



Scoring Indicators

Question Paper Set 1

APPLIED CHEMISTRY

Q	Scoring Indicators	Split	Sub	Total
No		score	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		1	
	molten state or in the dissolved state			
	PART B			24
II. 1	Statement of HUP	2	3	
	Mathematical statement	1_		
II. 2	Definition of covalent bond	1 1/2	3	
	Explanation with one example	1 1/2		
II. 3	$Molarity = \frac{wx1000}{Mol.wt.xV}$ Calculation of Molecular weight of Na ₂ CO ₃ = 106 $Molarity = \frac{10.6x1000}{53 \times 500}$ =0.4M	1 1/2 1 1/2	3	
II. 4	Presence of Ca and Mg salt in hard water	1	3	
	Formation of scum	1		
	Lather will be formed only after the precipitation of dissolved			
	salts			
II. 5	$pOH = -\log_{10}[OH^{-}]$ = $-\log_{10}[0.01] = 2$ pH + pOH = 14	1	3	
	pH = 14 - pOH = 14 - 2 = 12	1		

II. 6	Homopolymer- formed from only one type of monomer	1	3	
	Example- Polythene (Any one example)	1/2		
	Co-polymer- formed from two or more types of monomers	1		
	Example- Bakelite (Any one example)	1/2		
II. 7	Safety glass-explanation	2	3	
	Use	1		
II. 8	Definition of CNT	2	3	
	Single walled carbon nanotubes and multiwalled carbon	1		
	nanotubes			
II.9	Definition of fuel cell		3	
	H ₂ -O ₂ fuel cell (Any one example)			
II.10	Statement of Faraday's first law of electrolysis	2	3	
	m=ZQ	1		
	PART C			42
III.1	Any four postulates of Bohr's atom model	4 x 1=4	7	7
	Any three demerits	3 x 1=3		
III.2	a) de Broglie relation $\lambda = \frac{h}{mv}$	1	5	7
	Explanation of terms	1		
	$\lambda = \frac{6.625 \times 10^{-34} \text{ Kgm}^2 \text{s}^{-1}}{9.1 \times 10^{-31} \text{kg} \times 10^4 \text{m} \text{ s}^{-1}}$	2		
	$= 7.28 x 10^{-8} m$	1		
	b) Statement of Aufbau principle	2	2	
III.3	a) Definition of buffer solution	2	5	7
	Acidic buffer-Definition	1		
	Any one example	1/2		
	Basic buffer-Definition	1		
	Any one example	1/2		
	b) (i) Methyl orange	1 1	2	
TIT 4	(ii) Phenolphthalein	1 1/2	5	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	3.50	3	/
	Equation	1.1/		
	Anion exchange resins contains basic functional groups like -OH and can exchange OH—with anions like Cl ⁻ .	1 1/2		

		A Company of the Comp			
	b)	Boiler scale is the hard insulating deposit formed on the	2	2	
		inner surface of the boiler when hard water is used.			
III.5	a)	Any 5 applications of pH	5 x1=5	5	7
	b)	$N_1 V_1 = N_2 V_2$	1		
		$N_2 = \frac{25 \times 0.1}{20} = 0.125 \text{N}$	1	2	
III.6	a)		5 x 1=5	5	7
		Raw water			
		Screening tank By screens			
		Sedimentation tank For 6-12 hours			
		Coagulation tank By alum			
		Filtration tank By gravity sand filter			
		Sterilization tank By chlorine gas			
		Potable water			
	b)	Soda lime process-explanation only	2	2	
III.7	a)	Definition of refractory material	2	5	7
		Any three characteristics	3		
	b)	Any two merits of Vulcanisation	2	2	
III.8	a)	0D – all dimensions are in nano scale	1 1/2	5	7
		Example – Fullerene (any one example) 1D- Two dimensions in nano scale and one in macro	1/ ₂ 1		
		scale	1/2		
		Example-CNT	1		
		2D- One dimension in nano scale and two in macro	1/2		
		scale Evennele Granhane			
	b)	Example-Graphene Brass- Cu, Zn	1		
	-	Bronze-Cu, Sn	1	2	
	a)		3x1=3	5	7,
III.9		One example for each	2x1=2		
TTT 10		Definition of electrochemical series	2	2	
III.10	a)	Definition of corrosion Cathodic protection	2	5	7
		Iron is connected to an active metal like Zn	1		
		Active metal acts as anode and Iron acts as cathode.	1		
		Active metal gets oxidized and cathodic metal is protected.	1		
	b)	Definition of electrolysis	2	2	

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III.11	a)	Anode: Nickel plate	1/2	5	7
		Cathode: Steel object	1/2		
		Electrolyte: Nickel sulphate solution	1/2		
		When electricity is passed, oxidation occurs at the nickel			
		plate(anode) and the Ni2+ ions go to the electrolytic			
		solution. Ni $(s) \rightarrow Ni^{2+}(aq) + 2e$	2		
		These ions are discharged at the cathode and forms a film			
		of nickel at the surface of the steel object	1 ½		
		$Ni^{2+}_{(aq)} + 2e \rightarrow Ni_{(s)}$			
	b)	Definition of electrolyte	1		
		Definition of non-electrolyte	1	2	
III.12	a)	According Faraday's first law, m = zIt	1	5	7
		I = 6 A	1/2		
		t= 10 minutes= 10 x60=600seconds	1 1/2		
		Electrochemical equivalent, $z = \frac{E}{F} = \frac{106}{96500} =$	1 /2		
		=0.0001098g/C	1 1/2		
		Mass of chlorine liberated; $m = 0.0001098 \times 6 \times 600$	1/2		
		=3.95g			
	b)	Definition of secondary cell	1 1/2		
		One example	1/2	2	
			72		