Chemistry (Objective)

RWP-2-24

(Group-II)   Time: 20 Minutes   Marks : 17

Note: Write Answers to the Questions on the objective answer sheet provided. Four possible answers A, B, C and D to each question are given. Which answer you consider correct, fill the corresponding circle A, B, C or D given in front of each question with Marker or Pen ink on the answer sheet provided.

1.1 Mixture of NH_4OH and NH_4Cl is one of the best example of:

(A) Acidic buffer (B) Basic buffer (C) Common Ion effect (D) Solubility product

2. Molarity of pure water is:

(A) 1 (B) 18 (C) 55.5 (D) 6

3. Stronger the oxidizing agent, greater is the:

(A) Oxidation potential (B) Reduction potential (C) Redox potential (D) E.M.F. of cell

4. The process in which catalyst and reactant are in different phases is called:

(A) Homogeneous catalysis (B) Heterogeneous catalysis (C) Autocatalysis (D) Negative catalysis

5. The efficiency of a reaction can be checked by calculating its:

(A) Theoretical yield (B) Actual yield (C) Percentage yield (D) Mass

6. The mass of one mole of electrons is:

(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg

7. A safe and reliable method for drying the crystals is by using:

(A) Vacuum desiccators (B) Oven (C) Filter paper (D) Spreading the crystals in open air

8. Chromatography in which stationary phase is liquid is classified as:

(A) Thin layer chromatography (B) Gas chromatography (C) Adsorption chromatography (D) Partition chromatography

9. The partial pressure of oxygen in lungs is:

(A) 159 torr (B) 116 torr (C) 1160 torr (D) 1590 torr

10. Smell of the cooking gas during leakage from a gas cylinder is due to the process of:

(A) Osmosis (B) Diffusion (C) Effusion (D) Evaporation

11. When water freezes at 0°C , its density decreases due to:

(A) Cubic structure of ice (B) Empty spaces present in the structure of ice

(C) Change of bond lengths (D) Change of bond angles

12. Ice and sugar are the best examples of:

(A) Ionic solids (B) Covalent solids (C) Molecular solids (D) Metallic solids

13. The name of proton was suggested by:

(A) Bohr (B) J.J Thomson (C) Rutherford (D) Stoney

14. When 6d orbital is complete, the entering electron goes into:

(A) 7f (B) 7s (C) 7p (D) 7d

15. The covalent radius of hydrogen is:

(A) 176.7 pm (B) 37.7 pm (C) 75.4 pm (D) 77.3 pm

16. Which of the following molecule has zero dipole moment?

(A) NH_3 (B) $CHCl_3$ (C) H_2O (D) BF_3

17. The product of mass and specific heat of water is called:

(A) Heat capacity (B) Enthalpy of reaction (C) Heat of a reaction (D) Buffer capacity

Roll No _____

HSSC-(P-I)-A-2024
(For All Sessions)

RWP-2-24

Marks : 68

Chemistry (Subjective)

(GROUP-II)

Time: 2:40 hours

SECTION-I

2. **Write short answers of any eight parts from the following:** (8x2=16)

i. Molecular formula is multiple of empirical formula. Give an example.

ii. Define gram formula. Give an example.

iii. Many chemical reactions taking place in our surrounding involve the limiting reactants. Give the reason.

iv. Give two methods for drying of the crystallized substance.

v. What is ether extraction? Give its importance.

vi. How does a Gouch crucible increase the rate of filtration?

vii. What is plasma? How is it formed?

viii. Calculate the value of R in SI units.

ix. Derive Boyle's law from kinetic molecular theory of gases.

x. How can we prepare basic buffers? Give an example.

xi. Define solubility product. Give an example.

xii. How does the equilibrium constant of a reaction tell us about the direction of a chemical reaction?

3. **Write short answers of any eight parts from the following:** (8x2=16)

i. Why ionic crystals do no conduct electricity in solid state but their aqueous solutions are good conductors?

ii. Why one feels sense of cooling under the fan after bath?

iii. Why ethane (C_2H_6) has lower boiling point than hexane (C_6H_{14})?

iv. Why lower alcohols are water soluble but hydrocarbons are water insoluble?

v. Calculate wave number for first spectral line of Lyman series.

vi. Define Hund's rule, give an example.

vii. Write electronic configuration of Cu_{29} and I_{53}.

viii. Differentiate between orbit and orbitals.

ix. Justify that sum of all mole fractions is equal to unity for any solution.

x. Freezing points of solvents are depressed due to presence of solutes in solutions.

xi. Justify that radioactive decay is always a first order reaction.

xii. A catalyst is specific in its function, prove it by chemical reactions.

4. **Write short answers of any six parts from the following:** (6x2=12)

i. Na metal can displace hydrogen from acids but 'Pt' and 'Pd' cannot. Explain by giving reason.

ii. Calculate the oxidation number of underlined elements: H$\underline{N}O_3$; $\underline{Cr}O_3$

iii. Define enthalpy of neutralization by giving one such example.

iv. A reaction may be endothermic and spontaneous. Explain by giving example.

v. Prove that $\Delta E = q_v$

vi. The distinction between coordinate covalent bond and a covalent bond vanishes after the bond formation in CH_3NH_3. Explain by giving reason.

vii. The abnormality of bond length and bond strength in HI is less prominent than that of HCl. Explain with reason.

viii. Calculate the bond energy of H-Br. The bond energy of H-H is 436 KJ mol^{-1} and that of Br-Br is 193 KJ mol^{-1}

ix. Give any two limitations of Lewis concept of chemical bonding.

SECTION-II

Note **Attempt any three questions. Each question carries equal marks:** (8x3=24)

5. (a) What are limiting reactants and how is limiting reactant identified. (4)

(b) Discuss manometric method for measurement of vapour pressure. (4)

6. (a) Calculate the mass of 1 dm^3 of NH_3 gas at 30°C and 1000 torr pressure, considering that NH_3 is behaving ideally. (4)

(b) Describe eight (08) characteristics of cathode rays. (4)

7. (a) Define sp^3 hybridization. Explain the shape of methane molecule. (1+3)

(b) Calculate the P$_H$ of buffer solution in which 0.11 molar CH_3COONa and 0.09 molar CH_3COOH solution are present. Ka for CH_3COOH is 1.85×10^{-5} (4)

8. (a) Explain how enthalpy of a reaction is determined by glass calorimeter. Also draw diagram. (3+1)

(b) Explain construction and working of standard hydrogen electrode. (4)

9. (a) Define the following terms: (i) Molarity (ii) Molality (iii) Mole Fraction (iv) Parts per million (ppm) (1x4)

(b) Define activation energy. How does the Arrhenius equation help us to calculate energy of activation of reaction. (4)