SEMESTER–ONE

CHEMISTRY

Class XI

Sample Paper—2

Max. Marks: 50 **Time Allowed: 90 minutes**

General Instructions:

(i) This question paper consists of 40 questions in 4 sections.

(ii) Section A consists of 10 Objective type questions carrying 1 mark each.

(iii) Section B consists of 10 Fill in the blanks type questions carrying 1 mark each.

(iv) Section C consists of 10 True or False statement type questions carrying 1 mark each.

(v) Section D consists of 10 Short answer and Numerical type questions carrying 2 marks each.

Section A

Select and write one most appropriate option out of the four options given for each of the questions 1–10.

1. Which of the following is the cause of low concentration of oxygen in the blood and tissues of people living at high altitude ?

(a) high atmospheric pressure

(b) low atmospheric pressure

(c) low temperature

(d) both low temperature and high atmospheric pressure.

2. An raw mango placed in a concentrated salt solution to prepare pickle, shrivels because

(a) it gains water due to osmosis.

(b) it loses water due to reverse osmosis.

(c) it gains water due to reverse osmosis.

(d) it loses water due to osmosis.

3. 4 L of 0.02 M aqueous solution of barium chloride was diluted by adding one litre of water. The molarity of the resultant solution is

(a) $0.004\ mol^{-1}$ (b) $8 \times 10^{-3}\ mol^{-1}$

(c) $0.016\ mol^{-1}$ (d) $0.012\ mol^{-1}$

4. The rate of diffusion of methane is twice that of X. The molecular mass of X is

(a) 64.0 (b) 32.0

(c) 40 (d) 80.

5. The density of chlorine relative to air is

(a) 2.46 (b) 3

(c) 4 (d) 5.1

6. Among the following, the incorrect statement is:

(a) At low pressures real gases show ideal behaviour.

(b) At very low temperatures real gases show ideal behaviour

(c) At very large volume real gases show ideal behaviour

(d) At Boyle's temperature, real show should ideal behaviour.

7. Which of the following is the strongest base?

(a) Cl^- (b) SO_4^{2-}

(c) CH_3COO^- (d) NO_3^-.

8. H_2O acts as a base according to

(a) Arrhenius concept only (b) Lewis concept only

(c) Bronsted concept only (d) Lewis as well as Bronsted concept.

9. Which of the following aqueous solutions will have highest pH?

(a) Sodium acetate (b) Sodium chloride

(c) Ammonium phosphate (d) Calcium chloride.

10. For a buffer solution, which of the following is true?

(a) pH does not change at all on addition of acid or base

(b) pH change is very little on addition of acid or base

(c) It is a mixture of strong acid and its salt

(d) It is a mixture of strong base and its salt.

Section B

Fill in the blanks with a suitable word for each of the questions 11–20.

11. Concentrated solutions which can be diluted are known as ..... solutions.

12. Amount of water to be added to 200 cm^3 of 1 M HCl to make it exactly 0.2 M HCl is ..... .

13. 1 atm = ... NM^{-2} = ... torr.

14. The volume occupied by 0.5 mol of an ideal gas at 1 atm pressure and 273°C is ..... .

15. K.E. of 8 g of O_2 at 27°C is ..... ergs.

16. pH of 0.1 M HCl is ..... .

17. The ionization constant (K) and degree of dissociation (α) of a weak electrolyte are related as ..... .

18. HSO_4^- is a conjugate acid of ..... .

19. In the reaction $Ag^+ + 2NH_3 \rightleftharpoons [Ag(NH_3)_2]^+$, the cation Ag^+ ion is called ..... .

20. K_a for a weak acid HA is 1×10^{-5}, K_b for A^- would be ..... .

Section C

State whether the following statements are true or false for each of the questions 21–30.

21. Gases do not settle at the bottom.

22. All the molecules in a given sample of gas move with same speed.

23. Equal volume of all gases always contain equal number of moles.

24. The kinetic gas equation is $pV = 1/3\ mNu^2$.

25. Ionic product of a slat in solution cannot be greater than solubility product.

26. Aqueous solution of Na_2CO_3 is neutral.

27. NH_4^+ ion is Bronsted acid.

28. The solution containing mixture of oxalic acid/sodium oxalate can act as buffer solution.

29. pH of 10^{-8} M HCl solutionis 8.

30. pK_w of water at 273 is greater than 14.

Section D

Answer each of the questions 31–40.

31. Why is freezing point depression of 0.1 M sodium chloride solution is nearly twice that of 0.1 M glucose solution?

32. What do you understand by tropopause?

33. What is the difference between ideal gas and real gas?

34. pH of a solution of a strong acid is 5.0. What will be the pH of the solution obtained by diluting the given solution a 100 times?

35. Decide whether solutions of the following salts are acidic, basic or neutral

(*i*) Sodium acetate (*ii*) Ammonium acetate

(*iii*) Ferric nitrate (*iv*) Sodium carbonate

(*v*) Potassium sulphate.

36. Boiling point of benzene is 353.23 K. When 1.80 g of a non volatile solute was dissolved in 90 g of benzene, the boiling point is raised to 354.11 K°. Calculate the molar mass of solute. Kb for benzene is = 2.53 kg mol^{-1}.

37. 200 cm^3 of a gas at 800 mn pressure is allowed to expand till the pressure is 0.9 atm keeping the temperature constant. Calculate the volume of gas.

38. A gas occupies 100.0 mL at 50°C and 1 atm pressure. The gas is cooled to reduce volume to 50.0 mL at constant pressure. What will be the final temperature?

39. Write the conjugate bases for the following Bronsted acids:

HCl, HNO_3, HSO^-_4, H_2SO_4 and H_2S.

40. Calculate the osmotic pressure of a solution containing 3.42 of sucrose per litre at 400 K. Molar mass of sucrose is 342 g mol^{-1}. R = 0.083 bar L mol^{-1} K^{-1}.