Roll No. of Candidate : _____ GUJ-61-21

CHEMISTRY (INTERMEDIATE PART-I) 321 - (III) **Paper - I** **Group - I**

Time: 20 Minutes **OBJECTIVE** ----- **Code : 6485** Marks: 17

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1. 1 - 18 g glucose is dissolved in 90 g of water. The relative lowering of vapour pressure is equal to

    (A) $\frac{1}{51}$ (B) $\frac{1}{5}$ (C) 5.1   (D) 6

    2 - The unit of the 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

    3 - The crystal system of sulphur is
    (A) cubic   (B) hexagonal   (C) triclinic   (D) monoclinic

    4 - An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are the main ions in the filtrate?

    (A) Ag^+ and NO_3^- only   (B) Ba^{2+} and NO_3^- only

    (C) Ag^+ and Ba^{2+} and NO_3^- (D) Ba^{2+} and NO_3^- and Cl^-

    5 - Which of the hydrogen halide has the highest percentage of ionic character ?
    (A) HCl   (B) HBr   (C) HI   (D) HF

    6 - The value of quantum number is n = 1 , 2 , 3 , 4 , 5 .... for
    (A) principal quantum number   (B) azimuthal quantum number
    (C) magnetic quantum number   (D) spin quantum number

    7 - Equal masses of methane and oxygen are mixed in an empty container at $25^{\circ}C$. The fraction of total pressure exerted by oxygen is

    (A) $\frac{1}{3}$ (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$

    8 - Number of isotopes of oxygen is
    (A) two   (B) three   (C) four   (D) five

    9 - The type of hybridization in NH_3 is
    (A) SP   (B) SP^2 (C) SP^3 (D) dSP^2

    10 - Stronger the oxidizing agent, greater is the
    (A) oxidation potential (B) reduction potential (C) redox potential   (D) E.M.F. of cell

    11 - Law of mass action states that the rate at which the reaction proceeds is directly proportional to the product of the active masses of
    (A) reactants   (B) products   (C) concentration   (D) equilibrium

    12 - A limiting reactant is the one which
    (A) is taken in lesser quantity in grams as compared to other reactants
    (B) is taken in lesser quantity in volume as compared to the other reactants
    (C) gives the maximum amount of the product which is required
    (D) gives the minimum amount of the product under consideration

    13 - The comparative rates at which the solutes move in paper chromatography depend on
    (A) the size of paper   (B) R_f values of solutes
    (C) temperature of the experiment   (D) size of the chromatographic tank used

    14 - One calorie is equivalent to
    (A) 0.4184 J   (B) 4.184 J   (C) 41.84 J   (D) 418.4 J

    15 - Oxygen molecule is heavier than hydrogen by
    (A) 1 time   (B) 8 times   (C) 16 times   (D) 32 times

    16 - Acetone and chloroform are soluble in each other due to
    (A) intermolecular hydrogen bonding   (B) ion-dipole interaction
    (C) instantaneous dipole   (D) all of these

    17 - The nature of the positive rays depends on
    (A) the nature of electrode   (B) the nature of the discharge tube
    (C) the nature of the residual gas   (D) all of these

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

(SECTION – I)

2. Write short answers to any EIGHT questions.   (2 x 8 = 16)

   i - Differentiate between theoretical yield and experimental yield.

   ii - Define mole with two examples.

   iii - Law of conservation of mass has to be obeyed during stoichiometric calculations. Justify it.

   iv - Iodine dissolves readily in CCl_4. Why?

   v - What is chromatography and R_f value?

   vi - Calculate S.I. unit of R.

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

   viii - Write down any two characteristics of plasma.

   ix - State Charles's law. Write down its mathematical form.

   x - Relative lowering of vapour pressure is independent of temperature. Justify this statement.

   xi - Define hydration energy of ions.

   xii - What are continuous solubility curves? Give one example.

3. Write short answers to any EIGHT questions.   (2 x 8 = 16)

   i - What is role of hydrogen bonding in paints, dyes, and textile materials?

   ii - What do you mean by liquid crystal? Write down any two uses of it.

   iii - Define the property of solids allotropy and give two examples.

   iv - The crystals showing isomorphism mostly have the same atomic ratios; explain.

   v - How neutron was discovered by Chadwick? Also write down reaction.

   vi - Write down postulates of Bohr's atomic model.

   vii - How azimuthal quantum number (l) gives information about types of subshells?

   viii - Explain the concept of atomic spectrum.

   ix - Write down optimum conditions of temperature and pressure in the manufacture of ammonia by Haber's process.

   x - Define pH and pOH of solutions.

   xi - What do you understand by rate determining step? Give a suitable example.

   xii - How does Arrhenius equation help us to calculate the energy of activation of a reaction?

4. Write short answers to any SIX questions.   (2 x 6 = 12)

   i - Define ionization potential of element. How ionization potential vary across the period?

   ii - Anionic radius is greater than that of its parent atomic radius. Why?

   iii - Draw the structure of NH_3 with reference to VSEPR Theory.

   iv - How do electronegativity values charge in a group?

   v - Define enthalpy of solution with an example.

   vi - State first law of thermodynamics. Give its mathematical expression.

   vii - Calculate the oxidation numbers of elements underlined:

      (a) $Na_2\underline{C}O_3$ (b) $K_2\underline{Mn}O_4$

   viii - Give function of salt bridge.

   ix - Why SHE acts as cathode when connected with Zn electrode but SHE acts as anode when connected with Cu? Justify.

                                             (Turn Over)

(SECTION – II) GUJ-4r-21

5. (a) When limestone ($CaCO_3$) is roasted then quicklime (CaO) is formed according to the (4)
following equation. The actual yield of (CaO) is 2.5 kg, when 4.5 kg of limestone is
heated. What is the percentage yield of this reaction?

$$CaCO_{3\,(S)} \xrightarrow{\Delta} CaO_{(S)} + CO_{2(g)}$$

   (b) Discuss the role of Hydrogen Bonding in Biological Compounds. (4)

6. (a) Write fundamental postulates of kinetic molecular theory of gases. (4)

   (b) Discuss four postulates of Bohr's model of atom. (4)

7. (a) What is Sp^3 hybridization? Explain the structure of methane. (4)

   (b) Explain measurement of enthalpy by a glass calorimeter. (4)

8. (a) Calculate the pH of 1.0 mole dm^{-3} of NH_4OH, which is 1% dissociated. (4)

   (b) Explain half life method for determination of order of reaction. (4)

9. (a) Freezing points of solutions are depressed when non-volatile solutes are present (4)
in volatile solvents. Justify it. Plot a graph to elaborate your answer.

   (b) Discuss measurement of electrode potential by standard hydrogen electrode (S.H.E) (4)

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