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Chemistry Grade 9 — Chapter 2

Matter

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Practice MCQs extracted from the supplied Class 9 Chemistry chapter tests (Section A). Total: 30 questions.

A. Important / Main Topics

1. Which of the following is a **plasma state of matter?**

(A) Lightning
(B) Steam
(C) Ice
(D) Brine

Correct Answer: A

Explanation: Plasma is formed at very high temperatures or under a strong electric field where gas atoms are ionized; lightning is a common example.

2. The state of matter in which particles are far apart, move freely, and have very weak forces of attraction is called:

(A) Solid
(B) Gas
(C) Liquid
(D) Plasma

Correct Answer: B

Explanation: Gas particles are far apart, move freely, and have very weak intermolecular forces of attraction.

3. The property of an element to exist in different physical forms is called:

(A) Isomerism
(B) Catenation
(C) Allotropy
(D) Crystallization

Correct Answer: C

Explanation: Allotropy is the property of an element to exist in different physical forms (allotropes), such as diamond and graphite for carbon.

4. Which of the following is **not a pure substance?**

(A) Oxygen
(B) Water
(C) Sodium chloride
(D) Air

Correct Answer: D

Explanation: Air is a mixture of nitrogen, oxygen, carbon dioxide, and other gases, so it is not a pure substance.

5. In a saturated solution, the undissolved solute is in equilibrium with the dissolved solute. This is called:

(A) Dynamic equilibrium
(B) Static equilibrium
(C) Chemical equilibrium
(D) Thermal equilibrium

Correct Answer: A

Explanation: In a saturated solution, the undissolved solute is in equilibrium with the dissolved solute. This is called Dynamic equilibrium.

6. The particle size in a **colloid ranges between:**

(A) Less than 1 nm
(B) 1 to 1000 nm
(C) Greater than 1000 nm
(D) Exactly 1000 nm

Correct Answer: B

Explanation: Colloidal particles range from 1 to 1000 nm in diameter, larger than solution particles but not visible to the naked eye.

7. Which of the following will **increase the solubility of a gas in a liquid?**

(A) Increasing temperature
(B) Decreasing pressure
(C) Increasing pressure
(D) Adding more solvent

Correct Answer: C

Explanation: For gases, increasing pressure increases solubility (e.g., carbonated drinks are bottled under high pressure).

8. In a **supersaturated solution, the amount of solute is:**

(A) Less than the maximum at a given temperature
(B) Exactly the maximum at a given temperature
(C) Always zero
(D) More than the maximum at a given temperature

Correct Answer: D

Explanation: A supersaturated solution contains more solute than a saturated solution at the same temperature and is uns.

9. Which of the following is an example of a **solid solution?**

(A) Brass
(B) Air
(C) Brine
(D) Fog

Correct Answer: A

Explanation: Brass is a solid solution (alloy) of copper and zinc, where the solvent is solid.

10. The Tyndall effect is used to distinguish:

(A) Solutions from suspensions
(B) Colloids from solutions
(C) Elements from compounds
(D) Mixtures from compounds

Correct Answer: B

Explanation: The Tyndall effect is the scattering of light by colloidal particles, which distinguishes colloids from true solutions.

11. Which of the following explains why a gas completely fills its container?

(A) Gas particles are held in fixed positions
(B) Gas particles have strong forces of attraction
(C) Gas particles are far apart and move freely
(D) Gas particles are tightly packed

Correct Answer: C

Explanation: In a gas, particles are far apart, have very weak forces of attraction, and move freely, which allows them to spread out and fill the entire container.

12. Why does graphite conduct electricity while diamond does not?

(A) Graphite has ionic bonds, diamond has covalent bonds
(B) Diamond has delocalized electrons, graphite has no free electrons
(C) Both have free electrons, but diamond's are less mobile

(D) Graphite has delocalized electrons, diamond has no free electrons

Correct Answer: D

Explanation: In graphite, the fourth valence electron of each carbon atom is delocalized and free to move. In diamond, all four valence electrons are used in covalent bonds, so no free electrons are present.

13. A solution in which no more solute can dissolve at a given temperature is called:

(A) Saturated
(B) Unsaturated
(C) Dilute
(D) Supersaturated

Correct Answer: A

Explanation: A saturated solution contains the maximum amount of solute that can dissolve at a given temperature; any extra solute remains undissolved.

14. Which of the following is an example of a **gaseous solution where a gas is the solvent?**

(A) Brine
(B) Air
(C) Brass
(D) Sugar syrup

Correct Answer: B

Explanation: In air, nitrogen gas is the solvent, and oxygen, carbon dioxide, and trace gases are solutes—this makes it a gaseous solution.

15. When a saturated solution of a solid is heated, it becomes:

(A) Supersaturated
(B) More saturated
(C) Unsaturated
(D) Unstable

Correct Answer: C

Explanation: Heating increases the solubility of most solids, so the solution can dissolve more solute and becomes unsaturated.

B. Less Important / Secondary Topics

16. Which property of colloids is used to distinguish them from true solutions?

(A) Their particles scatter a beam of light
(B) Their particles settle down on standing
(C) Their particles are visible to the naked eye
(D) Their particles cannot pass through filter paper

Correct Answer: A

Explanation: Colloidal particles are large enough to scatter light (Tyndall effect), which distinguishes them from true solutions whose particles are too small to scatter light.

17. In the context of solutions, what is the main difference between a concentrated and a dilute solution?

(A) Concentrated solutions are always saturated
(B) Dilute solutions contain a relatively small amount of solute
(C) Dilute solutions cannot dissolve more solute
(D) Concentrated solutions are always unsaturated

Correct Answer: B

Explanation: Dilute solutions contain a relatively small amount of solute — this correctly answers the question.

18. Which of the following correctly describes a **suspension?**

(A) Homogeneous mixture with particles less than 1 nm
(B) Heterogeneous mixture with particles between 1 and 1000 nm that scatter light
(C) Heterogeneous mixture with particles greater than 1000 nm that settle on standing

(D) Homogeneous mixture that cannot be separated by filtration

Correct Answer: C

Explanation: A suspension is a heterogeneous mixture with large particles (greater than 1000 nm) that are visible to the naked eye and settle down when left standing.

19. Which factor affects the solubility of a gas in a liquid?

(A) Pressure only
(B) Temperature only
(C) Neither temperature nor pressure
(D) Both temperature and pressure

Correct Answer: D

Explanation: The solubility of a gas in a liquid depends on both temperature (solubility decreases as temperature increases) and pressure (solubility increases as pressure increases).

20. Which of the following is a **heterogeneous mixture?**

(A) Milk
(B) Salt solution
(C) Air
(D) Brass

Correct Answer: A

Explanation: Milk is a colloid (a type of heterogeneous mixture) with particles that scatter light and remain dispersed. Salt solution, air, and brass are homogeneous.

21. A sealed container holds a mixture of two gases. The container is cooled to a very low temperature until the gases condense into a liquid. Which statement best explains this change of state?

(A) The kinetic energy of the gas particles increased, allowing them to settle
(B) The forces of attraction between particles became stronger than their kinetic energy
(C) The particles of the gas chemically reacted to form a new liquid compound
(D) The pressure inside the container increased, forcing the particles together

Correct Answer: B

Explanation: The forces of attraction between particles became stronger than their kinetic energy — this correctly answers the question.

22. Two samples of carbon are tested. Sample X is extremely hard and does not conduct electricity. Sample Y is soft, slippery, and conducts electricity. Which statement correctly identifies the samples and explains the difference?

(A) X is graphite and Y is diamond; graphite has free electrons
(B) X is diamond and Y is graphite; diamond has free electrons
(C) X is diamond and Y is graphite; graphite has delocalized electrons
(D) X is graphite and Y is diamond; diamond conducts electricity

Correct Answer: C

Explanation: Diamond is hard and non-conductive because each C is bonded to 4 others with no free electrons. Graphite is soft and conductive because each C is bonded to 3 others, leaving delocalized electrons.

23. A solution is prepared by dissolving 50 g of a solute in 100 g of water at 20 °C. At this temperature, the solubility of the solute is 40 g per 100 g of water. Which statement about the solution is correct?

(A) It is an unsaturated solution
(B) It is a saturated solution with no undissolved solute
(C) It is a supersaturated solution
(D) It is a saturated solution with 10 g of undissolved solute

Correct Answer: D

Explanation: Since the solubility is 40 g per 100 g of water, 40 g dissolves and 10 g remains undissolved, making it a saturated solution.

24. Which of the following observations would **most reliably identify a liquid as a colloid rather than a true solution?**

(A) A beam of light passing through it is visible from the side
(B) The liquid is clear and transparent
(C) The liquid conducts electricity
(D) The liquid has a colour

Correct Answer: A

Explanation: The Tyndall effect (visible path of light) is the defining test for colloids; true solutions do not scatter light because their particles are less than 1 nm.

25. A student heats a saturated solution of potassium nitrate from 20 °C to 60 °C. What happens to the solution and why?

(A) It becomes supersaturated because solubility decreases
(B) It becomes unsaturated because solubility increases
(C) It remains saturated because temperature does not affect solubility
(D) It becomes a suspension because the solute precipitates

Correct Answer: B

Explanation: The solubility of most solids increases with temperature, so the heated solution can dissolve more solute and becomes unsaturated.

26. Which statement correctly explains why ice floats on water?

(A) Ice has a higher density than liquid water
(B) Ice has a higher kinetic energy than liquid water
(C) Ice has a lower density than liquid water because of its hydrogen-bonded lattice
(D) Ice has a stronger intermolecular force than liquid water

Correct Answer: C

Explanation: In ice, hydrogen bonding forms a hexagonal lattice with more empty space, making solid water less dense than liquid water, so it floats.

27. A saturated solution of sodium thiosulphate is prepared at 60 °C and then cooled slowly to room temperature. No crystallization occurs immediately. What type of solution is this, and what happens when a small crystal of sodium thiosulphate is added?

(A) Unsaturated; the crystal dissolves
(B) Saturated; nothing happens
(C) Colloidal; the crystal scatters light
(D) Supersaturated; crystallization begins immediately

Correct Answer: D

Explanation: Supersaturated; crystallization begins immediately — this correctly answers the question.

28. A homogeneous mixture is separated into its components by distillation. Which type of mixture was it?

(A) A solution
(B) A compound
(C) A suspension
(D) A colloid

Correct Answer: A

Explanation: A solution is a homogeneous mixture whose components can be separated by physical means such as distillation (based on differences in boiling point).

29. Which of the following statements about plasma is correct?

(A) Plasma is formed when a solid is heated to its melting point
(B) Plasma consists of ionized gas particles with free electrons
(C) Plasma is a state of matter found only in laboratories
(D) Plasma is the most common state of matter on Earth's surface

Correct Answer: B

Explanation: Plasma forms at very high temperatures or in strong electric fields, where gas atoms are ionized and free electrons and ions are present.

30. Which observation shows that a solution is **supersaturated rather than merely saturated?**

(A) The solution is clear and transparent

(B) The solution contains some undissolved solute at the bottom

(C) Adding a seed crystal causes rapid crystallization

(D) The solution conducts electricity

Correct Answer: C

Explanation: Adding a seed crystal causes rapid crystallization — this correctly answers the question.