

Chemistry (Objective)

(Group-I)

RWP-1-24
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.

- The mass of one mole of electron is:

(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg
- In organic phase color of Iodine is:

(A) Brown (B) Purple (C) Colorless (D) Green
- Pressure remaining constant at which temp. The volume of a gas will become twice of it is at 0°C:

(A) 546°C (B) 200°C (C) 546 k (D) 273 k
- Ionic crystals are characterized by:

(A) Solubility in polar solvents (B) Low melting point (C) High vapour pressure (D) Conductivity in solid state
- Number of crystal systems are:

(A) 7 (B) 6 (C) 5 (D) 4
- When 6 d orbital is complete, the entering electron goes to:

(A) 7f (B) 7s (C) 7p (D) 7d
- Dipole moment of CS_2 is:

(A) 3.2D (B) 2.2D (C) 1.3D (D) Zero Debye
- The net heat change in a chemical reaction is same whether it is brought about in two or more different ways in one or more than one steps, it's known as:

(A) Henry's law (B) Joule's principle (C) Hess's law (D) Law of conservation of energy
- Which of the following solution have P_H less than 7?

(A) NaOH (B) NaCl (C) $Ca(OH)_2$ (D) HCl
- The boiling point constant is the ratio of the elevation in boiling point to:

(A) Molarity (B) Mole fraction of solvent (C) Molality (D) Mole fraction of solute
- Cathode reaction in the electrolysis of dil H_2SO_4 with Pt electrodes is:

(A) Oxidation (B) Reduction (C) Both oxidation & reduction (D) Neither oxidation nor reduction
- The unit of rate constant is the same as that of the rate of reaction in:

(A) First order reaction (B) Second order reaction (C) Third order reaction (D) Zero order reaction
- Number of isotopes of tin are:

(A) 8 (B) 10 (C) 6 (D) 11
- Which of the following is sublime?

(A) Iodine (B) Calcium (C) NaCl (D) Benzene
- S.I unit of pressure is:

(A) $N.m^{-1}$ (B) Torr (C) mm of Hg (D) Psi
- Positive rays are also called as:

(A) Cathode rays (B) Canal rays (C) X-rays (D) Magnetic rays
- Octet rule is not obeyed by the molecule:

(A) NF_3 (B) CF_4 (C) PF_5 (D) CO_2

Chemistry (Subjective)

(GROUP-I)

Time: 2:40 hours

SECTION-I

RWP-1-24

(8x2=16)

2. Write short answers of any eight parts from the following:
- Define gram ion. Give two examples.
 - One mole of H_2SO_4 should completely react with two moles of $NaOH$. How does Avogadro's number help to explain it?
 - Give any four methods for the separation of isotopes.
 - What is sintered glass crucible? Give its significance.
 - What is crystallization? Give its basic principle.
 - What is chromatogram? Give an example.
 - Derive Avogadro's law from kinetic molecular theory of gases.
 - Give two characteristics of plasma.
 - What is the effect of pressure and temperature on the density of an ideal gas?
 - Why is HCl added before passing H_2S gas for the detection of second group basic radicals during salt analysis?
 - What is the effect of rise in temperature on the solubility of KI in water?
 - What are buffer solutions? Give their two applications.

(8x2=16)

3. Write short answers of any eight parts from the following:

- Why HF is weaker acid than other hydrogen halids?
- Define dipole-dipole forces of attraction with example.
- Why lower alcohols are soluble in water?
- Define crystal lattice and unit cell.
- Why it is necessary to decrease pressure in discharge tube to get cathode rays?
- Define stark effect.
- What is origin of line spectrum?
- Why aqueous solution of NH_4Cl is acidic in nature?
- Discuss Pauli exclusion principle.
- Radioactive decay is always first order reaction. Justify.
- Define solubility with two examples.
- Rate of reaction decreases with passage of time. Explain.

(6x2=12)

4. Write short answers of any six parts from the following:

- Potassium can displace hydrogen from acids but copper cannot. Explain by giving reason.
- Calculate the oxidation number of underlined elements : HPO_3 , CrO_3
- Differentiate between system and surrounding by giving example.
- Define enthalpy of combustion by giving suitable example.
- What do you mean by internal energy? Briefly explain.
- The bond angle of H_2O is not 109.5° like that of CH_4 . Although 'O' and 'C' are both sp^3 hybridized. Explain with reason.
- π -bonds are more diffused than σ -bonds. Explain with reason.
- The heat of vapourization of electrovalent compounds are higher than covalent compounds. Explain with reason.
- Write down basic assumption of VSEPR-theory.

SECTION-II

(8x3=24)

Note Attempt any three questions. Each question carries equal marks:

- (a) Define following terms: (i) Atom (ii) Isotope (iii) Empirical formula (iv) Molecular formula. (4)
- (b) Give four (04) applications of liquid crystals. (4)
- (a) Calculate the density of CH_4 gas at $0^\circ C$ and 1 atm. What will happen to the density if temperature is increased to $27^\circ C$ (2+2)
- (b) Explain azimuthal quantum number in detail. (4)
- (a) Define ionization energy. How does it vary in the periodic table? What factors are responsible for their variations? (4)
- (b) The solubility product of Ag_2CrO_4 is 2.6×10^{-2} at $25^\circ C$. Calculate the solubility of the compound. (4)
- (a) Explain how enthalpy of a reaction can be measured by Bomb Calorimeter? Draw diagram also. (3+1)
- (b) How electrode potential of Zn can be measured? Draw diagram also. (3+1)
- (a) Define elevation of boiling point and describe Landsberger's method for measurement of boiling point elevation. (4)
- (b) Define catalysis. Explain its types with suitable examples. (1+3)

R



Roll No _____

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

Paper Code

6

4

8

4

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

Chemistry (Subjective)

(GROUP-II)

Time: 2:40 hours

SECTION-I

2. Write short answers of any eight parts from the following: (8x2=16)
- Molecular formula is multiple of empirical formula. Give an example.
 - Define gram formula. Give an example.
 - Many chemical reactions taking place in our surrounding involve the limiting reactants. Give the reason.
 - Give two methods for drying of the crystallized substance.
 - What is ether extraction? Give its importance.
 - How does a Gouch crucible increase the rate of filtration?
 - What is plasma? How is it formed?
 - Calculate the value of R in SI units.
 - Derive Boyle's law from kinetic molecular theory of gases.
 - How can we prepare basic buffers? Give an example.
 - Define solubility product. Give an example.
 - How does the equilibrium constant of a reaction tell us about the direction of a chemical reaction? (8x2=16)
3. Write short answers of any eight parts from the following:
- Why ionic crystals do not conduct electricity in solid state but their aqueous solutions are good conductors?
 - Why one feels sense of cooling under the fan after bath?
 - Why ethane (C_2H_6) has lower boiling point than hexane (C_6H_{14})?
 - Why lower alcohols are water soluble but hydrocarbons are water insoluble?
 - Calculate wave number for first spectral line of Lyman series.
 - Define Hund's rule, give an example.
 - Write electronic configuration of Cu_{29} and I_{53} .
 - Differentiate between orbit and orbitals.
 - Justify that sum of all mole fractions is equal to unity for any solution.
 - Freezing points of solvents are depressed due to presence of solutes in solutions.
 - Justify that radioactive decay is always a first order reaction.
 - A catalyst is specific in its function, prove it by chemical reactions. (6x2=12)
4. Write short answers of any six parts from the following:
- Na metal can displace hydrogen from acids but 'Pt' and 'Pd' cannot. Explain by giving reason.
 - Calculate the oxidation number of underlined elements: HNO_3 , CrO_3
 - Define enthalpy of neutralization by giving one such example.
 - A reaction may be endothermic and spontaneous. Explain by giving example.
 - Prove that $\Delta E = q_v$
 - The distinction between coordinate covalent bond and a covalent bond vanishes after the bond formation in $CH_3N H_3$. Explain by giving reason.
 - The abnormality of bond length and bond strength in HI is less prominent than that of HCl. Explain with reason.
 - 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}
 - Give any two limitations of Lewis concept of chemical bonding.

SECTION-II

- Note Attempt any three questions. Each question carries equal marks: (8x3=24)
- (a) What are limiting reactants and how is limiting reactant identified. (4)
(b) Discuss manometric method for measurement of vapour pressure. (4)
 - (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)
 - (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. K_a for CH_3COOH is 1.85×10^{-5} (4)
 - (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)
 - (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)