📘 DPP–5 : SOLUTIONS (Class 12 Chemistry – JAC Board)

◆ **SECTION–A : MCQs (20 × 1 = 20 marks)**

1. Osmosis takes place through
   (A) Porous membrane
   (B) Semipermeable membrane
   (C) Dialysis membrane
   (D) Filter paper

2. Osmotic pressure is defined as the
   (A) Pressure applied to stop osmosis
   (B) Pressure applied to start osmosis
   (C) Vapour pressure of solution
   (D) Pressure exerted by solute

3. The unit of osmotic pressure is
   (A) atm
   (B) bar
   (C) mm Hg
   (D) All of these

4. Osmotic pressure of a solution depends upon
   (A) Nature of solute
   (B) Temperature
   (C) Concentration
   (D) All of these

5. The relation for osmotic pressure is
   (A) $\pi V = nRT$
   (B) $PV = nRT$
   (C) $\pi = CRT$
   (D) Both (A) and (C)

6. Osmotic pressure is a
   (A) Additive property
   (B) Colligative property
   (C) Intensive property
   (D) Constitutive property

7. Osmotic pressure increases when
   (A) Temperature decreases
   (B) Concentration decreases
   (C) Temperature increases
   (D) Solvent amount increases

8. Which of the following solutions have same osmotic pressure at same temperature?
   (A) Isotonic solutions
   (B) Hypertonic solutions
   (C) Hypotonic solutions
   (D) Ideal solutions

9. Two solutions are isotonic when they have same
   (A) Vapour pressure
   (B) Freezing point
   (C) Osmotic pressure
   (D) Boiling point

10. Which of the following membranes is semipermeable?
    (A) Rubber sheet
    (B) Cellophane
    (C) Parchment paper
    (D) Both (B) and (C)

11. Osmotic pressure is preferred for determination of molar mass because
    (A) It is very small
    (B) It can be measured at room temperature
    (C) It is independent of temperature
    (D) It does not depend on concentration

12. A solution having higher osmotic pressure than another is called
    (A) Isotonic
    (B) Hypotonic
    (C) Hypertonic
    (D) Ideal

13. Van't Hoff factor for glucose in water is
    (A) 1
    (B) 2
    (C) 0.5
    (D) 3

14. Which of the following will have maximum osmotic pressure?
    (A) 0.1 M NaCl
    (B) 0.1 M glucose
    (C) 0.1 M $CaCl_2$
    (D) 0.1 M urea

15. Osmosis stops when
    (A) Solute particles stop moving
    (B) Osmotic pressure equals applied pressure
    (C) Temperature becomes zero
    (D) Solution becomes dilute

16. Reverse osmosis occurs when
    (A) Pressure < osmotic pressure
    (B) Pressure = osmotic pressure
    (C) Pressure > osmotic pressure
    (D) No pressure is applied

17. Which of the following is a biological semipermeable membrane?
    (A) Cell wall
    (B) Cell membrane
    (C) Plastic sheet
    (D) Rubber tube

18. Osmotic pressure is directly proportional to
    (A) Volume

(B) Temperature

(C) Molecular mass

(D) Nature of solvent

19. The unit of concentration (C) in $\pi = CRT$ is

(A) mol L^{-1}

(B) g L^{-1}

(C) mol kg^{-1}

(D) mole fraction

20. Osmotic pressure becomes zero when

(A) Solution is concentrated

(B) Solvent is pure

(C) Temperature is high

(D) Pressure is applied

◆ **SECTION–B : Short Answer Questions**

1. Define osmosis.

2. What is osmotic pressure?

3. Define semipermeable membrane.

4. What are isotonic solutions?

5. Why osmotic pressure is preferred for molar mass determination?

◆ **SECTION–C : Long Answer Questions**

1. **Derive the expression for osmotic pressure** of a dilute solution.

2. Calculate the **osmotic pressure** of a solution prepared by dissolving **2 g of glucose** in **250 mL of solution** at **27°C**.
(Molar mass of glucose = 180 g mol^{-1}, R = 0.082 L atm K^{-1} mol^{-1}).