SECTION NAME

Chemistry Test

DURATION: 0 Hours 30 Minutes

DATE: 2025-03-28

SYLLABUS

Chemistry: | Solutions.

(Chemistry)

1. When mercuric iodide is added to the aqueous solution of potassium iodide, then
- **A)** Freezing point is raised
- **B)** Freezing point is lowered
- **C)** Freezing point does not change
- **D)** Boiling point does not change

2. Which has the maximum freezing point?
- **A)** 6 g urea solution in 100 g H_2O
- **B)** 6 g acetic solution in 100 g H_2O
- **C)** 6 g sodium chloride in 100 g H_2O
- **D)** All have equal freezing point

3. 2.56 g of sulphur in 100 g of CS_2 has depression in freezing point of 0.010°, $K_f = 0.1^o$ (molal)$^{-1}$. Hence, atomicity of sulphur in CS_2 is
- **A)** 2
- **B)** 4
- **C)** 6
- **D)** 8

4. A 5.25% solution of a substance is isotonic with a 1.5% solution of urea (molar mass = 60 g mol^{-1}) in the same solvent. If the densities of both the solutions are assumed to be equal to 1.0 g cm^{-3}, molar mass of the substance will be
- **A)** 90.0 g mol^{-1}
- **B)** 115.0 g mol^{-1}
- **C)** 105.0 g mol^{-1}
- **D)** 210.0 g mol^{-1}

5. The molarity of a solution obtained by mixing 800 mL of 0.5 M HCl with 200 mL of 1 M HCl will be
- **A)** 0.8 M
- **B)** 0.6 M
- **C)** 0.4 M
- **D)** 0.2 M

6. The density of KCl solution labelled as 9 \% \mathrm{w} / \mathrm{w} is 1.4 \mathrm{~g} \mathrm{~mL}^{-1}. The molarity of the solution is
- **A)** 2.17 \mathrm{M}
- **B)** 2.5 \mathrm{M}
- **C)** 1.69 \mathrm{M}
- **D)** 1.5 \mathrm{M}

7. The vapour pressure of a solvent decreased by 10mm of mercury, when a non-volatile solute was added to the solvent. The mole fraction of the solute in the solution is 0.2. What should be the mole fraction of the solvent, if decrease in the vapour pressure is to be 20 mm of mercury?
- **A)** 0.8
- **B)** 0.6
- **C)** 0.4
- **D)** 0.2

8. Which of the following units is used to express the concentration of a solution in parts per million (ppm)?
- **A)** g/L
- **B)** mol/L
- **C)** g/kg
- **D)** mg/L

9. If a solution of molarity \left(\mathrm{M}_1\right) is diluted by the addition of a solvent, its volume changes from \mathrm{V}_1 to V_2. The molarity \left(M_2\right) of the new solution is given by the equation M_1 V_1=M_2 V_2. A solution of molarity 1.2 is diluted to make a new solution whose molarity is 0.1 \mathrm{M} and volume is 1 \mathrm{~L}. The initial volume of the solution is
- **A)** 1.80 \mathrm{~L}
- **B)** 1.08 \mathrm{~L}
- **C)** 0.80 \mathrm{~L}
- **D)** 0.08 \mathrm{~L}

10. 0.33 g of NaOH is added in water to make a 6 L solution at 277 K. The concentration of NaOH, when expressed in ppm is
- **A)** 3.3 × 10^{−5}
- **B)** 5.5 × 10^{−5}
- **C)** 6.3 × 10^{−4}
- **D)** 8.5 × 10^{−4}

11. Which of the following factors does NOT affect the solubility of a solid solute in a liquid solvent?
- **A)** Temperature
- **B)** Pressure

C) Nature of solute and solvent **D)** Volume of the solvent

12. The solution of sugar in water contains

A) Free atoms   **B)** Free ions

C) Free molecules   **D)** Free atom and molecules

13. The solubility of a gas in a liquid _____ with increasing pressure, according to Henry's law.

A) Increases   **B)** Decreases

C) Remains constant   **D)** Becomes unpredictable

14. The solubility of most solid solutes in water tends to increase with:

A) Increase in temperature   **B)** Decrease in temperature

C) Increase in pressure   **D)** Decrease in pressure

15. Henry's law constant for the solubility of methane in benzene at $25^{\circ} \mathrm{C}$ is $4.27 \times 10^5 \mathrm{~mm} \mathrm{Hg}$. The mole fraction of methane in benzene is 1.5×10^{-3} when the pressure is

A) $42.7 \mathrm{~mm} \mathrm{Hg}$ **B)** $64.05 \mathrm{~mm} \mathrm{Hg}$

C) $427.0 \mathrm{~mm} \mathrm{Hg}$ **D)** $640.5 \mathrm{~mm} \mathrm{Hg}$

16. Which of the following is a colligative property?

A) Density   **B)** Boiling point elevation

C) Viscosity   **D)** Surface tension

17. The vapour pressure of pure benzene at $50^{\circ} \mathrm{C}$ is 268 torr. How many mol of non-volatile solute per mol of benzene is required to prepare a solution of benzene having a vapour pressure of 167 torr at $50^{\circ} \mathrm{C}$?

A) 0.377   **B)** 0.605

C) 0.623   **D)** 0.0395

18. The vapour pressure of water is 12.3 kPa at 300 K. What will be the vapour pressure of 1 molal solution of a non-volatile solute in it ?

A) 24.16 kPa   **B)** 1.208 kPa

C) 2.416 kPa   **D)** 12.08 kPa

19. If P_{A}^{0} is the vapour pressure of a pure liquid A and the mole fraction of A in the mixture of two liquids A and B is x, the partial vapour pressure of A is:

A) $(1-x) P_A^0$ **B)** $x P_{A}^0$

C) $\frac{x}{(1-x)} P_A^0$ **D)** $\frac{(1-x)}{x} P_A^0$

20. 60 gm of Urea (Mol. wt 60) was dissolved in 9.9 moles, of water. If the vapour pressure of pure water is P_0, the vapour pressure of solution is

A) $0.10 P_{\circ}$ **B)** $1.10 P_{\circ}$

C) $0.90 P_{\circ}$ **D)** $0.99 P_{\circ}$