

8
18/1/24

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JAN-24

Scoring Indicators
Question Paper Set 1
APPLIED CHEMISTRY

Q No	Scoring Indicators	Split score	Sub Total	Total score
PART A				9
I. 1	Azimuthal quantum number		1	
I. 2	Co-ordinate bond		1	
I. 3	pH + pOH = 14		1	
I. 4	Bicarbonates, chlorides and sulphates of Ca and Mg		1	
I. 5	Solute		1	
I. 6	Graphene		1	
I. 7	Isoprene		1	
I. 8	Oxidation		1	
I. 9	The substances which do not conduct electricity either in the molten state or in the dissolved state		1	
PART B				24
II. 1	Statement of HUP Mathematical statement	2 1	3	
II. 2	Definition of covalent bond Explanation with one example	1 ½ 1 ½	3	
II. 3	$\text{Molarity} = \frac{wx1000}{\text{Mol. wt.} \times V}$ Calculation of Molecular weight of Na ₂ CO ₃ = 106 $\text{Molarity} = \frac{10.6 \times 1000}{53 \times 500} = 0.4\text{M}$	1 ½ 1 ½	3	
II. 4	Presence of Ca and Mg salt in hard water Formation of scum Lather will be formed only after the precipitation of dissolved salts	1 1 1	3	
II. 5	$pOH = -\log_{10}[OH^-]$ $= -\log_{10}[0.01] = 2$ $pH + pOH = 14$ $pH = 14 - pOH = 14 - 2 = 12$	1 1 1	3	

II. 6	Homopolymer- formed from only one type of monomer Example- Polythene (Any one example) Co-polymer- formed from two or more types of monomers Example- Bakelite (Any one example)	1 ½ 1 ½	3	
II. 7	Safety glass-explanation Use	2 1	3	
II. 8	Definition of CNT Single walled carbon nanotubes and multiwalled carbon nanotubes	2 1	3	
II.9	Definition of fuel cell H ₂ -O ₂ fuel cell (Any one example)	2 1	3	
II.10	Statement of Faraday's first law of electrolysis m=ZQ	2 1	3	
PART C				42
III.1	Any four postulates of Bohr's atom model Any three demerits	4 x 1=4 3 x 1=3	7	7
III.2	a) de Broglie relation $\lambda = \frac{h}{mv}$ Explanation of terms $\lambda = \frac{6.625 \times 10^{-34} \text{ Kg m}^2 \text{ s}^{-1}}{9.1 \times 10^{-31} \text{ kg} \times 10^4 \text{ m s}^{-1}}$ $= 7.28 \times 10^{-8} \text{ m}$ b) Statement of Aufbau principle	1 1 2 1 2	5 2	7
III.3	a) Definition of buffer solution Acidic buffer-Definition Any one example Basic buffer-Definition Any one example b) (i) Methyl orange (ii) Phenolphthalein	2 1 ½ 1 ½ 1 1	5 2	7
III.4	a) Cation exchange resins contains acidic functional groups and can exchange H ⁺ ions with cations like Ca ²⁺ and Mg ²⁺ ions Equation Anion exchange resins contains basic functional groups like -OH and can exchange OH ⁻ with anions like Cl ⁻ . Equation	1 ½ 1 1 ½ 1	5	7

III.11	<p>a) Anode: Nickel plate Cathode: Steel object Electrolyte: Nickel sulphate solution When electricity is passed, oxidation occurs at the nickel plate(anode) and the Ni^{2+} ions go to the electrolytic solution. $\text{Ni}_{(s)} \rightarrow \text{Ni}^{2+}_{(aq)} + 2e$ These ions are discharged at the cathode and forms a film of nickel at the surface of the steel object $\text{Ni}^{2+}_{(aq)} + 2e \rightarrow \text{Ni}_{(s)}$</p> <p>b) Definition of electrolyte Definition of non-electrolyte</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 2 1 $\frac{1}{2}$ 1 1	5 2	7
III.12	<p>a) According Faraday's first law, $m = zIt$ $I = 6 \text{ A}$ $t = 10 \text{ minutes} = 10 \times 60 = 600 \text{ seconds}$ Electrochemical equivalent, $z = \frac{E}{F} = \frac{106}{96500} =$ $= 0.0001098 \text{ g/C}$ Mass of chlorine liberated; $m = 0.0001098 \times 6 \times 600$ $= 3.95 \text{ g}$</p> <p>b) Definition of secondary cell One example</p>	1 $\frac{1}{2}$ 1 $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$	5 2	7