

Roll No. of Candidate : _____

CHEMISTRY

(Intermediate Part-I, Class 11th) 322 - (III)

Paper I

(Group - I)

Time: 20 Minutes

OBJECTIVE - - - - - Code : 6485

907-9122

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 - An aqueous solution of ethanol in water may have vapour pressure _____.
(A) equal to that of water (B) equal to that of ethanol
(C) more than that of water (D) less than that of water
- 2 - The unit of the rate constant is the same as that of the rate of reaction in _____ order.
(A) first (B) second (C) zero (D) third
- 3 - Amorphous solids _____.
(A) have sharp melting points
(B) undergo clean cleavage when cut with knife
(C) have perfect arrangement of atoms
(D) can possess small regions of orderly arrangement of atoms
- 4 - In endothermic reactions, the heat content of the _____.
(A) products is more than that of reactants (B) reactants is more than that of products
(C) surroundings increases (D) reactants and products is equal
- 5 - When 6d orbital is completed, the entering electron goes into _____.
(A) 7f (B) 7s (C) 7p (D) 7d
- 6 - Orbitals having same energy are called _____.
(A) hybrid orbitals (B) valence orbitals (C) degenerate orbitals (D) d-orbitals
- 7 - Solvent extraction is controlled by _____.
(A) distribution law (B) Newton's law (C) law of mass action (D) Graham's law
- 8 - The mass of one mole of electrons is _____.
(A) 1.008 mg (B) 0.55 mg (C) 0.184 mg (D) 1.673 mg
- 9 - VSEPR theory was developed by _____.
(A) Sidgwick and Powell (B) Sidgwick and Nyholm
(C) Powell and Gillespie (D) Nyholm and Gillespie
- 10 - If the salt bridge is not used between two half cells, then the voltage _____.
(A) decreases rapidly (B) decreases slowly (C) does not change (D) drops to zero
- 11 - An excess of aqueous silver nitrate is added to aqueous barium chloride and precipitate is removed by filtration. What are main ions in the filtrate?
(A) Ag^+ and NO_3^- only (B) Ag^+ and Ba^{+2} and NO_3^-
(C) Ba^{+2} and NO_3^- only (D) Ba^{+2} and NO_3^- and Cl^-
- 12 - A limiting reactant is the one which _____.
(A) is taken in lesser quantity in gm 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 - _____ is not used as drying agent in a desiccator.
(A) water (B) CaCl_2 (C) silica gel (D) phosphorus pentoxide
- 14 - BF_3 shows _____ hybridization.
(A) sp^2 (B) sp^3 (C) sp (D) sp^3d
- 15 - Equal masses of methane and oxygen are mixed in an empty container at 25°C .
The fraction of total pressure exerted by oxygen is _____.
(A) $\frac{1}{3}$ (B) $\frac{8}{9}$ (C) $\frac{1}{9}$ (D) $\frac{16}{17}$
- 16 - The deviation of a gas from ideal behaviour is maximum at _____.
(A) -10°C and 5.0 atm (B) -10°C and 2.0 atm (C) 100°C and 2.0 atm (D) 0°C and 2.0 atm
- 17 - _____ is a pseudo solid.
(A) CaF_2 (B) glass (C) NaCl (D) sugar

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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 - What is molecular ion? Write down formulas of any two of these ions.
- ii - Differentiate between empirical and molecular formula.
- iii - Mg (Magnesium) atom is twice heavier than C (Carbon) atom. Justify.
- iv - How crystals are dried in vacuum desiccator?
- v - What is R_f value? Why does it has no units?
- vi - What is partition chromatography?
- vii - Convert -40°C into Fahrenheit scale.
- viii - Define absolute zero temperature.
- ix - "Water vapours do not behave ideally at 273 K". Explain it.
- x - What is Le-chatelier's principle?
- xi - Define solubility product.
- xii - Prove that $K_a = \frac{[\text{H}_3\text{O}^+][\text{A}^-]}{[\text{HA}]}$.

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i - Boiling needs a constant supply of heat. Give reason.
- ii - The vapour pressures of solids are far less than those of liquids. Why?
- iii - Define symmetry. Give its elements.
- iv - What are ionic solids? Give two examples.
- v - Whichever gas is used in the discharge tube, the nature of cathode rays remains the same. Why?
- vi - What is the origin of line spectrum?
- vii - State Pauli's exclusion principle.
- viii - Write down names of two spectral series alongwith their regions.
- ix - The concentration in terms of molality is independent of temperature but molarity depends upon temperature. Why?
- x - Define hydrolysis. Give an example.
- xi - What is activated complex?
- xii - What is half-life period? Give an example.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i - Write Lewis structures of i) CCl_4 ii) HCN
- ii - Why Noble gases don't form chemical bonds?
- iii - O_2 shows paramagnetic behavior; why?
- iv - Why CH_4 does not form co-ordinate covalent bond but H_2O can form?
- v - Is it true that non spontaneous process never happens in the universe?
- vi - What does the symbol ΔH_n° denote? Define this quantity.
- vii - Burning of candle is spontaneous process; brief it.
- viii - What is difference between primary and secondary cell?
- ix - SHE acts as cathode when connected with zinc; why?

(Turn Over)

(SECTION – II)

CH-91-22

Note: Attempt any THREE (3) questions from Section II..

5. (a) Define yield. How theoretical and practical yield can be calculated? (1+3)
(b) Define quantum numbers. Explain azimuthal quantum number in detail. (1+3)
6. (a) Calculate the density of CH_4 (g) at 0°C and 1 atm pressure. What happens to the density if the pressure is increased to 2 atm at 0°C ? (4)
(b) Explain the construction of lead accumulator. Give its discharging process. (4)
7. (a) Draw the molecular orbital diagram for O_2 and explain its paramagnetic behaviour. (2+2)
(b) How the enthalpy of a reaction can be measured by using glass calorimeter? (3+1)
8. (a) What are London forces? Write down factors affecting them. (1+3)
(b) Calculate the pH of a buffer solution in which 0.11 molar CH_3COONa and 0.09 molar acetic acid solution are present. K_a for CH_3COOH is 1.85×10^{-5} . (1+1+1+1)
9. (a) Differentiate between (2+2)
i) Ideal and non-ideal solutions.
ii) Hydration and hydrolysis
(b) Define catalysis. Explain its types with suitable examples. (1+3)

Roll No. of Candidate : _____

CHEMISTRY (Intermediate Part-I, Class 11th) 322 - (IV) Paper I (Group - II)

Time: 20 Minutes **OBJECTIVE** ----- Code: 6488 *445-6202* 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. The pH of 10^{-3} mol.dm⁻³ of an aqueous solution of H₂SO₄ is _____.
(A) 1.5 (B) 2.0 (C) 3.0 (D) 2.7
2. _____ substance is used as decolourizing agent in crystallization process.
(A) silica gel (B) animal charcoal (C) CaCl₂ (D) H₂SO₄
3. Bohr model of atom is contradicted by _____.
(A) planks quantum theory (B) dual nature of matter
(C) Heisenberg's uncertainty principle (D) all of these
4. When water freezes at 0°C its density decreases due to _____.
(A) cubic structure of ice (B) changes bond length
(C) empty spaces present in structure of ice (D) changes bond angles
5. The largest number of molecules are present in _____.
(A) 3.6 g of H₂O (B) 4.8 g of C₂H₅OH (C) 2.8 g of CO (D) 5.4 g of N₂O₅
6. An aqueous solution of ethanol in water may have vapour pressure _____.
(A) equal to that of water (B) more than that of water
(C) equal to that of ethanol (D) less than that of water
7. _____ is a pseudo solid.
(A) glass (B) CaF₂ (C) NaCl (D) HCl
8. Orbitals having same energy are called _____.
(A) degenerate orbitals (B) S and P orbitals (C) molecular orbitals (D) valence orbitals
9. In Sp³ hybrid orbital "S" character is _____.
(A) 25% (B) 50% (C) 75% (D) 100%
10. Number of molecules in one dm³ of water is close to _____.
(A) $\frac{6.02}{22.4} \times 10^{23}$ (B) $\frac{12.04}{22.4} \times 10^{23}$ (C) $\frac{18}{22.4} \times 10^{23}$ (D) $55.6 \times 6.02 \times 10^{23}$
11. Solvent extraction is an equilibrium process and is controlled by _____.
(A) law of mass action (B) amount of solvent used (C) distribution law (D) amount of solute
12. If the rate equation of a reaction $2A+B \longrightarrow$ products is, rate = K [A]⁻² [B] and A is present in large excess then order of reaction is _____.
(A) 1 (B) 2 (C) 3 (D) 4
13. The number of bonds in nitrogen molecule is _____.
(A) one σ and one π (B) one σ and two π (C) three sigma only (D) two σ and one π
14. How many subatomic particles are thought to exist in an atom.
(A) 3 (B) 20 (C) 50 (D) 100
15. Stronger the oxidizing agent greater is the _____.
(A) redox potential (B) E.M.F. of cell (C) oxidation potential (D) reduction potential
16. The molar volume of CO₂ is maximum at _____.
(A) STP (B) 127°C and 1 atm (C) 0°C and 2 atm (D) 273°C and 2 atm
17. For the reaction $\text{NaOH} + \text{HCl} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ the enthalpy change is called _____.
(A) heat of reaction (B) heat of formation (C) heat of neutralization (D) heat of combustion

Time: 2:40 Hours

SUBJECTIVE

Marks: 68

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 - What is mass spectrum?
- ii - One mole of H_2SO_4 should completely react with two moles of NaOH. How does Avogadro's number help to explain it?
- iii - Define limiting reactant. Give an example.
- iv - Write down the names of any four major steps involved in crystallization.
- v - What is ether extraction?
- vi - What is paper chromatography? Name its two types.
- vii - What is mean square velocity?
- viii - Where is plasma found?
- ix - Derive Charle's law from kinetic molecular theory of gases.
- x - What is common ion effect? Give an example.
- xi - Write down the Henderson's equation to determine the pH of a buffer solution.
- xii - Define solubility product. Give an example.

3. Write short answers to any EIGHT questions.

(2 x 8 = 16)

- i - Ionic crystals are highly brittle. Justify it.
- ii - Cleavage of the crystals is itself anisotropic behaviour. Justify it.
- iii - Diamond is hard and an electrical insulator. Justify it.
- iv - Boiling needs a constant supply of heat. Justify it.
- v - How the ${}_{29}^{65}\text{Cu}$ can be converted into ${}_{30}^{66}\text{Zn}$.
- vi - What is Zeeman effect?
- vii - Define Moseley's law and give its relationship/equation.
- viii - Define Pauli's exclusion principle.
- ix - Define parts per million (PPM) and give its expression.
- x - Define critical solution temperature and give an example.
- xi - What is catalytic poisoning? Give an example.
- xii - Define catalysis and give two examples of catalysed reactions.

4. Write short answers to any SIX questions.

(2 x 6 = 12)

- i - Why the molecules of BF_3 are triangular planar?
- ii - Define covalent radius. Give one example.
- iii - Define shielding effect. How it varies across the period?
- iv - Define coordinate covalent bond. Give one example.
- v - Differentiate between endothermic and exothermic reaction.
- vi - What is lattice energy? Give one example.
- vii - Enthalpy of neutralization of a strong acid and a base is always $-57.5 \text{ Kcal mole}^{-1}$. Why?
- viii - Calculate the oxidation number of chromium in the following compounds:
a) CrO_3 b) Cr_2O_3
- ix - Define oxidation state. Give example.

(Turn Over)

(SECTION – II)

Note: Attempt any THREE (3) questions from Section II..

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5. (a) Explain the concept of limiting reactant with a suitable example. 1+1+2 (4)
Also write down steps to identify a limiting reactant.
- (b) Define quantum numbers and explain in detail azimuthal quantum number. 1+3 (4)
6. (a) 250 cm^3 of the sample of hydrogen effuses four times as rapidly as 250 cm^3 of an unknown gas. Calculate the molar mass of unknown gas. (4)
- (b) Discuss any two industrial importance of electrolytic process. (4)
7. (a) Explain the geometry of NH_3 using hybridization. 3+1 (4)
- (b) State and explain Hess's law of constant heat summation with an example. 1+3 (4)
8. (a) Brief about structure of ice. (4)
- (b) Calculate the pH of buffer solution in which $0.11 \text{ M CH}_3\text{COONa}$ and $0.09 \text{ M CH}_3\text{COOH}$ solutions are present while k_a for CH_3COOH is 1.85×10^{-5} . (4)
9. (a) What is solubility curve? Discuss its types with examples. (4)
- (b) What in catalysis? Give any three characteristics of catalyst with examples. (4)

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