


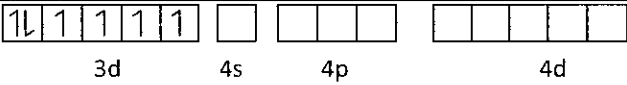
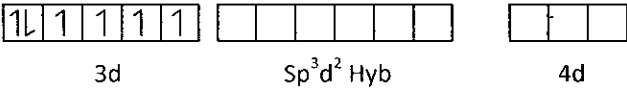
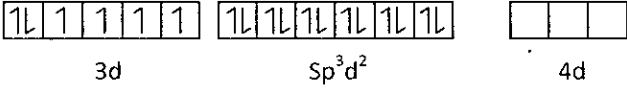
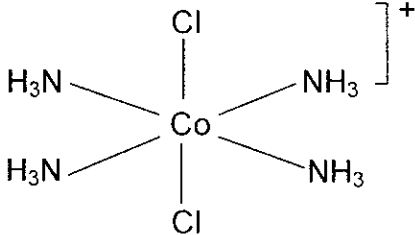
## SCHEME OF VALUATION

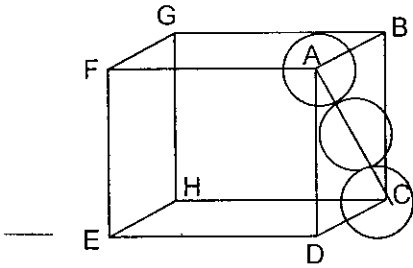
Subject Code: 34 (NS)

Subject: CHEMISTRY

Qn. No.	Answer	Marks
I	<b>Part – A</b>	<b>10x1=10</b>
1	For any solution the partial vapour pressure of each volatile component in the solution is directly proportional to its mole fraction.	1
2	Dissociation of the solute take place in the solution.	1
3	$2\text{H}_2(\text{g}) + 4\text{OH}^-(\text{aq}) \rightarrow 4\text{H}_2\text{O}(\text{l}) + 4\text{e}^-$	1
4	Half or $\frac{1}{2}$	1
5	Decreases	1
6	Zone refining	1
7	$\text{XeO}_3$	1
8	2-methyl-prop-1-ene	1
9	Prop-2enal	1
10	Vitamin A, D, E or K. (Any one example)	1
II	<b>Part – B</b>	
11	When domains in the substance are aligned in parallel and anti-parallel directions in unequal numbers.  <div style="text-align: center;">                     OR   </div>	1
	Examples $\text{Fe}_3\text{O}_4$ (magnetite), ferrites, $\text{MgFe}_2\text{O}_4$ $\text{ZnFe}_2\text{O}_4$ (Any one example)	1
12	$\Lambda_m^0(\text{CH}_3\text{COOH}) = \Lambda_m^0(\text{HCl}) + \Lambda_m^0(\text{CH}_3\text{COONa}) - \Lambda_m^0(\text{NaCl})$	1
	$= 425.9 + 91.0 - 126.4$	1
	$= 390.5 \text{ Scm}^2\text{mol}^{-1}$	
13	Rate = $-\frac{1}{2} \frac{\Delta[\text{A}]}{\Delta t}$	1
	$= -\frac{1}{2} \frac{(0.4 - 0.5)}{10} = 0.005 \text{ mol L}^{-1} \text{ min}^{-1}$	1
14	1) The actinoids are radioactive	1
	2) They could be prepared only in small quantities	1

15	Sodium phenate when treated with carbon dioxide, followed by acidification gives salicylic acid (2-Hydroxybenzoic acid)	1
	<p>Sodiumphenate <math>\xrightarrow[\text{(ii) H}^+]{\text{(i) CO}_2}</math> 2-Hydroxybenzoic acid</p> <p>OR</p>	1
	Self explanatory equation	2
16	Methanoic acid	1
	Ethanoic acid contains +I group CH <sub>3</sub> – But methanoic acid does not contain +I group.	1
17	(i) Aspartame	1
	(ii) Sodium laurylsulphate, sodium dodecyl benzenesulphonate (Any one example)	1
18	Antifertility drug: Norethindrone, ethynylestradiol (noverstrol) (Any one example)	1
	Antiseptics: Furocine, soframicine, chloroxelyenol, terpinol, bithionol, tincture of iodine, iodoform etc. (any one example)	1
III	<b>Part – C</b>	
19 (a)	$4\text{Au}_{(s)} + 8\text{CN}^-_{(aq)} + 2\text{H}_2\text{O}_{(aq)} + \text{O}_{2(g)} \rightarrow 4[\text{Au}(\text{CN})_2]^-_{(aq)} + 4\text{OH}^-_{(aq)}$	1
	$2[\text{Au}(\text{CN})_2]_{(aq)} + \text{Zn}_{(s)} \rightarrow [\text{Zn}(\text{CN})_4]^{2-} + 2\text{Au}_{(s)}$	1
(b)	$\text{Cu}_2\text{S} + \text{FeS}$	1
20 (a)	$4\text{NH}_3 + 5\text{O}_2 \xrightarrow[500\text{K, 9 bar}]{\text{Pt/Rh gauze}} 4\text{NO} + 6\text{H}_2\text{O}$	1
	$2\text{NO} + \text{O}_2 \rightarrow 2\text{NO}_2$	1
	$3\text{NO}_2 + \text{H}_2\text{O} \rightarrow 2\text{HNO}_3 + \text{NO}$	1
21 (a)	$\text{SO}_2\text{Cl}_2$	1
(b)	$2\text{HCl}$	1
(c)	$\text{PbSO}_4$	1

22 (i)	I-Cl bond is weaker than Cl-Cl bond	1
(ii)	Fluorine is most electronegative element OR Fluorine does not contain <i>d</i> -orbitals	1
(iii)	Presence of strong hydrogen bonding in HF	1
23 (a)	i) Due to smaller size of metal ions ii) Their high ionic charges (iii) Non availability of <i>d</i> -orbitals for bond formation (any two points)	2
(b)	$\mu = \sqrt{n(n+2)}$	1
24	$4\text{FeCr}_2\text{O}_4 + 8\text{Na}_2\text{CO}_3 + 7\text{O}_2 \rightarrow 8\text{Na}_2\text{CrO}_4 + 2\text{Fe}_2\text{O}_3 + 8\text{CO}_2$	1
	$2\text{Na}_2\text{CrO}_4 + 2\text{H}^+ \rightarrow \text{Na}_2\text{Cr}_2\text{O}_7 + 2\text{Na}^+ + \text{H}_2\text{O}$	1
	$\text{Na}_2\text{Cr}_2\text{O}_7 + 2\text{KCl} \rightarrow \text{K}_2\text{Cr}_2\text{O}_7 + 2\text{NaCl}$	1
25	Orbitals of $\text{Co}^{3+}$ ion  $\text{Sp}^3\text{d}^2$ hybrid orbitals of $\text{Co}^{3+}$  $[\text{CoF}_6]^{3-}$ 	1
	Geometry: Octahedral	1
	Magnetic nature: Paramagnetic due to the presence of unpaired electrons	1
26 (a)	(i) In co-ordination compounds metal exhibits two types of valencies, primary and secondary. (ii) Primary valencies are ionisable and satisfied by negative ions. (iii) Secondary valencies are non ionisable. These are satisfied by neutral molecules or negative ions. (iv) The ions / groups bound to secondary valencies gives characteristic shape to the compounds. Any two postulates	2
(b)		1

IV	Part – D		
27 (a)			1
	Derivation upto $r = \frac{a}{2\sqrt{2}}$		1
	Packing efficiency = $\frac{\text{Volume occupied by four spheres in the unit cell}}{\text{Total volume of the unit cell}} \times 100$  $= \frac{4 \times \frac{4}{3} \pi r^3}{(2\sqrt{2} r)^3} \times 100$  $= 74\%$		1
(b)	Schottky defect	Frankel defect	
	(i) Equal No. of anions and cation are missing from lattice sites (ii) Decreases the density of the solid. (iii) Shown by ionic solids in which size of cation and anion is almost same. (iv) It is found in ionic solids having high co-ordination number.	(i) The smaller ion is dislocated from its normal site. (ii) No change in density of the solid. (iii) Shown by ionic substances in which large difference in the size of ion. (iv) It is found in ionic solids having low co-ordination number.	
	Any two differences		2
28 (a)	$\frac{P_1^0 - P_1}{P_1^0} = \frac{W_2 \times M_1}{M_2 \times W_1}$		1
	$\frac{0.850 - 0.845}{0.850} = \frac{0.5 \times 78}{M_2 \times 39}$		1
	$M_2 = 170 \text{ gmol}^{-1}$		1
(b)	The process of movement of pure solvent out of the solution, through the semipermeable membrane is called reverse osmosis		1
	Desalination of sea water		1

29 (a)	$E^0_{\text{Cell}} = \frac{0.059}{n} \log Kc$	1
	$0.46 = \frac{0.059}{2} \log Kc$	1
	$\log Kc = \frac{0.46 \times 2}{0.056} = 15.6$	
	$Kc = \text{Antilog of } 15.6$ $= 3.92 \times 10^{15}$	1
(b)	$H^+_{(\text{aq})} + e^- \rightarrow \frac{1}{2} H_2 (g)$	1
	Zero or 0 V	1
30 (a)	For the 1 order reaction $R \rightarrow P$	
	Rate = $\frac{-d[R]}{dt} = k[R]$	1
	or $\frac{d[R]}{[R]} = -k dt$	
	Integrating both sides $\ln [R] = -kt + I$ .....1	1
	When $t = 0$ , $[R] = [R]_0$ $\therefore I = \ln [R]_0$ ..... Substituting in equation 1 $\ln [R] = -kt + \ln [R]_0$ or $\frac{\ln [R]_0}{[R]} = kt$ or $k = \frac{1}{t} \ln \frac{[R]_0}{[R]}$ or $k = \frac{2.303}{t} \log \frac{[R]_0}{[R]}$	1
(b)	Activation energy	1
	Proper orientation of the molecules	1
31 (a)	The catalytic reaction that depends upon the pore structure of the catalyst and the size of the reactant and product molecules is called shape selective catalysis.	1
	Zeolites, ZSM – 5 (Any one suitable example)	1
(b)	Liquid – liquid colloidal systems or dispersion of liquid dispersed phase in liquid dispersion medium.	1

	Example: Milk, vanishing cream or any one suitable example.	1
(c)	Productoin of high vacuum, in gas masks, control of humidity, removal colouring matter, heterogeneous catalysis chromatography (any one application)	1
32 (a)	Step 1 $(\text{CH}_3)_3\text{Br} \rightleftharpoons$ $\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ \diagdown \quad / \\ \text{C}^+ \\ / \\ \text{CH}_3 \end{array} + \text{Br}^-$	1
	Step 2 $\begin{array}{c} \text{H}_3\text{C} \quad \text{CH}_3 \\ \diagdown \quad / \\ \text{C}^+ \\ / \\ \text{CH}_3 \end{array} + \text{OH}^- \longrightarrow (\text{CH}_3)_3\text{OH}$	1
	Order = one or 1	1
(b)	i. Resonance effect in aryl halide ii. Halogen is attached to $\text{sp}^2$ - Hybridised carbon atom in haloarenes iii. Instability of phenyl carbocation iv. Arens are electron rich (Any two reasons)	2
33 (a)	Step 1: Formation of protonated alcohol $\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{O}-\text{H} \\   \quad   \\ \text{H} \quad \text{H} \end{array} + \text{H}^+ \longrightarrow \begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}-\text{O}^+-\text{H} \\   \quad   \quad   \\ \text{H} \quad \text{H} \quad \text{H} \end{array}$	1
	Step 2: Formation of carbocation $\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}^+ \\   \quad   \\ \text{H} \quad \text{H} \end{array} \xrightleftharpoons{\text{Slow}} \begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}^+ \\   \quad   \\ \text{H} \quad \text{H} \end{array} + \text{H}_2\text{O}$	1
	Step 3: Elimination of proton $\begin{array}{c} \text{H} \quad \text{H} \\   \quad   \\ \text{H}-\text{C}-\text{C}^+ \\   \quad   \\ \text{H} \quad \text{H} \end{array} \longrightarrow \text{CH}_2 = \text{CH}_2 + \text{H}^+$	1

(b)	On treating phenol with chloroform in presence of sodium hydroxide, salicylaldehyde is obtained.	
	<p style="text-align: center;">Phenol <span style="margin-left: 150px;"></span> Salicylaldehyde</p>	1
	OR self explanatory equation	2
34 (a)		
(i)		1
(ii)		1
(iii)		1
(b)	Aldehydes which do not have an $\alpha$ - hydrogen, atom, undergo self oxidation and reduction reaction on treatment with concentrated alkali to form an alcohol and a carboxylic acid salt.	1
	$2\text{HCHO} + \text{KOH (conc)} \rightarrow \text{CH}_3\text{OH} + \text{HCOOK}$ Formaldehyde <span style="margin-left: 100px;"></span> methanol <span style="margin-left: 20px;"></span> potassium formate .. Or any other suitable example	1
35 (a)	An amide is treated with bromine in an aqueous or ethanolic solution of sodium hydroxide primary amines are obtained.	1
	$\text{R} - \text{CONH}_2 + \text{Br}_2 + 4\text{NaOH} \rightarrow \text{RNH}_2 + \text{Na}_2\text{CO}_3 + 2\text{NaBr} + 2\text{H}_2\text{O}$ Amide <span style="margin-left: 150px;"></span> 1 <sup>o</sup> amine	1
	Or self explanatory general reaction	2
(b)	i) Methanol	1
	(ii) Iodobenzene	1
(c)	Methylamine	1
36 (a)		2

(b)	Aminoacids which cannot be synthesised in the body and must be obtained through diet.	1
	Examples: Valine, Leucine, Isoleucine, Arginine, Lysine, Phenylalanine, Histidine. Any one correct example.	1
(c)	Ribose sugar or $\beta$ D-ribose	1
37 (a)	i) Caprolactum	1
	ii) Isoprene or 2 methyl 1,3 butadiene	1
	iii) Chloroprene or 2 chloro 1,3 butadiene	1
(b)	Polymers which contains more than one type of monomeric species are called co-polymers.	1
	Example: Butadiene – Styrene rubber (Bu na – s ) Buna – N, Bakelite, Nylon 6,6, Terylene Any one suitable example.	1