

Marking scheme – 2017 (Compartment)

CHEMISTRY (043)/ CLASS XII

Set 56/1/1

Q.No	Value Points	Marks
1	hcp	1
2	AICl ₃ / Al ³⁺	1
3	Orbital splitting energies are not sufficiently large for forcing pairing	1
4	2,3-dinitro phenol	1
5	Having no α- hydrogen	1
6	Vapour pressure of the solvent decreases in the presence of non – voilatile solute (glucose) hence boiling point increases	2
7	(i) First order	1
	(ii) $s^{-1}/time^{-1}$	1
8	Hypophosphorous acid is a good reducing agent as it contains two P-H bonds. There is no P-H bond in orthophosphoric acid, so it is not a reducing agent	1
	Example : It reduces $AgNO_3$ to metallic silver/ chemical equation	1
	OR	
8	a) 4	1
	b) Due to lower bond dissociation enthalpy of BiH ₃ as compared to SbH ₃	1
9	i. Due to resonance the two O-O bond lengths are identical.	1
-	ii. Due to strong bond formed by it with other elements.	1
10.	i) (b) is chiral	1
10.	ii) (a) will undergo S _N 2 reaction faster	1
11	In bcc, $z=2$;	
	$d = (zxM) / a^{3}x N_{A} $ (i) No. of atoms = $\frac{w}{M} \times N_{A}$ 2.5 × 10 ²⁴ = $\frac{500g}{M} \times N_{A}$ M= [500 × N _A] / 2.5 × 10 ²⁴ (ii)	½ 1
	Putting values of M in equation (i) d= 2 x 500 g × N _A / [2.5 × 10^{24} atoms × (400x 10^{-10} cm) ³ x N _A] d= 6.25 g/ cm ³	½ 1
	(or any other correct method)	1
12	$p_{total} = p_1^{\circ} + (p_2^{\circ} - p_1^{\circ})^{\chi_2}$	1
	$600=450+(700-450)^{-X_2}$	1
	$x_2 = 0.6$	1/2
	$x_2 = 1-0.6 = 0.4$	1/2
13	$P_A = 2PO - Pt$	1/2
	$=(2 \times 0.4) - 0.7 = 0.1$	1/2
	$k = \frac{2.303}{t_{ros}} \log Po/P_{A}$	
	$k = \frac{2.303}{t} \log Po/P_{A}$ $k = \frac{2.303}{100} \log 0.4/0.1$ $k = \frac{2.303}{100} \times 0.6021$	1
		1
14	i) The process of removing an adsorbed substance from a surface on which it is	1



		1
	adsorbed. ii) The formation of micelles takes place only above a particular concentration called CMC.	1
	iii) The catalytic reaction that depends upon the pore structure of the catalyst and size of the reactant and product molecules.	1
15	a) The metal is converted into its volatile compound and collected elsewhere. It is then decomposed to get the pure metal.	1
	b) i)Ni ii) Ti/Zr	1/2 + 1/2
10	c) It is used to separate two sulphide ores by preventing one to form froth.	1
16	a) $H_2O < H_2S < H_2Se < H_2Te$, because of decrease in bond dissociation enthalpy.	1,1
	b) 🔛 🕞	1
	OR	
	a) i)Due to higher oxidation state of P in PCl ₅	1
	ii) Liberation of hydrogen prevents the formation of FeCl ₃	1
	b)	1
17	Hybridisation : sp ³ d ²	1
	Magnetic character : Paramagnetic	1
10	Spin nature: High spin	1
18.	a) A: CH ₃ - CH=CH ₂ B: CH ₃ - CH ₂ -CH ₂ Br C: CH ₃ - CH ₂ -CH ₂ I D: CH ₃ - CH ₂ -CH ₂ MgI	½ × 4
	$ \longrightarrow $	1
	Aryl halide	
	b) X = Cl, Bi , CN	
19.	a) CH_3 -O- CH_3 + HI \longrightarrow CH_3 -OH + CH_3 -I	1
	b) .	



		1
	Protonation of alkene to form carbocation by electrophilic	
	attack of H ₃ O ⁺ .	
	$H_2O + H^* \rightarrow H_3O^*$	
	Н н	
	$>C = C < + H - O + H \implies -C - C < + H_2O$	1/2
	Nucleophilic attack of water on carbocation.	
	Н Н Н	
	$ \begin{array}{c} H \\ - \overset{H}{C} - \overset{H}{C} \overset{H}{\leftarrow} + H_{a} \overset{H}{\underset{i}{\overset{i}{\underset{j}{\underset{j}{\underset{j}{\underset{j}{\underset{j}{\underset{j}{\underset{j}{\underset$	
	Deprotonation to form an alcohol.	1/2
	н Н — н ЮН	
	$\begin{array}{cccc} H & H & H & H^{*}OH \\ -C & -C & -O & H & H^{*}O \\ -C & -O & -H & H^{*}O & -O & -C & -C \\ -O & -H & +H^{*}O & +H^{*}O \\ -O & -O & -O & -O & -O \\ -O & -O & -$	
		1
20.	i) A: CH ₃ - CH ₂ CN; B: CH ₃ - CH ₂ - CH ₂ NH ₂ ; C: CH ₃ - CH ₂ - CH ₂ -NH-COCH ₃	½ ×3
	NO ₂ NH ₂	
	ii) A: $Ar - \frac{1}{N_2 BF_4}$; B: C:	½ ×3
21		1
21	a) Glycosidic linkageb) Source : Meat, Fish, egg, curd (any one) ; Pernicious anaemia	1
	c) DNA is double strand while RNA is single strand molecule (or any other	1/2 , 1/2
	correct difference)	1
22	i) Treatment of hyperacidity	1/2
	Class : Antacids	1/2
	ii) Relieve pain and produce sleep	1/2
	Class: Narcotic analgesics	1/2
	iii) Relieve pain and reduce fever	1/2
	Class: Non- Narcotic analgesics / Analgesics	1/2
23	a) Poly β-hydroxybutyrate – co-β-hydroxy valerate / (PHBV) OH OH	1/2
	Monomers: CH ₃ -CH-CH ₂ -COOH CH ₃ -CH ₂ -CH-CH ₂ -COOH	1/2 , 1/2
	Repeating unit :	
	$ \begin{array}{c} \left(\begin{array}{c} \mathbf{O}-\mathbf{CH}-\mathbf{CH}_{2}-\mathbf{C} & -\mathbf{O}-\mathbf{CH}-\mathbf{CH}_{2}-\mathbf{C} \\ & & \\ \mathbf{CH}_{3} & \mathbf{O} & \mathbf{CH}_{2}\mathbf{CH}_{3} \end{array} \right)^{n} \end{array} $	1/2
	b) PHBV is used in speciality packaging, orthopaedic devices and in controlled	1/2 , 1/2
	release of drugs.(any two) c) Concern for environment , caring (or any other)	1/2 , 1/2
24	a) E^0 value of silver is lower than that of gold, hence silver displaces gold	1
27	which gets deposited on the silver object.	-
	E^0 value of copper is lower than that of silver, hence silver cannot displace	
	copper from its solution.	1
	b) i) Electrons flow from Zn to Ag plate.	1/2
	i) Zn as anode and Ag acts as cathode	1/2
		1/2
	iii) Cell will stop functioning	1/2, 1/2
	iv) Concentration of Zn^{2+} ions will increase and that of Ag^+ ions will decrease.	1/2, /2 1/2
	v) No change	12
	OR	



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24	a) When concentration approaches zero, the molar conductivity is known as limiting	
	molar conductivity	1
	The change in Λm with dilution is due to the increase in the degree of dissociation and	1
	consequently the number of ions in the total volume of the solution that contains 1 mol of	
	electrolyte , hence Λm increases steeply.	
	b) $E_{cell} = E_{cell}^{\circ} - \frac{0.059}{n} \log \frac{[Mg2+]}{[Cu2+]}$	1
	$=2.71 \text{ V} - \frac{0.059}{2} \log \frac{0.1}{0.001}$	1
	$=2.71 \text{ V} - \frac{0.059}{2} \log 10^2$	
	= 2.651 V	1
25	a) A: Na ₂ CrO ₄ ; B: Na ₂ Cr ₂ O ₇ ; C : K ₂ Cr ₂ O ₇	1/2, 1/2, 1
25	4 FeCr ₂ O ₄ + 8 Na ₂ CO ₃ + 7 O ₂ \rightarrow 8 Na ₂ CrO ₄ + 2 Fe ₂ O ₃ + 8 CO ₂	1
		Т
	$2\mathrm{Na_2CrO_4} + 2~\mathrm{H^+} \rightarrow \mathrm{Na_2Cr_2O_7} + 2~\mathrm{Na^+} + \mathrm{H_2O}$	1
	$Na_2Cr_2O_7 + 2 KCl \rightarrow K_2Cr_2O_7 + 2 NaCl$	1
	$Na_2Cr_2O_7 + Z RCr \rightarrow R_2Cr_2O_7 + Z NaCr$	1
25	OR	1/ 1/
25	a) i)Copper; Due to high $\Delta_{a}H^{\ominus}$ and low $\Delta_{hyd}H^{\ominus}$	1/2 , 1/2
	ii) Cerium ; Due to stable 4f ⁰ configuration / Tb ; Due to stable 4f ⁷ configuration	1/2 , 1/2
	b) i) Due to ability of oxygen to form multiple bonds to metal	1
	ii) HCl is oxidized to chlorine	1
	iii) Due to strong interatomic metallic bonding.	1
26	a) i).	
	Q	1
	+ $CH_3 - C - Cl$ Anhyd. AlCl ₃ CH ₃	
	+ CH_{3} - C_{1} - C_{1} Anhyd. AlCl ₃ CH_{3}	
	ii).	
	CH ₃ CH ₃	
	$CH_{3} CO CH_{3} + CH_{3} MgX \longrightarrow CH_{3} - CH_{3$	
		1
	CH₃ CH₃	-
	b) i) Because it is a deactivating group / Due to electron withdrawing carboxylic	
	group resulting in decreased electron density at o- and p- position.	1
	ii) Due to extensive association of carboxylic acid molecules through intermolecular	1
	hydrogen bonding.) -
	iii) Due to steric and +I effect of two methyl groups in propanone	1
		T
26	OR a) i) .	
20		
	N-NH-CO-NH ₂	1
		1
		1
	iii) CH₃ -CH(Br)-COOH	1
	b) i) Add ammonical solution of silver nitrate / Tollen's reagent to both the	
	compounds, propanal will give silver mirror while propanone does not.	1
	ii) Add NaHCO $_3$ solution to both the compounds, benzoic acid will give	1
	effervescence and liberate CO ₂ while benzaldehyde will not. (Or any other suitable	
	test)	
	l test)	



Marking scheme – 2017 (Compartment)

CHEMISTRY (043)/ CLASS XII

Set 56/1/2

Q.No	Value Points	Marks
1	Orbital splitting energies are not sufficiently large for forcing pairing	1
2	2,3-dinitro phenol	1
3	Having α- hydrogen	1
4	(NH ₄) ₃ PO ₄ / PO ₄ ³⁻	1
5	ccp / fcc	1
6	Hypophosphorous acid is a good reducing agent as it contains two P-H bonds. There	1
	is no P-H bond in orthophosphoric acid, so it is not a reducing agent	
	Example : It reduces AgNO ₃ to metallic silver/ chemical equation	1
	OR	
6	a) 4	1
	b) Due to lower bond dissociation enthalpy of BiH ₃ as compared to SbH ₃	1
7	i) (b) is chiral	1
	ii) (a)	1
8	(i) Zero order	1
	(ii) Mol $L^{-1}s^{-1}$	1
9	Vapour pressure of the solvent decreases in the presence of non – voilatile solute	2
	(glucose) hence boiling point increases	
10.	i. Due to resonance the two S-O bond lengths are identical.	1
	ii. Absence of d- orbitals and most electronegative element.	1
11	a) Peptide linakge	1
	b) Water soluble - Vit. B/C , Fat soluble- Vit. A/D/E/K/B12	1/2 , 1/2
	c).	
	⁶ CH ₂ OH	
	H 5 O H CH ₂ OH	
	H H OH	1
	OH H	-
	HO $3 \frac{2}{OH}$ HO $3 \frac{2}{H}$ H	
	н он ог н он	
12	a) Temperature above which micelle formation takes place.	1
	b) Process of converting freshly prepared precipitate into sol by shaking it	-
	with dispersion medium along with a small amount of suitable electrolyte.	1
	c) The potential difference between fixed layer and the diffused layer	1
13	i) Treatment of hyperacidity	1/2
10	Class : Antacids	1/2
	ii) Relieve pain and produce sleep	1/2
	Class: Narcotic analgesics	1/2
	iii) Relieve pain and reduce fever	1/2
	Class: Non- Narcotic analgesics / Analgesics	1/2 1/2
14	a) Glycosidic linkage	1
14	b) Source : Meat, Fish, egg, curd (any one) ; Pernicious anaemia	1 1/2 , 1/2
	c) DNA is double strand while RNA is single strand molecule (or any other	¹ /2 , ¹ /2
	correct difference)	1



b). Protonation of alkene to form carbocation by electrophilic attack of H_3O^* . $H_2O + H^* \rightarrow H_3O^*$ $\downarrow C = C < + H - O - H \implies -C - C < + H_2O$	
attack of H_3O^* . $H_2O + H^* \rightarrow H_3O^*$	
$H_2O + H^* \rightarrow H_3O^*$	
$H \xrightarrow{H} H \xrightarrow{H} H$	
$C = C + H - O - H \implies -C - C + H O$	
	1/2
Nucleophilic attack of water on carbocation.	
Н н Н	
$\begin{array}{c c} H & H & H \\ -C - C - C + H_2 \ddot{O} & \rightleftharpoons & -C - C - O - H \end{array}$	
$-\zeta \zeta + H_2 \\ \vdots \leftarrow -\zeta - \zeta - 0 - H$	1/2
Deprotonation to form an alcohol.	
и н Он	
$\begin{array}{cccc} H & H & H & H \\ -C - C - Q & H & + & H_2 \\ \hline & & & & -C - C - & + & H_3 \\ \hline & & & & & - & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - & - \\ \hline & & & & & - \\ \hline $	
$-C-C-O-H$ + $H_2O \rightarrow -C-C-$ + H_3O	1
16 In fcc, z=4 ;	
$d = (zxM) / a^3 x N_A $ (i)	1/2
No. of atoms = $\frac{m}{M} \times N_A$	
No. of atoms = $\frac{w}{M} \times N_A$ 2.5 × 10 ²⁴ = $\frac{250 g}{M} \times N_A$	1
$M = [250 \times N_{A}] / 2.5 \times 10^{24} $ (ii)	
Putting values of M in equation (i)	
$d = 4 \times 250 \text{ g} \times \text{N}_{\text{A}} / [2.5 \times 10^{24} \text{ atoms} \times (400 \times 10^{-10} \text{ cm})^3 \times \text{N}_{\text{A}}]$	1/2
$d= 6.25 \text{ g/ cm}^3$	1
(or any other correct r	method)
a) The metal is converted into its volatile compound and collected	1
elsewhere. It is then decomposed to get the pure metal.	
b) i)Ni ii) Ti/Zr	$\frac{1}{2} + \frac{1}{2}$
c) It is used to separate two sulphide ores by preventing one to form	n froth. 1
18. $p_{total} = p_1^{\circ} + (p_2^{\circ} - p_1^{\circ})^{X_2}$	1
$600=450+(700-450)^{-X_2}$	1
	1/2
$x_2 = 0.6$	
$x_2 = 1-0.6 = 0.4$	1/2
19. a) $H_2O < H_2S < H_2Se < H_2Te$, because of decrease in bond dissociatio	on 1,1
enthalpy.	··· 1,1
Xe	
E P	
b) 👻 逆 🖤	1
OR	1
a) i)Due to higher oxidation state of P in PCI ₅	1
90.00	-
a) i)Due to higher oxidation state of P in PCI ₅	-
a) i)Due to higher oxidation state of P in PCI ₅	
a) i)Due to higher oxidation state of P in PCI ₅	
a) i)Due to higher oxidation state of P in PCl ₅ ii) Liberation of hydrogen prevents the formation of FeCl ₃	
a) i)Due to higher oxidation state of P in PCI ₅	1



20.	Hybridisation : sp ³ d ²	1
	Magnetic character : Paramagnetic	1
	Spin nature: High spin	1
21	a) A: CH ₃ - CH=CH ₂ B: CH ₃ - CH ₂ -CH ₂ Br C: CH ₃ - CH ₂ -CH ₂ I D: CH ₃ - CH ₂ -CH ₂ MgI	½ × 4
	$ \bigcup^{N_{y}X} \xrightarrow{Cu_{y}X_{y}} \bigcup^{X} + N_{z} $	
	b) X = Cl, Bi , CN	1
22	$P_A = 2Po - Pt$	1/2
	$= (2 \times 0.3) - 0.5 = 0.1$	1/2
	$k = \frac{1}{2.303} \log 0.2/0.1$	
	$k = \frac{2.303}{t} \log \text{Po/P}_{A}$ $k = \frac{2.303}{100} \log 0.3/0.1$ $k = \frac{2.303}{100} \times 0.4771$	1
	$= 1.1 \times 10^{-2} \text{ s}^{-1}$	1
23	a) Poly β-hydroxybutyrate – co-β-hydroxy valerate / (PHBV) OH OH	1/2
	$\begin{array}{c} OH & OH \\ CH_3-CH_2-COOH \\ Monomers: \\ Repeating unit: \end{array}$	1/2 , 1/2
	$ \begin{array}{c} \left(\begin{array}{c} \mathbf{O} - \mathbf{C} \mathbf{H} - \mathbf{C} \mathbf{H}_2 - \mathbf{C} \\ \mathbf{O} - \mathbf{C} \mathbf{H}_3 - \mathbf{C} \\ \mathbf{H}_3 \end{array} \right)_n \\ \mathbf{C} \mathbf{H}_3 \\ \mathbf{O} \\ \mathbf{C} \mathbf{H}_2 \mathbf{C} \mathbf{H}_3 \\ \mathbf{O} \\ \mathbf{O} \end{array} \right) $	1/2
	b) PHBV is used in speciality packaging, orthopaedic devices and in controlled release of drugs.(any two)	1/2 , 1/2 1/2 , 1/2
24	c) Concern for environment , caring (or any other) a) A: Na ₂ CrO ₄ ; B: Na ₂ Cr ₂ O ₇ ; C : K ₂ Cr ₂ O ₇	1/2 , 1/2 , 1
27	4 $\operatorname{FeCr}_2O_4 + 8 \operatorname{Na}_2CO_3 + 7 O_2 \rightarrow 8 \operatorname{Na}_2CrO_4 + 2 \operatorname{Fe}_2O_3 + 8 \operatorname{CO}_2$	1
	$2\mathrm{Na_2CrO_4} + 2~\mathrm{H^+} \rightarrow \mathrm{Na_2Cr_2O_7} + 2~\mathrm{Na^+} + \mathrm{H_2O}$	1
	$Na_2Cr_2O_7 + 2 \text{ KCl} \rightarrow K_2Cr_2O_7 + 2 \text{ NaCl}$	1
	OR	
24	a) i)Copper; Due to high $\Delta_{a}H^{\oplus}$ and low $\Delta_{hyd}H^{\oplus}$ ii) Cerium ; Due to stable 4f ⁰ configuration / Tb ; Due to stable 4f ⁷ configuration b) i) Due to ability of oxygen to form multiple bonds to metal ii) HCl is oxidized to chlorine iii) Due to strong interatomic metallic bonding.	½,½ ½,½ 1 1 1
25	a) i). $() + CH_3 - C - Cl \xrightarrow{Anhyd. AlCl_3} CH_3$	1
	ii).	



	$\begin{array}{cccc} CH_3 & CH_3 & CH_3 \\ I \\ CH_3 CO CH_3 & + & CH_3 MgX & \longrightarrow CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3 CH_3$	1
	b) i) Because it is a deactivating group / Due to electron withdrawing carboxylic	1
	group resulting in decreased electron density at o- and p- position. ii) Due to extensive association of carboxylic acid molecules through intermolecular	1
	hydrogen bonding.	1
	iii) Due to steric and + I effect of two methyl groups in propanone OR	
25	a) i) .	
25	$\sim = N-NH-CO-NH_2$	1
	ii) CH ₃ COOH	1
	iii) CH ₃ -CH(Br)-COOH	1
	b) i) Add ammonical solution of silver nitrate / Tollen's reagent to both the	224
	compounds, propanal will give silver mirror while propanone does not.	1
	 ii) Add NaHCO₃ solution to both the compounds, Benzoic acid will give effervescence and liberate CO₂ while benzaldehyde will not. (Or any other suitable test) 	1
26	a) E^0 value of silver is lower than that of gold, hence silver displaces gold which gets deposited on the silver object. E^0 value of copper is lower than that of silver, hence silver cannot displace	1
	copper from its solution.	1
	b) i) Electrons flow from Zn to Ag plate.	1/2
	ii) Zn as anode and Ag acts as cathode	1/2
	iii) Cell will stop functioning	1/2
	 iv) Concentration of Zn²⁺ ions will increase and that of Ag⁺ ions will decrease. v) No change 	14, 1/2 1/2
	OR	
26	 a) When concentration approaches zero, the molar conductivity is known as limiting molar conductivity 	1
	The change in Am with dilution is due to the increase in the degree of dissociation and consequently the number of ions in the total volume of the solution that contains 1 mol of	1
	electrolyte, hence Am increases steeply.	
	b) $E_{cell} = E_{cell}^{o} - \frac{0.059}{n} \log \frac{ Mg2+ }{ Cu2+ }$ 0.059 t 0.1	1
	$=2.71 \text{ V} - \frac{0.059}{2} \log \frac{0.1}{0.001}$ $=2.71 \text{ V} - \frac{0.059}{2} \log 10^2$	1
	= 2.651 V	1
	- 2.0J1 V	107.0



Marking scheme – 2017 (Compartment)

CHEMISTRY (043)/ CLASS XII

Set 56/1/3

Q.No	Value Points	Marks
1	Having no α - hydrogen	1
2	Frenkel Defect	1
3	$K_4[Fe(CN)_6] / [Fe(CN)_6]^{4-}$	1
4	Orbital splitting energies are not sufficiently large for forcing pairing	1
5	2,3-dinitro phenol	1
6	(i) First order	1
	(ii) $s^{-1} / time^{-1}$	1
7	i) In NH4 ⁺ , all are bond pairs whereas in ammonia the lone pair of electron on	1
	nitrogen repels the bond pairs and reduces the bond angle.	
	ii) I-Cl bond is weaker than I-I bond / low bond dissociation enthalpy in I-Cl	1
8	Vapour pressure of the solvent decreases in the presence of non – voilatile solute	2
	(glucose) hence boiling point increases	
9	i) (b) is chiral	1
	ii) (a) will undergo $S_N 2$ reaction faster	1
10.	Hypophosphorous acid is a good reducing agent as it contains two P-H bonds. There	1
	is no P-H bond in orthophosphoric acid, so it is not a reducing agent	
	Example : It reduces AgNO ₃ to metallic silver/ chemical equation	1
	OR	
10	a) 4	1
	b) Due to lower bond dissociation enthalpy of BiH ₃ as compared to SbH ₃	1
11	i) The process of removing an adsorbed substance from a surface on which it is adsorbed.	1
	ii) The formation of micelles takes place only above a particular concentration called CMC.	1
	iii) The catalytic reaction that depends upon the pore structure of the catalyst and size of the reactant and product molecules.	1
12	a) $H_2O < H_2S < H_2S < H_2Te$, because of decrease in bond dissociation	1,1
12	enthalpy.	1,1
	E . E	
	b)	1
	OR	
12	a) i)Due to higher oxidation state of P in PCI ₅	1
12	ii) Liberation of hydrogen prevents the formation of FeCl ₃	1
	b)	1



13	a) A: CH ₃ - CH=CH ₂	1⁄2 × 4
	B: CH ₃ - CH ₂ -CH ₂ Br	
	C: CH ₃ - CH ₂ -CH ₂ I D: CH ₃ - CH ₂ -CH ₂ MgI	
	*	
	$ \begin{array}{ c c c c } & & & & \\ & & & & \\ & & & & \\ & & & & $	
		1
	Aryl halide X = Cl, Br, CN	1
	D	
14	a) CH ₃ -O-CH ₃ + HI → CH ₃ -OH + CH ₃ -I	1
	b) .	
	Protonation of alkene to form carbocation by electrophilic	
	attack of H_3O^* .	
	$H_2O + H^+ \rightarrow H_3O^+$	
	>C = C < + H - O - H	
	$>C=C< + H-\ddot{O}-H \leq -C-C' + H^{3}\ddot{O}$	1/2
	Nucleophilic attack of water on carbocation.	
	Н Н Н	
	$ \begin{array}{c} H \\ -\overset{H}{C} - \overset{H}{C} \stackrel{H}{\leftarrow} + H_2 \overset{H}{\odot} \end{array} \rightleftharpoons \begin{array}{c} H \\ -\overset{H}{C} - \overset{H}{C} - \overset{H}{C} - \overset{H}{C} - \overset{H}{O} - H \end{array} $	
	Deprotonation to form an alcohol.	1/2
	н н Он	
	$ \begin{array}{c} H & H \\ - \overset{H}{C} - \overset{H}{C} - \overset{H}{O} + \overset{H}{H} + H_{3} \overset{H}{O} \rightarrow - \overset{H}{C} - \overset{H}{C} - \overset{H}{C} + H_{3} \overset{H}{O} \end{array} $	
	$\downarrow \downarrow \downarrow \downarrow \downarrow$	
		1
15	In bcc, z=2 ;	
	$d = (z x M) / a^3 x N_A $ (i)	
	$d = (zxM) / a^3 x N_A $ (i) No. of atoms = $\frac{w}{M} \times N_A$	1/2
	$2.5 \times 10^{24} = \frac{250g}{M} \times N_A$	1
	$M = 250 \times NA / 2.5 \times 10^{24} $ (ii)	
	Putting values of M in equation (i) d= 2 x 250 g × N _A / [2.5 × 10^{24} atoms × (400x10 ⁻¹⁰ cm) ³ x N _A]	17
	$d = 2 \times 250 \text{ g} \times \text{N}_A / [2.5 \times 10^{\circ} \text{ atoms} \times (400 \times 10^{\circ} \text{ cm}) \times \text{N}_A]$ $d = 3.125 \text{ g/ cm}^3$	½ 1
	(or any other correct method)	1
16	$P_A = 2Po - Pt$	1/2
	$= (2 \times 35) - 63 = 7$	1/2
	$k = \frac{2.303}{t} \log Po/P_A$	
	t 2.303 L 2.5 / 7	
	$k = \frac{2.303}{100} \log 35/7$ $k = \frac{2.303}{100} \times 0.6990$	1
	$k = \frac{2.303}{100} \times 0.6990$	
	$= 2.236 \times 10^{-3} \text{ s}^{-1}$	1
	(or any other correct method)	
17	i) A: CH ₃ - CH ₂ CN; B: CH ₃ - CH ₂ - CH ₂ NH ₂ ; C: CH ₃ - CH ₂ - CH ₂ -NH-COCH ₃	½ ×3
	NO ₂ NH ₂	
		1/
	Ar-NBF	½ ×3
10	ii) A: $Ar - N_2 BF_4$; B: C:	- Anger
18.	ii) A: $Ar - N_2 BF_4$; B: C: a) Glycosidic linkage b) Source : Meat, Fish, egg, curd (any one); Pernicious anaemia	¹ / ₂ ×3



	c) DNA is double strand while RNA is single strand molecule (or any other	1/2 , 1/2
	correct difference)	1
19.	Hybridisation : dsp ²	1
	Magnetic character : Diamagnetic	1
	Spin nature: Low spin	1
20.	i) Controlling depression and hypertension	1/2
	Class : Tranquilizers ii) Relieve pain and reduce fever	1/2
	Class: Non- Narcotic analgesics / Analgesics	1/2
	iii) Kills or inhibits the growth of micro organisms	1/2
	Class: Antibiotics	1/2
		1/2
21	$p_{total} = p_1^{\circ} + (p_2^{\circ} - p_1^{\circ})^{-X_2}$	1
	$600=450+(700-450)^{-X_2}$	1
	$x_2 = 0.6$	11.0.00
		1/2
	$x_2 = 1-0.6 = 0.4$	1/2
22	a) Impurities are more soluble in the melt than in the solid state of the metal.	1/2
	Example : Ge/ Si/ B (any other)	1/2
	b) i)Zn/ Hg	1
	ii) Sn	1
23	a) Poly β-hydroxybutyrate – co-β-hydroxy valerate / (PHBV) OH OH	1/2
	Monomers : $CH_3-CH-CH_2-COOH$, $CH_3-CH_2-CH-CH_2-COOH$	1/2 , 1/2
	Repeating unit :	
	$\begin{array}{c} \left(\begin{array}{c} \mathbf{O}-\mathbf{CH}-\mathbf{CH}_{2}-\mathbf{C} \\ \\ \mathbf{CH}_{3} \end{array} \right) \begin{array}{c} \mathbf{O}-\mathbf{CH}-\mathbf{CH}_{2}-\mathbf{C} \\ \\ \mathbf{CH}_{2}\mathbf{CH}_{3} \end{array} \right) \\ \mathbf{CH}_{2}\mathbf{CH}_{3} \end{array} $	1/2
	b) PHBV is used in speciality packaging, orthopaedic devices and in controlled release of drugs.(any two)	1/2 , 1/2 1/2 , 1/2
	c) Concern for environment, caring (or any other)	/2 , /2
24	a) i).	
	H + $CH_3 - C - Cl$ Anhyd. AlCl ₃ CH_3	1
	+ $CH_3 - C - Cl \xrightarrow{Anhyd. AlCl_3}$ CH_3	
	ii) .	
	CH₃ CH₃	
	$CH_{3} CO CH_{3} + CH_{3} MgX \longrightarrow CH_{3}-C - OMgX \xrightarrow{H_{3}O} CH_{3}-C - OH$	
	$CH_3COCH_3 + CH_3MgX \longrightarrow CH_3-C-OMgX \longrightarrow CH_3-C-OH$	
	CH₃ CH₃	1
	b) i) Because it is a deactivating group / Due to electron withdrawing carboxylic	
	group resulting in decreased electron density at o- and p- position.	1
	ii) Due to extensive association of carboxylic acid molecules through intermolecular	
	hydrogen bonding.	1
	iii) Due to steric and +I effect of two methyl groups in propanone	1
	OR	
24	a) i) .	
1		
	\sim N-NH-CO-NH ₂	1
		1



	ii) CH₃COOH	1
	iii) CH₃ -CH(Br)-COOH	1
	b) i) Add ammonical solution of silver nitrate / Tollen's reagent to both the	
	compounds, propanal will give silver mirror while propanone does not.	1
	ii) Add NaHCO ₃ solution to both the compounds, Benzoic acid will give	1
	effervescence and liberate CO ₂ while benzaldehyde will not. (Or any other suitable	
	test)	
25	a) E^0 value of silver is lower than that of gold, hence silver displaces gold	1
	which gets deposited on the silver object.	
	E^0 value of copper is lower than that of silver, hence silver cannot displace	
	copper from its solution.	1
	b) i) Electrons flow from Zn to Ag plate.	1/2
	ii) Zn as anode and Ag acts as cathode	1/2
	iii) Cell will stop functioning	1/2
	iv) Concentration of Zn^{2+} ions will increase and that of Ag^{+} ions will decrease.	1/2, 1/2
	v) No change	1/2
	OR	
25	a) When concentration approaches zero, the molar conductivity is known as limiting	
	molar conductivity	1
	The change in Λm with dilution is due to the increase in the degree of dissociation and	1
	consequently the number of ions in the total volume of the solution that contains 1 mol of	
	electrolyte , hence Λm increases steeply.	
	b) $E_{cell} = E_{cell}^{o} - \frac{0.059}{n} \log \frac{[Mg2+]}{[Cu2+]}$	1
	$=2.71 \text{ V} - \frac{0.059}{2} \log \frac{0.1}{0.001}$	1
	$=2.71 \text{ V} - \frac{0.059}{2} \log 10^2$	-
	= 2.651 V	1
26	a) A: Na ₂ CrO ₄ ; B: Na ₂ Cr ₂ O ₇ ; C : K ₂ Cr ₂ O ₇	- ½,½,1
20	$4 \text{ FeCr}_2O_4 + 8 \text{ Na}_2O_3 + 7 \text{ O}_2 \rightarrow 8 \text{ Na}_2\text{CrO}_4 + 2 \text{ Fe}_2O_3 + 8 \text{ CO}_2$	⁷² , ⁷² , 1
		1
	$2\mathrm{Na}_{2}\mathrm{CrO}_{4} + 2 \ \mathrm{H}^{*} \rightarrow \mathrm{Na}_{2}\mathrm{Cr}_{2}\mathrm{O}_{7} + 2 \ \mathrm{Na}^{*} + \mathrm{H}_{2}\mathrm{O}$	1
	$Na_2Cr_2O_7 + 2 \text{ KCl} \rightarrow K_2Cr_2O_7 + 2 \text{ NaCl}$	1997 C
	$Ra_2Cr_2C_7 + 2$ RCr $\rightarrow R_2Cr_2C_7 + 2$ Nacr	1
	OR	
26	a) i)Copper; Due to high $\Delta_{a}H^{\oplus}$ and low $\Delta_{hyd}H^{\oplus}$	1/2 , 1/2
	a) i)Copper; Due to instruct and for Δ_{hyd}	1/2 , 1/2
	ii) Cerium ; Due to stable $4f^0$ configuration / Tb ; Due to stable $4f^7$ configuration	1
	b) i) Due to ability of oxygen to form multiple bonds to metal	1
	ii) HCl is oxidized to chlorineiii) Due to strong interatomic metallic bonding.	1
	in Due to strong interatornic metallic bonding.	-

