MODEL PAPER OF CHEMISTRY FOR CLASS-11

Objective Type

Time Allowed: 20 Mins. **Max. Marks: 17**

Q-1: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle with marker or pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

(i) Which is the oxidation state of sulfur in the sulfate ion (SO_4^{2-})?

(A) +4 (B) +2

(C) +6 (D) 0

(ii) Which of the following elements have the highest ionization energy?

(A) Sodium (Na) (B) Megnesium (Mg)

(C) Aluminum (Al) (D) Argon (Ar)

(iii) How many **'d'** orbitals are there in a given energy level?

(A) 1 (B) 3

(C) 5 (D) 7

(iv) The enthalpy of neutralization of NaOH and HCl is?

(A) - 57.1kj mol^{-1} (B) + 436 kj mol^{-1}

(C) -27.8 kj mol^{-1} (D) 01kj mol^{-1}

(v) The number of **σ** and **π** bonds in the N_2 molecule are:

(A) One σ and one π bond (B) One σ and two π bonds

(C) Three σ bonds only (D) Two σ and one π bonds

(vi) Which one of the following has the greatest mass?

(A) 0.5 mol of N_2 (B) 0.5 mol of NH_3

(C) 0.5 mol of He (D) 0.5 mol of CO_2

(vii) When water freezes at 0 °C, its density decreases due to:

(A) Cubic structure of ice (B) Decrease in volume

(C) Decrease in density (D) Empty spaces in structure of ice

(viii) The enthalpy change for a reaction depends on:

(A) Pathway taken from reactants to products

(B) Presence of catalyst

(C) Initial and final states of reactants and products

(D) Rate of reaction

(ix) The order of chemical reaction that is independent of concentration is:

(A) Second order reaction (B) First order reaction

(C) Zero order reaction (D) Pseudo first order reaction

(x) For a specific reaction, the value of the equilibrium constant $\mathbf{K_c}$:

(A) Always remain the same at different reaction conditions.

(B) Increases if the concentration of one of the products is increased

(C) Changes with changes in the temperature

(D) Increases if the concentration of one of the reactants is increased

(xi) Which of the following pairs forms a buffer solution?

(A) HCl and NaCl (B) CH_3COONa and CH_3COOH

(C) HCl and NaOH (D) NH_3 and Na_2SO_4

(xii) If the salt bridge is not used between two half cells in a Galvanic cell, then the voltage:

(A) Decreases slowly (B) Decreases rapidly

(C) Does not change (D) Drop to zero

(xiii) Which of the following statements about a photovoltaic cell is correct?

A) It converts chemical energy directly into electrical energy.

B) It converts light energy directly into electrical energy.

C) It converts electrical energy into light energy.

D) It stores energy like a battery.

(xiv) The most stable carbonium ion among the following is:

(A) CH_3^+ (B) $CH_3CH_2^+$

(C) $(CH_3)_2CH^+$ (D) $(CH_3)_3C^+$

(xv) Peroxyacetyl nitrate (PAN) formation starts when _____ reacts with the hydrocarbons.

(A) NO (B) NO_2

(C) O_3 (D) H_2O

(xvi) Which of the halogen molecules has the strongest bond?

(A) F_2 (B) Br_2

(C) Cl_2 (D) I_2

(xvii) Which gas causes yellow colour in photochemical smog?

(A) CO (B) SO_3

(C) NO_2 (D) SO_2

Subjective Type (Part-I)

Time Allowed: 2.40 Hrs. **Max. Marks: 68**

Q. 2: Write short answers to any eight (08) questions: **(2 × 8 = 16)**

i. What is 1st ionization energy? Give an example.

ii. What are the factors that affect the electronegativity?

iii. Why oxides of sodium and magnesium are more ionic than the oxides of nitrogen and phosphorus?

iv. There are three orientations of p-orbital due to three values of magnetic quantum number. Justify it.

v. What is the purpose of Azimuthal Quantum Number and how is it represented?

vi. What do you understand by the rate of reaction?

vii. Differentiate between order and molecularity of a reaction?

viii. What is meant by the state of chemical equilibrium?

ix. Write two characteristics of equilibrium constant.

x. Why HF is weaker acid than HCl?

xi. Which halogen is the least reactive, which is the most reactive? Give reason.?

xii. How does the reactivity of halogens with hydrogen vary?

Q. 3: Write short answers to any eight (08) questions: **(2 × 8 = 16)**

i. Explain the difference between the formation of σ and π bonds in terms of Valence Bond Theory (VBT).

ii. Define bond order with one example.

iii. Define sp^2 hybridization with suitable example.

iv. Explain, at the molecular level, why evaporation leads to a cooling effect.

v. Why does the boiling point of a liquid increase when the external pressure rises?

vi. What factors influence the magnitude of the lattice enthalpy?

vii. Why does wood burn more rapidly in pure oxygen than in air?

viii. Why does common ion effect decrease solubility of a less soluble salt?

ix. How does a buffer maintain pH stability?

x. Differentiate between aliphatic and aromatic hydrocarbons.

xi. Explain why alkanes do not undergo addition reactions.

xii. Define enthalpy change of Atomization with a suitable example.

Q. 4: Write short answers to any six (06) questions: (2 × 6 = 12)

i. List two reasons for inertness of N_2.

ii. What is the construction and function of a catalytic converter?

iii. Identify and briefly explain two major natural sources of air pollutants.

iv. How do Chlorofluorocarbons (CFCs) cause depletion of Ozone?

v. How is the concept of mole derived from Avogadro's number?

vi. What is stoichiometry? Give the basic assumptions of stoichiometric calculations.

vii. How and why electrical double layer is formed?

viii. During electrolysis of NaCl, why is Na not liberated at cathode?

ix. What are the advantages of salt bridge in a galvanic cell?

Subjective Type (Part II)

Note: Attempt any three questions.

Q.5:

(a) What are quantum numbers? Describe briefly principal and spin quantum numbers. (4)

(b) Discuss structural changes when water turns into ice. Justify the empty spaces in its crystals as compared to H_2O at 40 °C and lower density of ice. (4)

Q.6:

(a) Explain the orbital hybridization in NH_3 and BF_3. (4)

(b) Define catalysis and explain two types with one example each. (4)

Q.7:

(a) Define and explain the law of mass action and derive the expression for the equilibrium constant. (4)

(b) In a solution, the pH is 9.2, determine the product of water K_w at 25 °C. (4)

Q.8:

(a) Describe the following methods for the preparation of alkenes: (2, 2)

i. Dehydrohalogenation of alkyl halides

ii. Dehydration of alcohol

(b) How does the burning of fossil fuel cause acid rain? Discuss in detail the chemical reaction. (4)

Q.9:

(a) How do the oxides of nitrogen (NO_x) cause the formation of chemical smog and PAN? Give its mechanism. (4)

(b) Describe the volatility of halogens and also explain its trends in detail. (4)