studies organic molecules and processes occurring within living organisms, such as proteins, enzymes, and DNA.

iv. Give the reason of brilliance shown by diamond. Can you improve it?

Ans. The brilliance of a diamond is due to its high refractive index and the way it disperses light. It can be enhanced by precise cutting techniques that maximize internal reflection and dispersion.

v. Explain the dissolution of sodium chloride in water.

Ans. Sodium chloride dissolves in water as its ions, Na^+ and Cl^- , separate due to the polar nature of water molecules. Water molecules surround and stabilize the ions, breaking the ionic lattice and forming a homogeneous solution.

vi. Why do different compounds have different solubilities in water at a particular temperature?

Ans. Different compounds have different solubilities in water at a particular temperature due to variations in their chemical properties, including the strength of intermolecular forces between the solute and solvent molecules. Factors like polarity, hydrogen bonding, ionic nature, and molecular size affect how well a compound dissolves in water. For example, polar and ionic compounds dissolve well in water due to strong interactions with water's polar molecules, while nonpolar compounds do not.

vii. Why NaCl can be crystallized from water just like KNO_3 ?

Ans. NaCl can be crystallized from water just like KNO_3 because both salts dissolve in water and form a saturated solution at a certain temperature. When the temperature of the solution is lowered or water is evaporated, the solubility of the salt decreases, causing the ions to recombine and form solid crystals.

viii. Why graphite is slippery to touch? Which property of graphite enables it to be used as lubricant?

Ans. Graphite is slippery to touch because its structure consists of layers of carbon atoms arranged in a hexagonal lattice. These layers are held together by weak van der Waals forces, which allow them to slide over each other easily. This property makes graphite an excellent lubricant, as it reduces friction between surfaces.

4. Descriptive Questions

i. Mention the name of the branch of Chemistry in which you will study each of the following topics.

(a) Rate of a reaction

(b) Digestion of food in human body

(c) Properties of plasma

(d) Ecosystem

(e) Reactions taking place during fire works

(f) Measurement of the absorption of wavelength with the help of ultraviolet spectrometer

Ans. (a) Rate of a reaction:

Physical Chemistry

(b) Digestion of food in the human body:

Biochemistry

(c) Properties of plasma:

Astrochemistry

(d) Ecosystem:

Environmental Chemistry

(e) Reactions taking place during fireworks:

Inorganic Chemistry

(f) Measurement of the absorption of wavelength with the help of ultraviolet spectrometer:

Analytical Chemistry

ii. What are allotropic forms? Explain the allotropic forms of carbon and sulphur. How does coal differ from diamond?

Ans. Here is the information in a three-column tabular format:

Element	Allotropic Forms	Properties
Carbon	Diamond	Giant macromolecular structure (hard, transparent, high density)
	Graphite	Layered hexagonal structure (soft, conducts electricity)
	Buckminsterfullerene (C ₆₀)	Spherical structure (soft, low melting point)
Sulphur	Rhombic Sulphur	Stable crystalline form
	Monoclinic Sulphur	Less stable crystalline form
Coal vs Diamond	Coal	Amorphous structure, less durable, lower density
	Diamond	Crystalline structure, very hard, high density

iii. What are supercritical fluids. How are they different from ordinary liquids?

Ans. Supercritical fluids are substances at a temperature and pressure above their critical point, where liquid and gas phases coexist without distinction. Unlike ordinary liquids, they have gas-like diffusivity and liquid-like density, making them ideal for processes like extraction and reaction.

Aspect	Supercritical Fluids	Ordinary Liquids
Definition	Substances above their critical point with no distinct liquid or gas phases.	Substances with a clear distinction between liquid and gas phases.
Phase Characteristics	Exhibits properties of both gases and liquids (flows like gas, dense like liquid).	Has a definite shape and volume, with a clear phase separation from gas.
Density and Behavior	Density similar to liquids, but can diffuse through solids like gases.	Density is fixed and does not change like in supercritical fluids.
Usage	Used for processes like supercritical fluid extraction, where high temperatures are avoided.	Typically used for processes where phase separation is maintained.
Example	Carbon dioxide at high temperature and pressure.	Water, oil, and alcohol under normal conditions.

- iv. Define solubility of a solute. How does the solubility of solutes change with the increase in temperature?

Ans. Solubility of a Solute: Solubility is defined as the maximum amount of solute that can dissolve in a given amount of solvent at a specific temperature to form a stable solution. It is generally expressed in terms of grams of solute per 100 grams of solvent or in molarity. There are a large number of compounds whose solubility in H_2O increases with the increase in temperature e.g. potassium nitrate (KNO_3) silver nitrate ($AgNO_3$) and potassium chloride (KCl) etc. The solubility of sodium chloride in H_2O does not increase appreciably with the increase in temperature. The solubility of compounds like lithium carbonate (Li_2CO_3) and calcium chromate ($CaCrO_3$) decreases with the increase in temperature. The solubility of gases in water also decreases with the increase in temperature.

- v. What types of movements are present in gaseous and liquid molecules?

Ans. In gaseous molecules, the particles are in constant, random motion. They move freely and rapidly in all directions, with a wide range of speeds, due to the weak intermolecular forces between them. This movement causes gases to expand and fill the container they are in, and they are highly compressible.

In liquid molecules, the particles are closer together than in gases but still move randomly. They have more freedom of movement compared to solids but less than gases. The intermolecular forces are stronger than in gases, which keeps the molecules together, allowing liquids to maintain a definite volume, though they can flow and take the shape of their container.

- vi. Differentiate between the areas which are studied under inorganic and organic chemistry.

Aspect	Inorganic Chemistry	Organic Chemistry
Scope	Studies elements and compounds that contain little or no carbon, including metals, nonmetals, salts, acids, and bases.	Focuses on carbon-containing compounds, especially hydrocarbons and their derivatives (excluding simple salts like carbonates, bicarbonates, oxides, and carbides).
Examples of Compounds	Salts, acids, bases, metals, nonmetals (e.g., sodium chloride, potassium nitrate).	Methane, proteins, carbohydrates, lipids, and natural polymers.
Key Focus	Chemical synthesis, composition, properties, and structure of elements and compounds.	Study of the structure, formation, properties, and reactions of carbon compounds.
Applications	Used in industries like fertilizers, catalysts, pigments, and coatings.	Central to life sciences, pharmaceuticals, agriculture, and petrochemical industries.

5. Investigative Questions

- i. **Preparation of solutions leads to an important process in chemistry which enables us to purify a compound through crystallization. Describe a process in which potassium nitrate is purified by crystallizing it in water.**

Ans. To purify potassium nitrate (KNO_3) through crystallization, follow these steps:

1. **Dissolution:** First, dissolve impure potassium nitrate in hot water. The solubility of potassium nitrate increases with temperature, so heating the water allows more of the compound to dissolve.
2. **Filtration:** After dissolving the potassium nitrate, filter the solution to remove any insoluble impurities. This step ensures that only the dissolved potassium nitrate remains in the solution.
3. **Cooling:** Gradually cool the filtered solution. As the solution cools, the solubility of potassium nitrate decreases, causing it to crystallize.
4. **Crystallization:** Once the solution reaches a lower temperature, potassium nitrate begins to form crystals. The pure potassium nitrate will crystallize out of the solution, while the remaining impurities will stay dissolved in the water.
5. **Separation:** After sufficient crystallization, filter the crystals from the solution to separate the pure potassium nitrate. The crystals are then dried, leaving behind pure potassium nitrate.

This process of crystallization helps in purifying potassium nitrate by removing soluble impurities and obtaining it in its pure crystalline form.

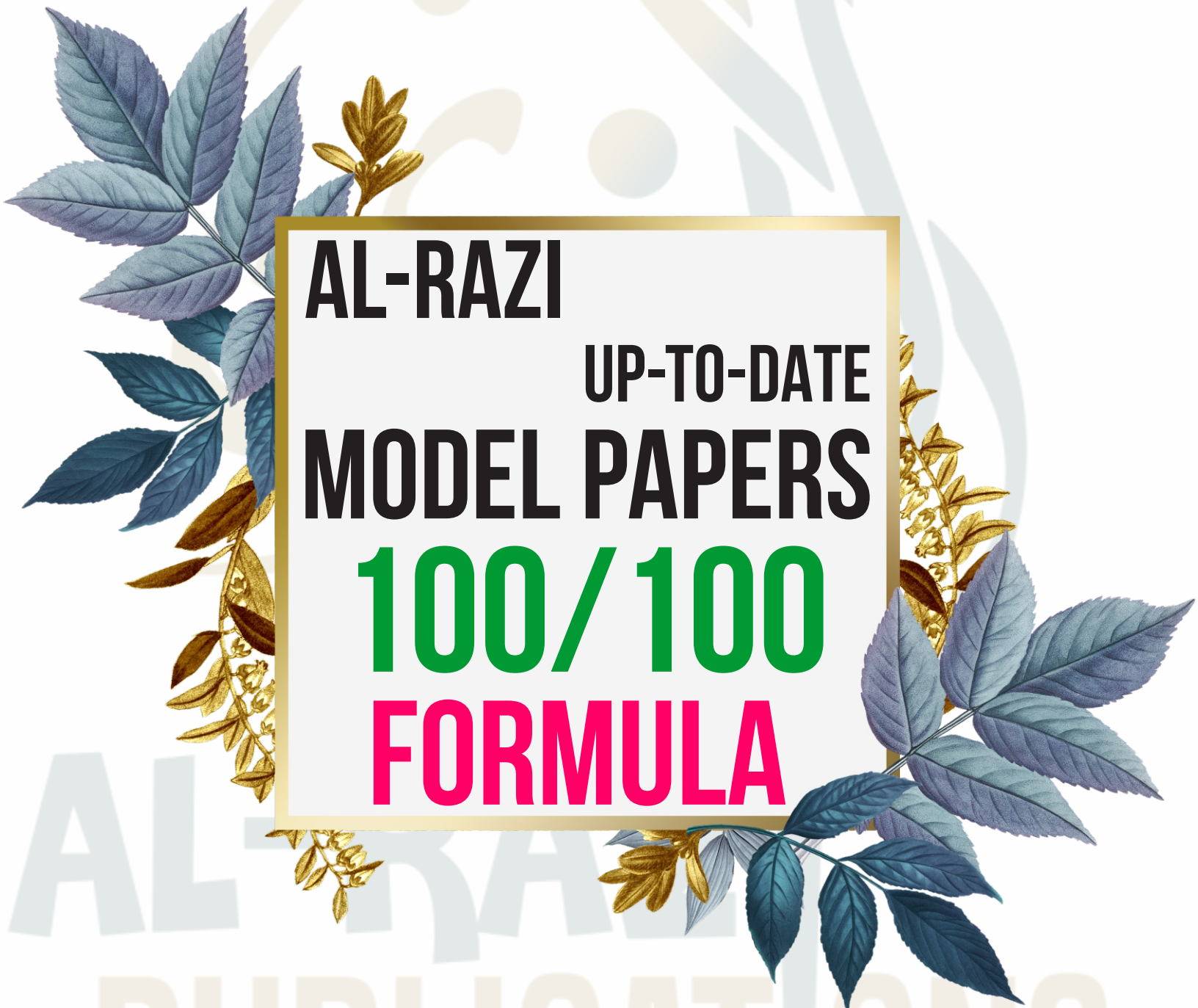
- ii. **Graphene is called a miracle material and it is the material of the future. Which of its many properties makes it very useful in electronics?**

Ans. Following properties make Graphene a miracle material or material of the future:

1. **High Electrical Conductivity:** Graphene is an excellent conductor of electricity, which makes it ideal for use in electronic components such as transistors, sensors, and conductors in flexible electronics.
2. **High Thermal Conductivity:** It efficiently conducts heat, which is beneficial for dissipating heat in electronic devices, especially in high-performance chips and circuits.
3. **Strength and Flexibility:** Despite being extremely thin, graphene is incredibly strong and flexible, allowing it to be used in bendable or stretchable electronic devices without compromising durability.
4. **Thinness and Lightness:** Graphene is a single layer of carbon atoms, making it the thinnest material known. This property is crucial for creating ultra-thin and lightweight electronic devices such as flexible screens and lightweight batteries.
5. **High Surface Area:** The large surface area of graphene allows for more efficient use in applications such as supercapacitors and batteries, enabling better energy storage and faster charging.

These exceptional properties make graphene an attractive material for the development of next-generation electronic devices, from flexible electronics to energy-efficient systems.

☆☆.....☆☆☆.....☆☆



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Al-Razi Guess Paper consist of 100 MCQs, 100 Short Questions and Long Questions to get 100% Success in Examination

OBJECTIVE TYPE
Multiple Choice Questions

- Which branch of chemistry is primarily concerned with the analysis of substances?
A Medicinal Chemistry
B Environmental Chemistry
C Analytical Chemistry
D Astrochemistry
- Matter is present in neon signs in the state of:
A Supercritical fluid
b Plasma C Gas
D Liquid crystal
- The state of matter composed of particles with very high kinetic energy is:
a Plasma B Gas
C Liquid D Solid
- The man-made polymer is:
A Starch b Polystyrene
C Protein D Cellulose
- The type of substance made up of two or more different elements combined in a fixed ratio is:
A Mixture B Element
C Isotope d Compound
- The crystals of which substance have a rhombic shape?
A Brass b Sulphur
C Graphite D Bronze
- The following is an example of a compound:
A Sodium B Air
C Water D Iron
- A state of matter whose properties are between those of liquids and crystalline solids:
a Liquid crystal
B Supercritical fluid
C Plasma D Dark matter
- The relative mass of a proton as compared to an electron is:
A 1836 times lighter
B Equal in mass
C 1836 times heavier
D 1000 times heavier
- How many electrons can be accommodated at the most in the third shell of the elements?
A 8 b 18 C 10 D 32
- What is the relationship to find the number of neutrons (N) in an atom?
A $N = Z + A$ b $N = A - Z$
C $N = Z - A$ D $N = A \times Z$
- Which particle is present in different number in the isotopes?
A Electron b Neutron
C Proton
D Both neutron and electron
- Which hydrogen isotope does not contain a neutron?
a ${}^1_1\text{H}$ B ${}^2_1\text{H}$
C ${}^3_1\text{H}$
D None of these
- What will be the relative atomic mass of nitrogen given the abundances of its two isotopes. ${}^{14}\text{N}$ and ${}^{15}\text{N}$ are 99.64 and 0.35 respectively.
A 14.0210 b 14.0021
C 14.2100 D 14.1200
- Which radioactive element disintegrates to give protactinium?
A Bismuth - 210
b Thorium - 234
C Uranium - 238
D Technetium - 99m
- What is the unit used for measuring the relative atomic mass of elements?
A Kilogram Kg
B Mole (mol)
C Joule (J)
d Atomic mass unit (amu)
- What is the electronic configuration of chlorine after forming NaCl?
A 2,6 B 2,8,7
C 2,7 d 2,8,8
- Which element is capable of forming all the three types of bonds; covalent, coordinate covalent or ionic?
a Carbon B Oxygen
C Magnesium
D Silicon
- Which example best explains metallic bonding?
A Iron B Copper
C Gold d Sodium
- Which form of carbon is used as a lubricant?
A Coal B Diamond
C Graphite D Charcoal
- The tendency of metals to lose electrons is called?
A Electronegativity
B Ionization Potential
C Electropositive character
D Reducing property
- Which ionic compound has the highest melting point?
A NaCl B KCl
C LiCl D RbCl
- Intermolecular forces are weakest in:
A Solids B Liquids
C Gases
D Ionic compounds

77. At night, the Earth's surface emits:

- A Short-wave radiation
- B Solar radiation
- C Long-wave radiation
- D None of the above

78. Which catalyst is used in the catalytic converter fixed in the exhaust systems of automobiles?

- A Ni B Cu
- C Pt, Pd and Rh
- D CaO

79. What process do plants use to help clean the air?

- A Combustion
- B Decomposition
- C Photosynthesis
- D Transpiration

80. Hydrocarbons consist only hydrogen and:

- a carbon B oxygen
- C nitrogen D phosphorus

81. Which other metal can be used to reduce alkyl halides?

- A Al b Mg C Ni D Co

82. In IUPAC nomenclature, the prefix 'eth-' indicates the presence of:

- A 1 carbon atom
- b 2 carbon atoms
- C 3 carbon atoms
- D 4 carbon atoms

83. Which reaction is not given by alkanes?

- A Substitution
- B Combustion
- C Addition D Cracking

84. The process of breaking higher molecular mass hydrocarbons into smaller ones is called:

- A Hydrolysis b Cracking
- C Hydrogenation
- D Fermentation

85. Which of the following is not a process of halogenation of alkanes?

- a Cracking
- B Chlorination
- C Bromination
- D Iodination

86. Combustion of alkanes produces CO_2 , H_2O , and:

- a Heat B Light
- C Smoke D Soot

87. In the SI system, the standard unit of length is the:

- a Meter B Foot
- C Inch D Yard

88. In which unit we usually measure the energy present in the food?

- A Kilojoules B Megajoules
- C Calorie D Joule

89. Random errors affect the _____ of the experimental results.

- A Accuracy B Speed
- C Efficiency d Precision

90. Which symbol is used for kilogram in SI units?

- A K B k
- C Kgm d kg

91. Variations in measurements due to slight procedural changes contribute to:

- A Systematic errors
- b Random errors
- C Human errors
- D Calculation errors

92. In SI units prefix nano means:

- a 10^{-9} B 10^{-8}
- C 10^{-11} D 10^{-12}

93. A measurement that repeatedly gives the same result is said to be:

- A Accurate b Precise
- C Reliable D Valid

94. Examples of toxic chemicals include all of the following EXCEPT:

- A Mercury B Benzene
- C Sodium chloride

D Ammonia

95. Accidents often result from:

- A making mistakes
- B failure to use common sense
- C failure to follow instructions
- d all of the above

96. Protective glasses in the laboratory are essential for protecting:

- A Ears B Feet
- C Eyes D Hands

97. What should each student know about fire extinguisher?

- A their price
- B their colour & size
- C where they are placed
- D their brand name

98. Example of self-reactive chemical:

- A Potassium B Phenol
- C Picric acid D n-Hexane

99. In the event of a fire in the lab, you should:

- A Open all doors and windows
- b Close doors to confine the fire
- C Use water to extinguish the fire
- D Leave the fire unattended

100. What does a red diamond with a flame symbol indicate?

- A Corrosive b Flammable
- C Radioactive D Oxidizing

Short Questions

1. What is biochemistry?

Ans. See on page No. 3

2. Why is there a need to divide Chemistry into many branches. Give three reasons.

Ans. See on page No. 11

3. What are homogeneous mixtures?

Ans. See on page No. 5

4. What types of problems are solved in analytical chemistry?

Ans. See on page No. 11

5. What are the types of mixtures?

Ans. See on page No. 6

6. Why are supercritical fluids important?

Ans. See on page No. 11

7. What happens to the solubility of gases with temperature?

Ans. See on page No. 7

8. What is the importance of graphene?

Ans. See on page No. 11

9. How much cesium is bigger than helium?

Ans. See on page No. 16

10. Why are elements different from one another?

Ans. See on page No. 23

11. What is Bohr's atomic model?

Ans. See on page No. 17

12. How many neutrons are present in $^{210}_{83}\text{Bi}$?

Ans. See on page No. 23

13. How atomic number and mass number is represented in an atom?

Ans. See on page No. 17

14. How can an atom absorb and evolve energy?

Ans. See on page No. 24

15. What is radioactive decay?

Ans. See on page No. 18

16. Describe ionization of atoms of electron.

Ans. See on page No. 19

17. Define duplet or octet rule?

Ans. See on page No. 26

18. Why does lower molecular mass covalent compound exist as gases or low boiling liquids.

Ans. See on page No. 33

19. Define ionic bond?

Ans. See on page No. 27

20. Give one example of an element which exists as a crystalline solid and it has covalent bonds in its atoms.

Ans. See on page No. 33

21. On which strength of metallic bond depends?

Ans. See on page No. 27

22. Write down dot and cross formula of HNO_3 .

Ans. See on page No. 33

23. Why are alkali metals considered highly reactive?

Ans. See on page No. 28

24. How do non-metals form molecular substances?

Ans. See on page No. 28

25. How a chemical compound is represented?

Ans. See on page No. 36

26. Write down the chemical formula of barium nitride.

Ans. See on page No. 44

27. What is the basic fault of empirical formula?

Ans. See on page No. 37

28. What is the difference between a mole and Avogadro's number?

Ans. See on page No. 45

29. Write down the importance of stoichiometry in chemical industry.

Ans. See on page No. 38

30. How the empirical formula and molecular formula is calculated?

Ans. See on page No. 39

31. What is the molecular formula of n-propyle and calcium carbonate?

Ans. See on page No. 39

32. Define molar mass with examples.

Ans. See on page No. 40

33. Why heat and enthalpy is important?

Ans. See on page No. 49

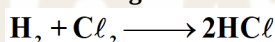
34. What is the difference between enthalpy and enthalpy change?

Ans. See on page No. 56

35. Why it is not possible to calculate the enthalpy of a system?

Ans. See on page No. 50

36. Depict the transition state for the following reaction.



Ans. See on page No. 56

37. Give two examples of endothermic reactions.

Ans. See on page No. 51

38. What is the role of glycogen in our body.

Ans. See on page No. 57

39. What happens when transition state is formed?

Ans. See on page No. 52

40. Why is oxygen important in aerobic respiration?

Ans. See on page No. 52

41. What are the effects of heating on hydrated copper sulfate?

Ans. See on page No. 59

42. How is dynamic equilibrium different from the static equilibrium?

Ans. See on page No. 65

43. How does the containment condition affect the decomposition of CaCO_3 ?

Ans. See on page No. 60

44. How can you get the maximum yield in a reversible reaction?

Ans. See on page No. 65

45. What role does a catalyst play in a reversible reaction?

Ans. See on page No. 61

46. What is the effect of increasing pressure on the following reaction?



Ans. See on page No. 65

47. How does temperature affect equilibrium?

Ans. See on page No. 61

48. Why is removing water beneficial in ethyl acetate production?

Ans. See on page No. 62

49. Write down properties of bases.

Ans. See on page No. 67

50. How does calcium metal react with dilute H_2SO_4 ?

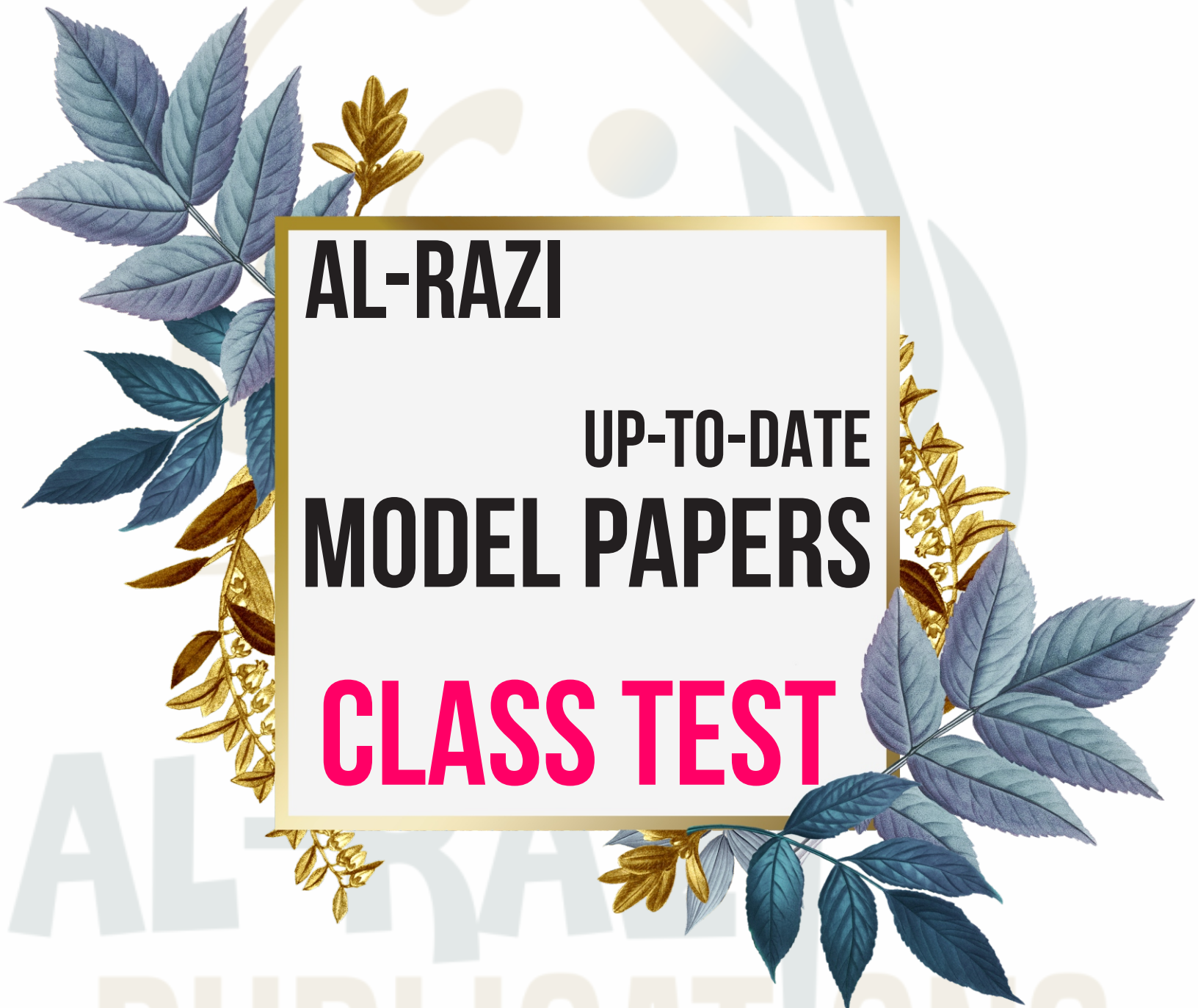
Ans. See on page No. 72

51. What are limitation of Arrhenius acid base concept?

Ans. See on page No. 68

52. How will you justify that HSO_4^- is a Bronsted-Lowry acid?

Ans. See on page No. 73



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CLASS TEST

PUBLICATIONS

Class Test # 5	Chemistry -9	Syllabus: Chapter 8,9	Objective Type	Time: 10 Min.	Marks: 8
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Q.1: Choose the correct option.

- The element having less value of ionization energy and less value of electron affinity is likely to belong to:
A Group 1 B Group 13 C Group 16 D Group 17
- The electronegativity of carbon is:
A 2.0 B 2.6 C 3.0 D 4.0
- The density of lithium is:
A 0.53 g/cm³ B 0.89 g/cm³ C 1.63 g/cm³ D 1.879 g/cm³
- Which of the following best describe the correct order of oxygen, fluorine, and nitrogen's atomic radii?
A $O < F < N$ B $N < F < O$ C $F < O < N$ D $O < N < F$
- In which element there exists the strongest forces of attraction between atoms?
A Mg B Ca C Sr D Ba
- Potassium has a melting point of _____ °C.
A 180 B 98 C 64 D 39
- Halogens are _____ non-metals.
A Inert B Neutral C Electropositive D Electronegative
- Which compound do you expect to be coloured?
A KCl B BaCl₂ C AlCl₃ D NiCl₂

PTO ✂----->

Class Test # 6	Chemistry -9	Syllabus: Chapter 10	Objective Type	Time: 10 Min.	Marks: 8
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Q.1: Choose the correct option.

- Which catalyst is used in the catalytic converter fixed in the exhaust systems of automobiles?
A Ni B Cu C Pt, Pd and Rh D CaO
- The percentage of nitrogen in the atmosphere is:
A 0.04% B 1.0% C 78.0% D 21.0%
- Acid rain can have harmful effects on:
A Aquatic life B Forests C Soil D All of the above
- Concentration of which gas in the atmosphere is decreased by photosynthesis in plants?
A Oxygen B Nitrogen C Carbon dioxide D Water vapour
- Which substance remains unaffected in the catalytic converter fixed in the exhaust of the automobiles?
A CO₂ B CO C NO D NO₂
- At night, the Earth's surface emits:
A Short-wave radiation B Solar radiation
C Long-wave radiation D None of the above
- What process do plants use to help clean the air?
A Combustion B Decomposition C Photosynthesis D Transpiration
- Which gases are responsible for greenhouse effect?
A SO₂, NO₂ B NO₂, CO C CO₂, CH₄ D O₂, N₂

Class Test # 5	Chemistry -9	Syllabus: Chapter 8,9	Subjective Type	Time: 35 Min.	Marks: 30
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Q.2: Write short answers to the following questions.

10 × 2 = 20

- (i) How do elements in the same group behave similarly?
- (ii) Why was atomic number chosen to arrange the elements in the periodic table?
- (iii) What is the relationship between group numbers and valence electrons?
- (iv) Which element has the least value of ionization energy and which element has the highest value of electronegativity?
- (v) Why are oxides of alkali metals strongly basic?
- (vi) Predict the reactivity of potassium towards halogens.
- (vii) Why do metals have high melting and boiling points?
- (viii) Why does iodine exist in the solid state at room temperature?
- (ix) What is the electronic configuration of noble gases?
- (x) How does Ni catalyse the reaction involving hydrogenation of oil?

Q.3: Answer the following questions.

1 × 10 = 10

- (i) How many blocks of elements are present in the periodic table? Are these blocks helpful in studying the properties of elements?

✂-----✂

Class Test # 6	Chemistry -9	Syllabus: Chapter 10	Subjective Type	Time: 35 Min.	Marks: 30
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Q.2: Write short answers to the following questions.

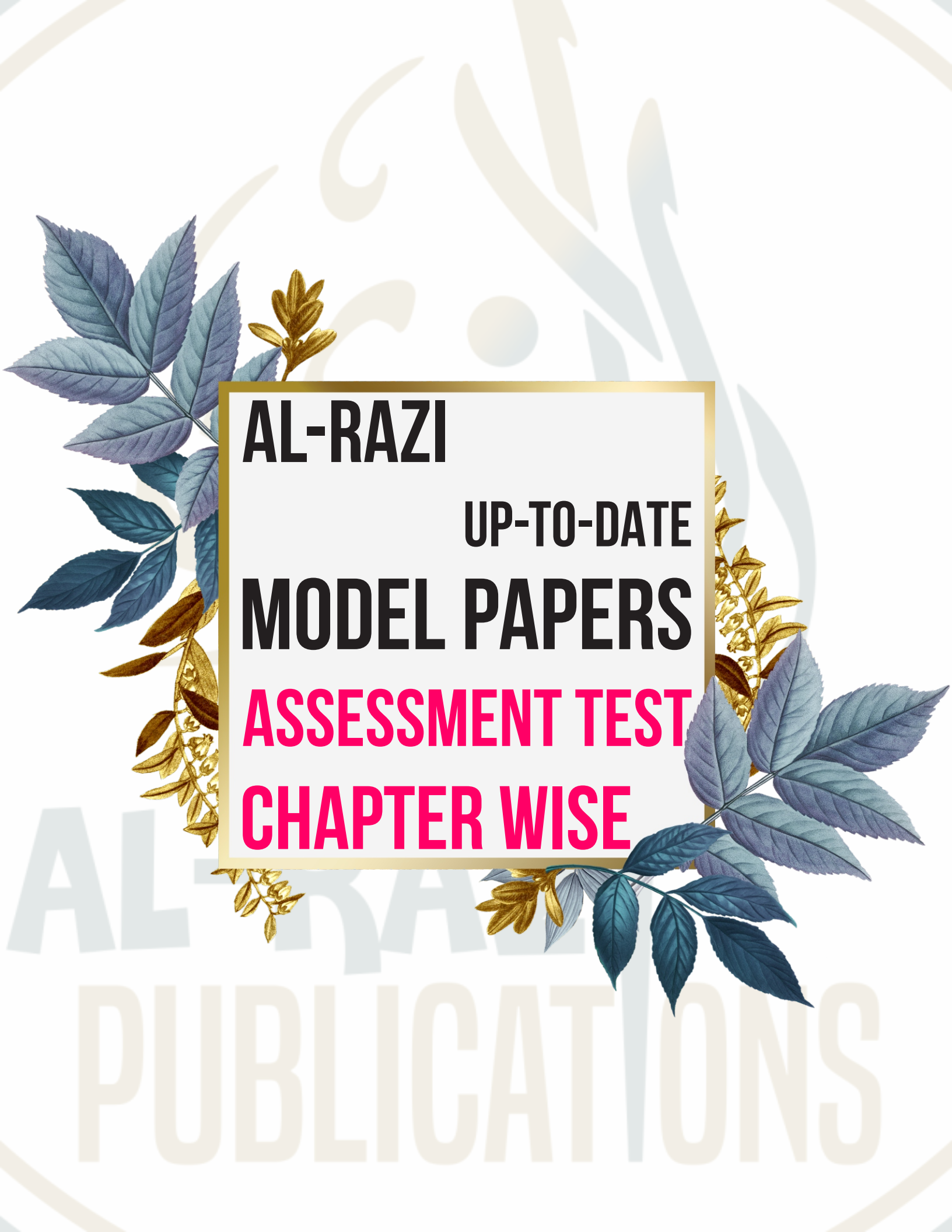
10 × 2 = 20

- (i) What is the main objective of environmental education?
- (ii) What should you do when the AQI is high?
- (iii) What should you do if you experience symptoms due to polluted air?
- (iv) How does sunlight contribute to global warming?
- (v) Which gas is more poisonous, CO₂ or CO?
- (vi) In what way sulphur present in fossil fuels becomes dangerous?
- (vii) How does acid rain damage buildings?
- (viii) What should individuals avoid to reduce pollution?
- (ix) How has the industrial revolution impacted the atmosphere?
- (x) How is wind energy useful for us?

Q.3: Answer the following questions.

1 × 10 = 10

- (i) Describe the harmful effects of the major pollutants present in the air.



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ASSESSMENT TEST

CHAPTER WISE

PUBLICATIONS

1. Ionization energy down a group:

- A Increases B Decreases
C Remains the same D Doubles
- The ionization energy of sodium is _____ kJ mol⁻¹.
A 496 B 520 C 737 D 1450
- Group II oxides dissolve in water to form:
A Acids B Neutral solutions C Salts D Alkalies
- Identify the electronic configuration of the outermost shell of a transition metal.
A ns²np⁴ B nd^xns² C ns²np⁶ D ns²np⁵
- Each period in the periodic table represents the completion of a:
A Group B Block C Subshell D Shell
- What causes the properties of elements to repeat in the periodic table?
A Electron configuration B Atomic number
C Valence electrons D Neutron configuration
- Which halogen acid is unstable at room temperature?
A HBr B HI C HCl D HF
- The ability of metals to be hammered into thin sheets is called:
A Malleability B Ductility C Elasticity D Tensile strength
- Noble gases have _____ electrons in their outermost shells, except helium.
A 6 B 7 C 8 D 9
- Transition elements are also called:
A d-block elements B f-block elements C s-block elements D p-block elements
- Halogens tend to accept _____ electron to become anions.
A One B Two C Three D None
- The melting point of alkali metals _____ down the group.
A Increases B Decreases C Remains constant D Fluctuates

Assessment Chapterwise Test 5	Syllabus: Chapter 8,9	Subjective Type	Time: 1:45 Min.	Marks: 48
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(Section - I)**Q2. Write short answers to any FIVE (5) questions.****(5 × 2 = 10)**

- (i) How does density vary in a group?
- (ii) How does metallic character change across a period?
- (iii) How does electron affinity change in a group?
- (iv) What is the significance of the word periodic?
- (v) How does atomic radius change in a period?
- (vi) Why does the tendency to lose electrons increase down group 2?
- (vii) Why are halogens called "salt formers"?
- (viii) What are groups in the periodic table?

Q3. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

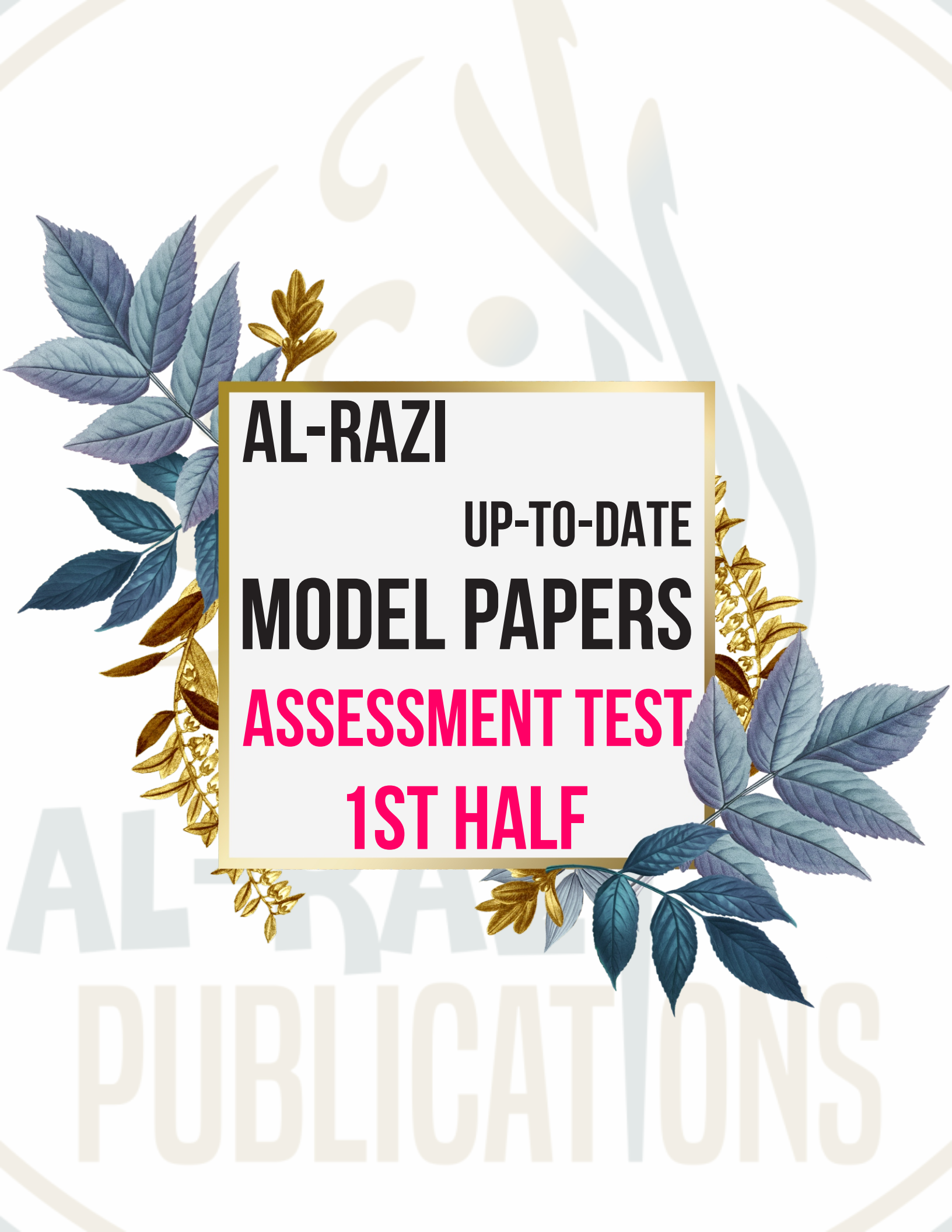
- (i) Is it possible for two metals or two non-metals to form an ionic bond?
- (ii) What are periods in the periodic table?
- (iii) What is meant by periodicity in the properties of elements?
- (iv) What is the modern periodic table based on?
- (v) Why does it become easier to cut an alkali metal when we move from top to bottom in a group I?
- (vi) In the following reaction, chlorine acts as an oxidizing agent. Which is the reducing agent?

$$\text{Cl}_{2(\text{aq})} + 2\text{NaBr}_{(\text{aq})} \longrightarrow 2\text{NaCl}_{(\text{aq})} + \text{Br}_{2(\text{g})}$$
- (vii) What are examples of non-metals?
- (viii) Why are non-metals not ductile or malleable?

Q4. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

- (i) What are noble gases?
- (ii) What role do transition metals play as catalysts?
- (iii) Why are transition metals hard and dense?
- (iv) Why are compounds of transition metals often colored?
- (v) How do halogens react with hydrogen?
- (vi) What are halogens?
- (vii) How do alkali metals react with chlorine?
- (viii) Why are Group 1 elements highly reactive?

(Section - II)**Note: Attempt TWO question in all.****9 × 2 = 18****Q5. (a) Which physical properties of elements may lead us to know what type of bond it will form?****4****(b) Explain the variation in the following properties in the periods giving reasons.****(i) Atomic radius****(ii) Ionization energy****5****Q6. (a) V₂O₅ catalyst is preferred over platinum in the oxidation of sulphur dioxide. Give reasons.****4****(b) Compare the properties of metals and non-metals.****5****Q7. (a) Why hydrogen bromide is thermally unstable as compared to hydrogen chloride?****4****(b) Explain the role of catalytic converter in an automobile.****5**



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ASSESSMENT TEST

1ST HALF

PUBLICATIONS

Assessment Test 8 (1st Half)	Syllabus: Chapter 1 to 6	Objective Type	Time: 15 Min.	Marks: 12
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Q1. Choose the correct option.

- A state of matter whose properties are between those of liquids and crystalline solids:
A Liquid crystal B Supercritical fluid C Plasma D Dark matter
- Which particle is present in different number in the isotopes?
A Electron B Neutron
C Proton D Both neutron and electron
- Keeping in view the intermolecular forces of attraction, indicate which compound has the highest boiling point:
A H_2O B H_2S C HF D NH_3
- How many atoms are present in one gram of H_2O ?
A 1.002×10^{23} atoms B 6.022×10^{23} atoms
C 0.334×10^{23} atoms D 2.004×10^{23} atoms
- The following is a true solution:
A Salt in water B Chalk in water C Oil in water D Dust in air
- What percentage of atoms in the human body are replaced every year?
A 50% B 75% C 98% D 100%
- What type of bond is formed in Sodium Chloride?
A Covalent bond B Metallic bond C Ionic bond D Hydrogen bond
- The chemical formula for Magnesium Nitride is:
A MgN B Mg_3N_2 C Mg_2N_3 D MgN_2
- What are the products of anaerobic respiration?
A $\text{ATP} + \text{CO}_2 + \text{H}_2\text{O}$ B $\text{CO}_2 + \text{H}_2\text{O}$
C $\text{ATP} + \text{Ethanol} + \text{H}_2\text{O}$ D $\text{Ethanol} + \text{H}_2\text{O}$
- How many molecules of ATP are produced during glycolysis?
A 4 B 32 C 2 D 6
- A catalyst increases the rate of:
A Forward reaction B Backward reaction
C Both a and b D None of these
- The symbol used to denote a reversible reaction is:
A $\rightarrow$ B $\leftrightarrow$ C $\rightleftharpoons$ D $\square$

Assessment Test 8 (1st Half)	Syllabus: Chapter 1 to 6	Subjective Type	Time: 1:45 Min.	Marks: 48
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(Section - I)**Q2. Write short answers to any FIVE (5) questions.****(5 × 2 = 10)**

- (i) What is the importance of graphene?
- (ii) What are examples of elements?
- (iii) Why are elements different from one another?
- (iv) How can we find the number of electrons in an atom?
- (v) What type of elements lose their outer electron easily and what type of elements gain electron easily?
- (vi) On which strength of metallic bond depends?
- (vii) What is the difference between a mole and Avogadro's number?
- (viii) Define Avogadro's number.

Q3. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

- (i) What is the molecular formula of n-propyle and calcium carbonate?
- (ii) Write any four atoms with anions and charges on them.
- (iii) Why do atoms form chemical bonds?
- (iv) How a chemical bond is formed?
- (v) What is Bohr's atomic model?
- (vi) Define isotopes.
- (vii) What are the allotropic forms of oxygen?
- (viii) What are the types of mixtures?

Q4. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

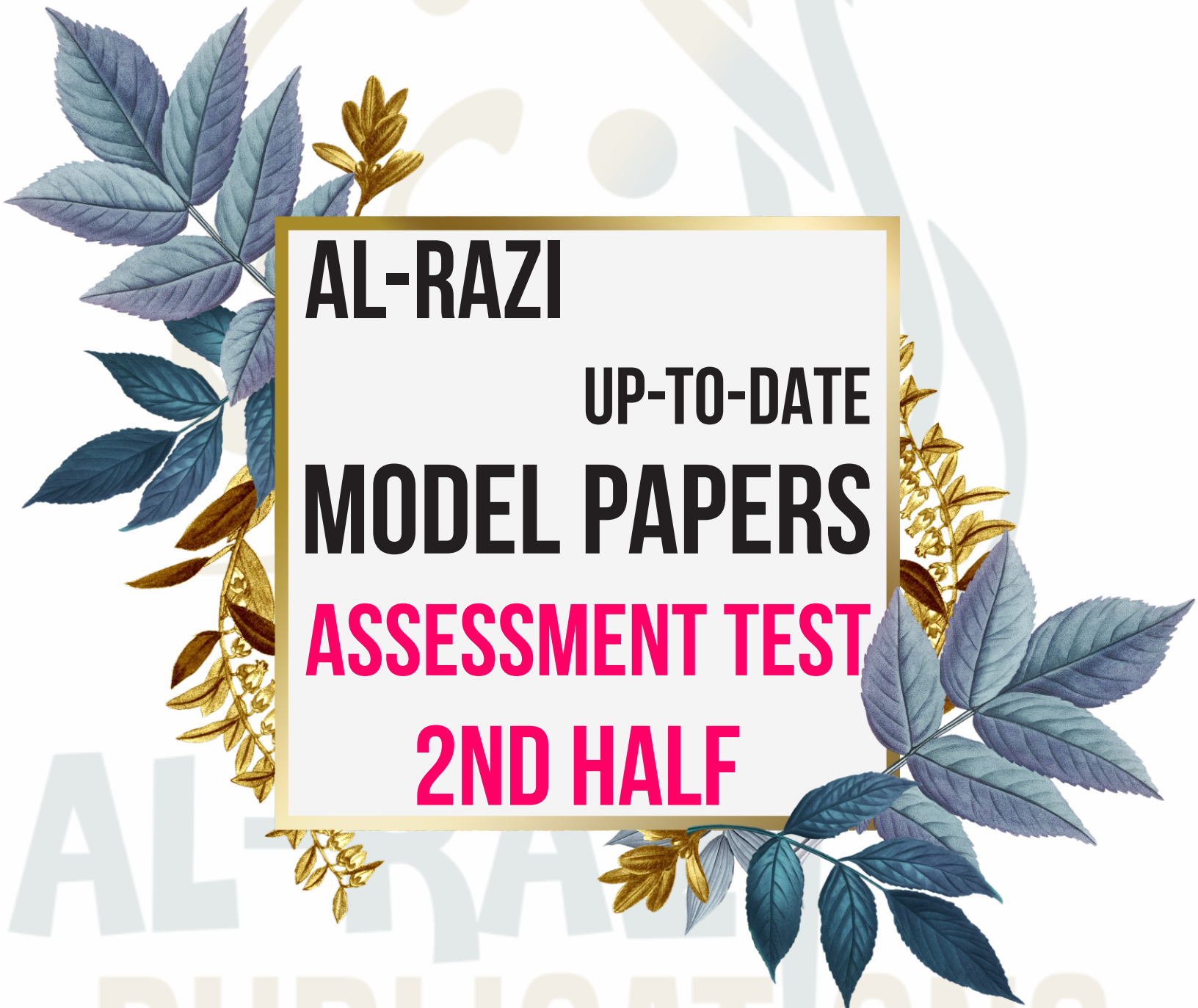
- (i) Depict the transition state for the following reaction.



- (ii) Why is oxygen important in aerobic respiration?
- (iii) What are excited molecules?
- (iv) Is burning of Fireworks exothermic reaction? Explain.
- (v) What role does a catalyst play in a reversible reaction?
- (vi) How does cobalt chloride transform when heated?
- (vii) Why is removing water beneficial in ethyl acetate production?
- (viii) How does the containment condition affect the decomposition of CaCO_3 ?

(Section - II)**Note: Attempt TWO question in all.****9 × 2 = 18**

- Q5. (a) How will you explain the electrical conductivity of graphite crystals? 4
- (b) Why are metals usually hard and heavy? 5
- Q6. (a) Explain the structure of a hydrogen atom. 4
- (b) What is radioactivity? Explain any three applications of radioactive isotopes. 5
- Q7. (a) What are supercritical fluids. How are they different from ordinary liquids? 4
- (b) What types of movements are present in gaseous and liquid molecules? 5



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ASSESSMENT TEST

2ND HALF

PUBLICATIONS

Q1. Choose the correct option.

1. Which acid is not used as a food or mixed with food?
A Tartaric acid B Citric acid C Ascorbic acid D Formic acid
2. What is nature of battery water?
A Neutral B Basic C Acidic D Salty
3. In what order does the metallic character change in the second group?
A $Mg > Ca > Ba > Sr$ B $Sr > Ba > Ca > Mg$
C $Mg > Sr > Ca > Ba$ D $Ba > Sr > Ca > Mg$
4. A yellow solid element exists in allotropic forms which is also present in fossil fuel. Indicate the name.
A Carbon B Iodine C Aluminium D Sulphur
5. Which halogen will have the least reactivity with alkaline earth metals?
A Chlorine B Iodine C Bromine D Fluorine
6. Elements of which group are all coloured?
A Second group B Sixth group C Fourth group D Fifth group
7. People of which age groups are the most affected by the air pollution?
A Young adult B Middle age people
C Children D Both children and aged people
8. Which gases contribute towards the formation of acid rain?
A Oxides of carbon B Oxides of sulphur
C Oxides of nitrogen D Both the oxides of nitrogen and sulfur
9. If naphtha undergoes a combustion reaction what products do you expect to form?
A Alkanes B Alkenes
C CO_2 and H_2O D Both alkanes and alkenes
10. Which other atom is almost always present along with carbon atom in all organic compounds?
A Oxygen B Nitrogen C Hydrogen D Halogen
11. What prefix is used for 10^{-12} ?
A Mega B Pico C Giga D Tessa
12. When diluting an acid with water:
A do it quickly B do not stir the container
C always add acid to water D always add water to acid

Assessment Test 9 (2nd Half)	Syllabus: Chapter 7 to 13	Subjective Type	Time: 1:45 Min.	Marks: 48
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(Section - I)

Q2. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

- (i) Why metal oxides are also known basic in nature?
- (ii) How will you justify that HSO_4^- is a Bronsted-Lowry acid?
- (iii) Write down adverse effects of acid rain.
- (iv) On which proportion of acids and bases depends.
- (v) Why does the size of a period increase as we move down the periodic table?
- (vi) What is metallic character? (vii) What is electronegativity?
- (viii) What is the characteristic of group 1 elements?

Q3. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

- (i) Why does iodine exist in the solid state at room temperature?
- (ii) Predict the reactivity of potassium towards halogens.
- (iii) Why can't non-metals be polished? (iv) How is nickel used as a catalyst?
- (v) What is the main objective of environmental education?
- (vi) Name any three major sources responsible for the greenhouse effect.
- (vii) How can you maintain good air quality indoors?
- (viii) How does global warming affect sea levels?

Q4. Write short answers to any FIVE (5) questions. (5 × 2 = 10)

- (i) Differentiate between an organic and an inorganic compound.
- (ii) What is combustion reaction? (iii) What is naphtha?
- (iv) What is the general formula for alkanes?
- (v) What is the reason behind a random error?
- (vi) What is consistency of results? (vii) Why is measurement essential in science?
- (viii) How fire caused by chemicals should be handled?

(Section - II)

Note: Attempt TWO question in all.

9 × 2 = 18

Q5. (a) Explain Arrhenius concept of acids and bases. 4

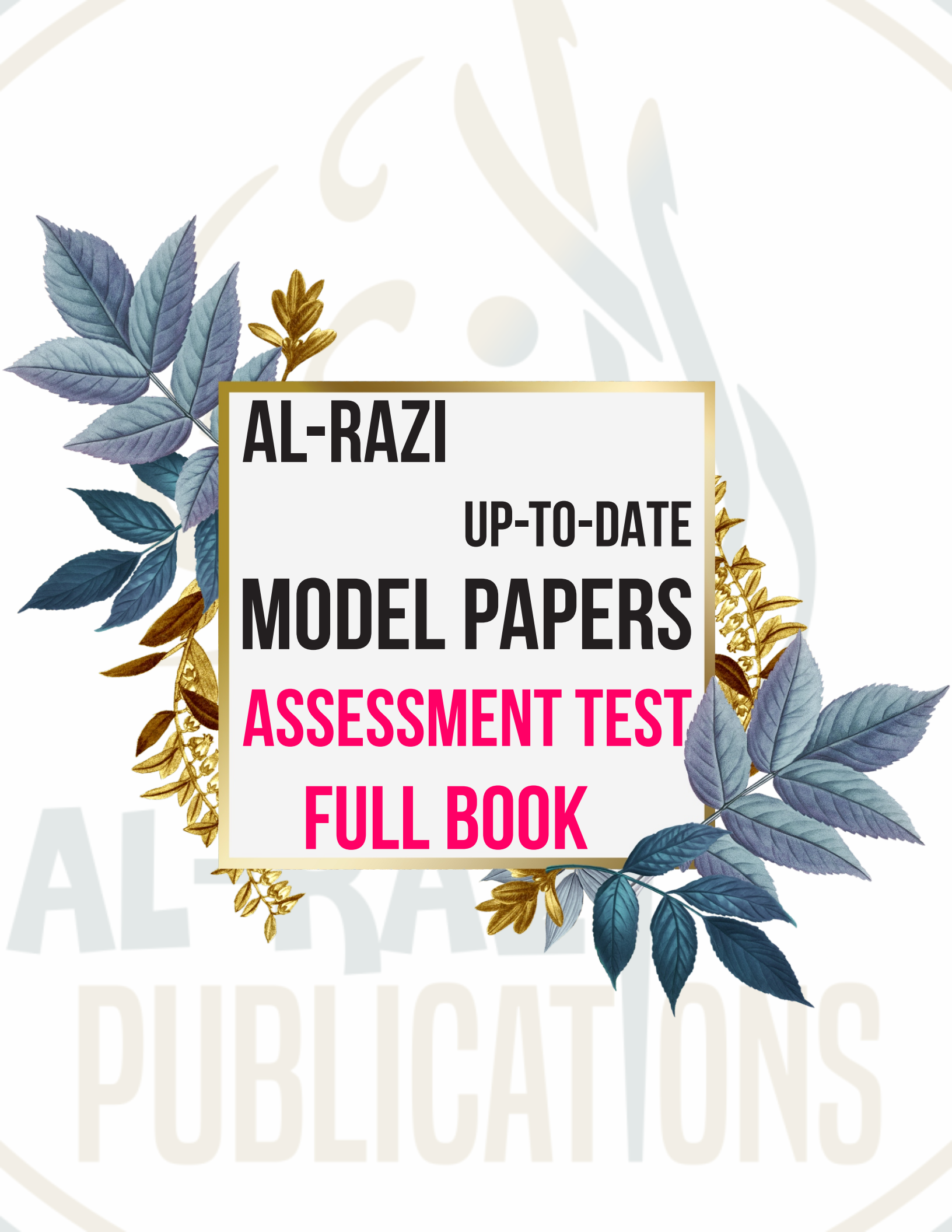
(b) State the reason of showing acidic character by both dry HCl gas and HCl solution in water. 5

Q6. (a) Write down the names of four non-metals which exist in solid state at normal temperature. 4

(b) Which information is needed to locate the elements in the periodic table if you do not know its atomic number? Is atomic mass helpful for this purpose? 5

Q7. (a) Why are metals generally tough and strong whereas non-metals are neither tough nor strong? 4

(b) Why do the chemical reactivities of alkali metals increase down the group whereas they decrease down the group in case of halogens? 5



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ASSESSMENT TEST

FULL BOOK

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Assessment Test 11 (Full Book)	Syllabus: Chapter 1 to 13	Objective Type	Time: 15 Min.	Marks: 12
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Q1. Choose the correct option.

- The state of matter has particles that are very widely apart:**
A Solid B Liquid C Gas D Plasma
 - Which of the following bonds is expected to be the weakest?**
A C – C B Cl – Cl C O – O D F – F
 - What mass of 95% CaCO_3 will be required to neutralize 50cm^3 of 0.5M HCl solution?**
A 9.5g B 1.25g C 1.32g D 1.45g
 - What happens when reactant molecules collide with sufficient energy?**
A They stop moving B A transition state is formed
C They lose energy D The reaction stops
 - Changes in pressure affect equilibrium when:**
A Liquids dominate B Gases are involved
C Solids dominate D There is no reaction
 - How many hydroxide ions, calcium hydroxide will release in water?**
A 1 B 2 C Zero D 3
 - Which element has the highest melting point?**
A Na B K C Rb D Cs
 - Which group elements are the most reactive elements?**
A Transition metal Group B First group
C Second group D Third group
 - Which components are essential for the formation of photochemical smog?**
A CO , NO_2 , CO_2 B NO_2 , volatile organic compounds, sunlight
C CO_2 , NO_2 , sunlight D volatile organic compounds, NO_2 , CO
 - Which hydrocarbon is responsible for explosions in coal mines?**
A Butane B Pentane C Methane D Ethene
 - In SI unit of pressure is expressed in:**
A Newton per metre B Newton per metre square
C Joule D Pascal
 - What should you do in case of a fire drill in lab?**
A run to the safety shower B climb into the fume cupboard
C close gas valves and turn off all the equipment
D carry chemicals out of the lab
-

Assessment Test 11 (Full Book)	Syllabus: Chapter 1 to 13	Subjective Type	Time: 1:45 Min.	Marks: 48
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(Section - I)**Q2. Write short answers to any FIVE (5) questions.****(5 × 2 = 10)**

- (i) In which state does matter exist in the Sun?
- (ii) What is a colloidal solution?
- (iii) Give one example of an element which exists as a crystalline solid and it has covalent bonds in its atoms.
- (iv) Write the molecular formula of acetic acid and phosphoric acid.
- (v) What is the standard enthalpy of reaction (ΔH°) in chemistry?
- (vi) What is the role of glycogen in our body.
- (vii) How does catalyst influence equilibrium?
- (viii) How is dynamic equilibrium different from the static equilibrium?

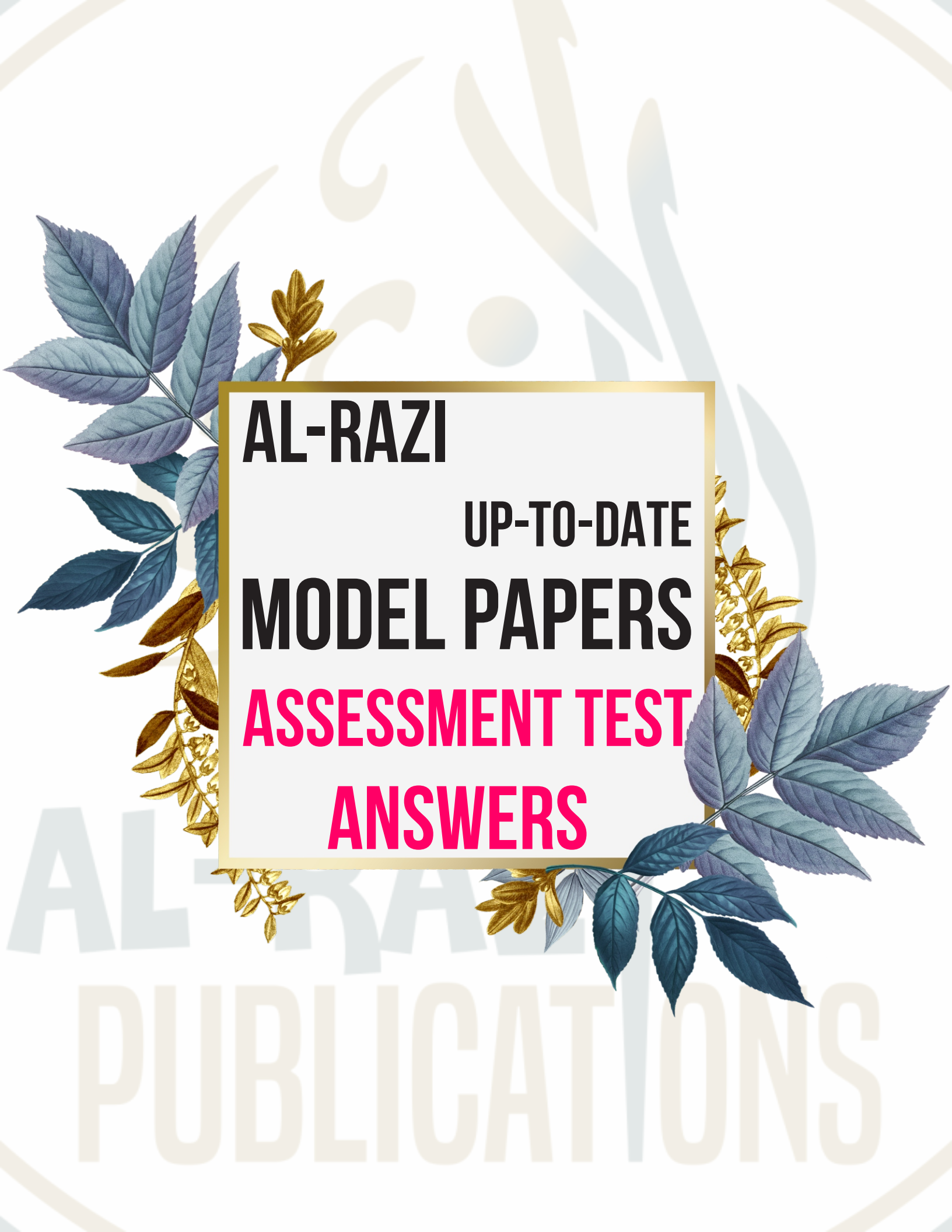
Q3. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

- (i) What are the types of acids on the basis of their occurrence?
- (ii) Write down chemical properties of alkalis.
- (iii) Why are the most electronegative elements present in sixth and seventh groups?
- (iv) Why do periods have a fixed number of elements?
- (v) What is malleability in metals?
- (vi) What are transition elements?
- (vii) What is the greenhouse effect?
- (viii) Which gas is more poisonous, CO_2 or CO ?

Q4. Write short answers to any FIVE (5) questions.**(5 × 2 = 10)**

- (i) What are alkanes?
- (ii) What is organic chemistry? Explain.
- (iii) Why are prefixes used in the SI system?
- (iv) What role does the Kelvin play in measuring temperature?
- (v) How is the kilogram defined in the SI system?
- (vi) Write examples of flammable compounds.
- (vii) Why warning signs are displayed in the laboratory?
- (viii) What should a student do before starting the laboratory work?

(Section - II)**Note: Attempt TWO question in all.****9 × 2 = 18****Q5. (a) Which emergency measures will you take if corrosive and explosive chemicals spill?****4****(b) Explain the importance of warning signs and symbols to avoid any accident in the lab.****5****Q6. (a) V_2O_5 catalyst is preferred over platinum in the oxidation of sulphur dioxide. Give reasons.****4****(b) Both alkali metals and halogens are very reactive elements with roles opposite to each other. Explain.****5****Q7. (a) Why do second and third periods have equal number of elements while all other periods contain different number of elements?****4****(b) Which physical properties of elements may lead us to know what type of bond it will form?****5**



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ASSESSMENT TEST

ANSWERS

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ANSWERS – ASSESSMENT TESTS**Assessment Chapterwise Test 1**

- | | | |
|----------------------------|----------------------------|-----------------------|
| 1. C Biochemistry | 2. D Carbon dioxide | 3. D Both (b) and (c) |
| 4. B Colloid | 5. B Suspension | |
| 6. D Heterogeneous mixture | 7. D Concrete mixture | |
| 8. B Allotropy | 9. D Compound | 10. A Milk |
| 11. B Solid | 12. C Analytical Chemistry | |

Note: Answers of subjective questions are given in Learning Material.

Assessment Chapterwise Test 2

- | | | | |
|---|---------------------------|----------------------|--------------|
| 1. C They combine with stable isotopes. | 2. B 14.0021 | | |
| 3. B Technetium - 99m | 4. C $Z = 17, A = 35$ | 5. B 18 | 6. C 9 times |
| 7. B Because water is a polar compound and there exists strong forces of attraction between its molecules | 8. B White precipitate | 9. B Polar compounds | |
| 10. B NH_4Cl | 11. D 801°C | 12. C Fluorine | |

Note: Answers of subjective questions are given in Learning Material.

Assessment Chapterwise Test 3

- | | | |
|---|------------------------------|-------------|
| 1. D (g) | 2. B 2 moles | 3. C Ethane |
| 4. D 24 : 32 : 56 | 5. C H_2SO_4 | 6. B 2 |
| 7. D $\text{CH}_{4(g)} \longrightarrow \text{CH}_{3(g)} + \text{H}_{(g)}$ | 8. B Glycolysis | |
| 9. C Kinetic energy of the molecules | 10. D 484 kJ/mol | |
| 11. A Joules | 12. C The water molecules | |

Note: Answers of subjective questions are given in Learning Material.

Assessment Chapterwise Test 4

- | | | |
|--|--|-------------------------|
| 1. A The equilibrium point will reach very soon. | 2. B Favors products | |
| 3. D More gas moles | 4. D Forward and reverse reaction rates are the same | |
| 5. D Absorbing moisture | 6. B Closed container | |
| 7. B Citric acid | 8. A Acid droplet | 9. C Ammonia gas |
| 10. A proton | 11. A 0.132% | 12. A Blue litmus paper |

Note: Answers of subjective questions are given in Learning Material.

Assessment Chapterwise Test 5

- | | | |
|------------------------|-------------------|-----------------------------|
| 1. B Decreases | 2. A 496 | 3. D Alkalies |
| 4. B nd^xns^2 | 5. D Shell | 6. A Electron configuration |
| 7. B HI | 8. A Malleability | 9. C 8 |
| 10. A d-block elements | 11. A One | 12. B Decreases |

Note: Answers of subjective questions are given in Learning Material.

Assessment Chapterwise Test 6

- | | |
|--|---|
| 1. C has adverse effects on human health and quality of life | 3. C Manchester |
| 2. C breathe in some areas | 5. D All of the above |
| 4. C Around industrial area | 7. C n-Butane |
| 6. A The burning of coal, oil, and natural gas | 10. B 5 moles |
| 8. C 2 | 9. B Nickel |
| 11. B Suffix | 12. B the chemistry of carbon compounds |

Note: Answers of subjective questions are given in Learning Material.

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پانی سے ہی بنتی ہے تصویر چمن

میٹرک امتحانات کی تیاری کے لیے الرازی اکیڈمک ڈیولپمنٹ یونٹ کی خدمات

الرازی پبلی کیشنز محض ایک ادارہ نہیں بلکہ ایک تحریک ہے۔ جس کی کتب طلباء کو امتحان میں 100 فیصد کامیابی تو دلاتی ہیں ساتھ ہی ان کی آئندہ زندگی میں کامیابی کے راستے بھی ہموار کرتی ہیں۔ الرازی پبلی کیشنز نے جدید تعلیمی تقاضوں کو مد نظر رکھتے ہوئے اپنی تمام کتب کو BLOOM TAXONOMY کے لیولز سے ہم آہنگ کیا ہے۔ یہ تحریک طلباء کے روشن مستقبل کے سفر کی نوید ہے۔

خوش خبری فری اسسٹمنٹ پیپرز (کتابچہ)

◀ پیریڈوائز پیپرز ▶ چپٹر وائز پیپرز ▶ فرسٹ ہاف بک پیپرز
◀ سیکنڈ ہاف بک پیپرز ▶ فل بک پیپرز

آپ ٹو۔ ڈیٹ ماڈل پیپرز کی تاریخ میں پہلی مرتبہ محترم اساتذہ کرام کی ڈیماڈ اور طلبہ کی تیاری کے لیے ماہانہ کلاس ٹیسٹ دیے گئے ہیں جو کہ محترم اساتذہ کرام کو پیپرز تیار کر کے فوٹو کاپی کروانا پڑتے تھے۔
(وقت اور پیسے دونوں بچائیے) امتحان میں 100 فیصد کامیابی اور A⁺ گریڈ کے حصول کے لیے الرازی آپ ٹو۔ ڈیٹ ماڈل پیپرز سے تیاری کیجیے۔

(ادارہ آپ کی کامیابی کے لیے دُعا گو ہے)



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