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Chemistry Grade 11 — Chapter 5

States and Phases of Matter

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Independent practice MCQs from the supplied Class 11 Chemistry notes pack. Total: 50 questions.

A. Important / Main Topics

1. Which of the following is true for liquids according to the kinetic molecular theory?

(A) Molecules are in contact with each other and in constant motion
(B) Molecules are far apart and move freely
(C) Molecules are fixed in position and only vibrate
(D) Molecules have no attractive forces between them

Correct Answer: A

Explanation: A liquid consists of molecules in contact with each other, and molecules within a liquid are in constant motion, but the motion is limited by their close packing.

2. The resistance to flow of a liquid is called:

(A) Surface tension
(B) Viscosity
(C) Vapour pressure
(D) Evaporation

Correct Answer: B

Explanation: The resistance to flow of a liquid is called viscosity. The higher the viscosity, the slower the liquid flows.

3. The pressure exerted by the vapour of a liquid in equilibrium with the liquid at a given temperature is called:

(A) Boiling point
(B) Surface tension
(C) Vapour pressure
(D) Molar heat of vaporization

Correct Answer: C

Explanation: Vapour pressure of a liquid is the pressure exerted by vapour of the liquid in equilibrium with the liquid at a given temperature.

4. The spontaneous change of a liquid into its vapour at the surface of the liquid is called:

(A) Condensation
(B) Boiling
(C) Sublimation
(D) Evaporation

Correct Answer: D

Explanation: The spontaneous change of a liquid into its vapour at the surface of liquid at a given temperature is called evaporation.

5. The temperature at which the vapour pressure of a liquid becomes equal to the external pressure is called:

(A) Boiling point
(B) Melting point
(C) Critical point
(D) Freezing point

Correct Answer: A

Explanation: The temperature at which the vapour pressure of a liquid becomes equal to external pressure or atmospheric pressure is called boiling point.

6. Which of the following properties of water is due to strong hydrogen bonding?

(A) Low surface tension
(B) High boiling point
(C) High vapour pressure
(D) Low heat of vaporization

Correct Answer: B

Explanation: High boiling point — this correctly answers the question.

7. The amount of heat required to convert one mole of a solid into its liquid state at its melting point is called:

(A) Molar heat of vaporization
(B) Enthalpy of solution
(C) Molar heat of fusion
(D) Lattice energy

Correct Answer: C

Explanation: Molar heat of fusion is the amount of heat required to convert one mole of a solid into its liquid state at its melting point.

8. In which state of matter are the particles most disordered?

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

Correct Answer: D

Explanation: Gas — this correctly answers the question.

9. Which of the following is a characteristic of crystalline solids?

(A) Sharp melting point
(B) No definite geometric shape
(C) No cleavage planes
(D) Random arrangement of particles

Correct Answer: A

Explanation: Sharp melting point — this correctly answers the question.

10. According to kinetic molecular theory, the average kinetic energy of gas molecules is:

(A) Equal to the intermolecular forces
(B) Greater than the average energy of attraction
(C) Less than the average energy of attraction
(D) Independent of temperature

Correct Answer: B

Explanation: In gases, average kinetic energy of molecules is larger than average energy of attraction between particles.

11. The SI unit of viscosity is:

(A) Newton per meter
(B) Joule per Kelvin
(C) Pascal second
(D) Debye

Correct Answer: C

Explanation: SI unit of viscosity is Pascal Second (Pa.s).

12. Small liquid droplets are usually spherical because:

(A) Liquids have high viscosity
(B) Liquids have low surface tension
(C) Molecules are far apart

(D) Spheres have the least surface area per unit volume

Correct Answer: D

Explanation: Spheres have less surface area per unit volume than anything else, so small liquid droplets are usually spherical.

13. Which of the following is an amorphous solid?

(A) Glass
(B) Sodium chloride
(C) Diamond
(D) Ice

Correct Answer: A

Explanation: Glass is an amorphous solid. Its constituent particles do not possess arrangement in a regular orderly manner.

14. The breaking of crystalline solids along definite planes is due to:

(A) Habit of a crystal
(B) Cleavage planes
(C) Amorphous nature
(D) High viscosity

Correct Answer: B

Explanation: Crystalline solids break up along certain planes called cleavage planes.

15. According to kinetic molecular theory, the particles of a solid:

(A) Move freely in all directions
(B) Have no kinetic energy
(C) Only vibrate about their mean positions
(D) Are far apart

Correct Answer: C

Explanation: The particles of solid can only vibrate and possess only vibrational kinetic energy.

16. When the surface area of a liquid increases, the rate of evaporation:

(A) Decreases
(B) Remains constant
(C) Becomes zero
(D) Increases

Correct Answer: D

Explanation: When surface area of a liquid increases, evaporation increases because evaporation takes place from liquid surface.

17. The vapour pressure of a liquid is independent of:

(A) Surface area
(B) Temperature
(C) Nature of the liquid
(D) Intermolecular forces

Correct Answer: A

Explanation: The surface area has no effect on vapour pressure. Larger surface area has larger target for evaporation and for returning the molecules.

18. If the external pressure on a liquid is decreased, its boiling point:

(A) Increases
(B) Decreases
(C) Remains constant
(D) Becomes zero

Correct Answer: B

Explanation: At lower external pressure, liquid boils at lower temperature as liquid requires less amount of heat to boil.

19. Explain why honey flows more slowly than water.

(A) Honey has lower viscosity than water
(B) Honey has lower intermolecular forces
(C) Honey has larger and irregular molecules, causing higher viscosity
(D) Honey has higher temperature

Correct Answer: C

Explanation: In liquids with large and irregular molecules, such as honey, molecules tend to tangle with each other, hindering flow and leading to high viscosity.

20. Define surface tension. Why does the surface tension of a liquid decrease with increasing temperature?

(A) Surface tension increases with temperature
(B) Surface tension is independent of temperature
(C) Surface tension is only affected by pressure
(D) Surface tension decreases with temperature because increased kinetic energy reduces intermolecular forces

Correct Answer: D

Explanation: The surface tension of a liquid decreases with increasing temperature because the increased kinetic energy of the molecules reduces the strength of the intermolecular forces.

21. Explain why glaciers and ice caps are important for studying global warming (with reference to heat of fusion).

(A) The melting and freezing of ice are closely tied to the heat of fusion
(B) Heat of fusion is not relevant to glaciers
(C) Heat of fusion decreases with temperature
(D) Glaciers are unrelated to global warming

Correct Answer: A

Explanation: The study of glaciers heavily relies on understanding the significant role that heat of fusion plays in their behaviour.

22. Differentiate between the motion of molecules in liquids and solids.

(A) Liquid molecules are fixed; solid molecules move freely
(B) Liquid molecules can slide past each other; solid molecules only vibrate
(C) Both have the same motion
(D) Solid molecules move faster than liquid molecules

Correct Answer: B

Explanation: Liquid molecules can slide past each other. Solid particles are closely packed and show only vibrational motion.

23. The heat required to convert one mole of liquid into vapours at its boiling point is called:

(A) Molar heat of fusion
(B) Specific heat capacity
(C) Molar heat of vaporization
(D) Heat capacity

Correct Answer: C

Explanation: The amount of heat required to convert one mole of a liquid into its vapours at its boiling point is called molar heat of vaporization.

24. Which of the following is NOT a general property of gases?

(A) High compressibility
(B) Diffusion
(C) Exertion of pressure
(D) Definite shape and volume

Correct Answer: D

Explanation: Gases do not have definite shape and volume. Volume of the gas is the volume of its container.

25. In a crystalline solid, the internal angles of the crystal:

(A) Are always the same regardless of growth form
(B) Change with the size of the crystal
(C) Are always 90^circ
(D) Depend on the rate of cooling

Correct Answer: A

Explanation: The internal angles of a crystal (where surfaces intersect) are always the same, no matter in what form they are grown.

B. Less Important / Secondary Topics

26. The shape in which a crystal usually grows is called its:

(A) Habit
(B) Cleavage plane
(C) Lattice
(D) Unit cell

Correct Answer: A

Explanation: The shape of a crystal in which it usually grows is called habit of a crystal.

27. A liquid boils when its vapour pressure:

(A) Is less than the external pressure
(B) Equals the external pressure
(C) Is greater than the external pressure
(D) Is zero

Correct Answer: B

Explanation: The temperature at which the vapour pressure of a liquid becomes equal to external pressure is called boiling point.

28. Which of the following statements about liquids is correct according to the kinetic molecular theory?

(A) Liquid molecules are fixed in position
(B) Liquids have no intermolecular forces
(C) The average kinetic energy of liquid molecules is directly proportional to absolute temperature
(D) Liquid molecules do not collide

Correct Answer: C

Explanation: The average kinetic energy of liquid molecules is directly proportional to the absolute temperature.

29. Ice floats on water because:

(A) Ice has high density
(B) Water has low surface tension
(C) Ice is amorphous
(D) Ice has a more open hydrogen-bonded structure and lower density

Correct Answer: D

Explanation: In ice, there is a three-dimensional hydrogen-bonded network, producing a rigid lattice with more open arrangement, making it less dense than water.

30. The property of the surface of a liquid to behave as if a membrane were stretched over it is called:

(A) Surface tension
(B) Viscosity
(C) Vapour pressure
(D) Evaporation

Correct Answer: A

Explanation: Surface tension is the property of the surface of liquids to behave as if a membrane were stretched over it.

31. The process in which vapour molecules return to the liquid surface is called:

(A) Evaporation
(B) Condensation
(C) Boiling
(D) Sublimation

Correct Answer: B

Explanation: The coming back of vapours to liquid and captured by liquid surface is called condensation.

32. At dynamic equilibrium between liquid and vapour:

(A) Evaporation stops
(B) Condensation stops
(C) The rate of evaporation equals the rate of condensation
(D) The liquid completely evaporates

Correct Answer: C

Explanation: Both processes, evaporation and condensation, continue till a time when the rate of evaporation is equal to the rate of condensation.

33. Which of the following is a general property of solids?

(A) High compressibility
(B) High kinetic energy
(C) Random arrangement of particles
(D) Definite mass, volume, and shape

Correct Answer: D

Explanation: Definite mass, volume, and shape — this correctly answers the question.

34. The particles of a solid are held together by:

(A) Strong cohesive forces
(B) Weak intermolecular forces
(C) No forces
(D) Repulsive forces only

Correct Answer: A

Explanation: Solid particles are held together by strong cohesive forces.

35. The average kinetic energy of molecules in a gas is:

(A) Smaller than the average energy of attraction
(B) Larger than the average energy of attraction
(C) Equal to the average energy of attraction
(D) Unrelated to the average energy of attraction

Correct Answer: B

Explanation: In gases, average kinetic energy of molecules is larger than average energy of attraction between particles.

36. A system has reached dynamic equilibrium. Which of the following statements is true?

(A) The reaction has stopped
(B) The concentrations of reactants and products are equal
(C) The rates of forward and reverse reactions are equal
(D) The temperature is zero

Correct Answer: C

Explanation: In dynamic equilibrium, the rate of forward and reverse reactions is the same. The concentrations remain constant but are not necessarily equal.

37. A liquid has a high vapour pressure. This indicates that:

(A) The liquid has strong intermolecular forces
(B) The liquid has a high boiling point
(C) The liquid is a solid
(D) The liquid has weak intermolecular forces

Correct Answer: D

Explanation: A liquid has a high vapour pressure. This indicates that The liquid has weak intermolecular forces.

38. Water boils at 100^circ C at sea level. At Murree hills, where external pressure is 700 torr, water boils at 98^circ C. This is because:

(A) Lower external pressure lowers the boiling point
(B) Water has higher vapour pressure at Murree
(C) Water molecules are different at Murree
(D) The temperature is higher at Murree

Correct Answer: A

Explanation: At lower external pressure, liquid boils at lower temperature as liquid requires less amount of heat to boil.

39. A pressure cooker cooks food faster because:

(A) It increases the vapour pressure of water
(B) It increases the external pressure, increasing the boiling point
(C) It decreases the boiling point
(D) It changes the intermolecular forces

Correct Answer: B

Explanation: A pressure cooker is a closed container from which water vapour cannot escape and pressure is created and the boiling temperature rises, therefore food is cooked quickly.

40. Vacuum distillation is used for liquids that:

(A) Have low boiling points
(B) Are non-volatile
(C) Decompose at their normal boiling points
(D) Have high viscosity

Correct Answer: C

Explanation: In vacuum distillation, liquid boils at low temperature which requires less amount of heat. Liquids like glycerine can decompose at their normal boiling point and can be distilled under vacuum.

41. Which of the following is a correct statement about the viscosity of a liquid?

(A) Viscosity increases with temperature
(B) Viscosity is independent of temperature
(C) Viscosity is highest for water
(D) Viscosity decreases with temperature

Correct Answer: D

Explanation: Molecules move faster when the temperature rises. An increase in temperature decreases intermolecular forces, lowering viscosity.

42. The surface tension of water is higher than that of alcohols because:

(A) Water has stronger hydrogen bonding
(B) Water has weaker intermolecular forces
(C) Water has lower molecular mass
(D) Water has higher viscosity

Correct Answer: A

Explanation: The surface tension of water is higher than that of alcohols because Water has stronger hydrogen bonding.

43. In a saturated solution, adding more solute:

(A) Increases the concentration
(B) Does not change the concentration
(C) Decreases the concentration
(D) Changes the temperature

Correct Answer: B

Explanation: In a saturated solution, no more solute can dissolve, so the concentration remains constant.

44. The enthalpy of solution of NH□NO□ is +25.7 kJ/mol. This means that:

(A) The dissolution is exothermic
(B) The solution becomes hot
(C) The dissolution is endothermic
(D) The lattice energy is greater than hydration energy

Correct Answer: C

Explanation: A positive Δ Hsolution indicates an endothermic process. The flask becomes cold when NH□NO□ dissolves.

45. The enthalpy of hydration is more exothermic for:

(A) Larger ions with lower charge
(B) Larger ions with higher charge
(C) Smaller ions with lower charge
(D) Smaller ions with higher charge

Correct Answer: D

Explanation: The enthalpy of hydration is more exothermic for Smaller ions with higher charge.

46. The correct order of boiling points of the first four alkanes is:

(A) Methane < Ethane < Propane < Butane
(B) Methane > Ethane > Propane > Butane
(C) Propane < Ethane < Methane < Butane
(D) Butane < Propane < Ethane < Methane

Correct Answer: A

Explanation: Boiling point increases with molecular mass. Methane (-164°C) < Ethane (-89°C) < Propane (-42°C) < Butane (-1°C).

47. Liquid crystals are used in:

(A) Pressure cookers
(B) LCD displays
(C) Vacuum distillation
(D) Ice caps

Correct Answer: B

Explanation: Liquid crystals are used in LCD displays (televisions, computer monitors, smartphones).

48. The molar heat of fusion of ice is +6.02 kJ/mol. This is the energy required to:

(A) Vaporize 1 mole of water
(B) Freeze 1 mole of water
(C) Melt 1 mole of ice
(D) Heat 1 mole of water by 1°C

Correct Answer: C

Explanation: Molar heat of fusion is the amount of heat required to convert one mole of a solid into its liquid state at its melting point.

49. In the study of glaciers and ice caps, the heat of fusion is crucial because:

(A) It determines the colour of ice
(B) It measures the density of ice
(C) It determines the temperature of the ice
(D) It helps predict the extent of ice melting and its impact on sea levels

Correct Answer: D

Explanation: In the study of glaciers and ice caps, the heat of fusion is crucial because It helps predict the extent of ice melting and its impact on sea levels.

50. Which of the following is an example of a crystalline solid?

(A) Sodium chloride
(B) Glass

(C) Plastic
(D) Rubber

Correct Answer: A

Explanation: Sodium chloride (NaCl) is a crystalline solid with a definite regular and three-dimensional geometric shape.