

## ANSWER KEY

..... FIRST YEAR HIGHER SECONDARY EXAMINATION, JUNE 2022 .....

PART-I/II/III

SUBJECT: CHEMISTRY .....

CODE NO: FY-25 .....

VERSION: ....

60 SCORES

..... 2 HOURS

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1.	(i) (ii)	(A) $n=1, l=0, m=0, s=+\frac{1}{2}$ Correct shape of 2s-orbital/Probability-density plot / Boundary surface diagram / Spherical shape.	1 1	2
2.		$\lambda = \frac{h}{mv}$ $= \frac{6.626 \times 10^{-34} \text{ kg m}^2 \text{ s}^{-1}}{9.1 \times 10^{-31} \text{ kg} \times 10 \text{ m s}^{-1}} = 7.28 \times 10^{-5} \text{ m}$	1 1	2
3.		Small size or polarizing power of $\text{Li}^+$ / cation Large size or high polarisability of $\text{Cl}^-$ / anion	1 1	2
4.		$\text{BF}_3 \rightarrow sp^2$ Triangular planar / Trigonal planar  $\text{SF}_6 \rightarrow sp^3d^2$ Octahedral / Square bipyramidal	$\frac{1}{2}$ $\frac{1}{2}$  $\frac{1}{2}$ $\frac{1}{2}$	2

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5.		Oxidising agent : HCl Reducing agent : Zn	1 1	2
6.		D <sub>2</sub> O / Water containing isotope of hydrogen, deuterium Moderator in nuclear reactor / In exchange reactions for the study of reaction mechanism / for the preparation of other deuterium compounds.	1 1	2
7.		(a) → (iii) (b) → (iv) (c) → (ii) (d) → (i)	1/2 1/2 1/2 1/2	2
8.		Any two differences in structures/properties between diamond & graphite.	2	2
9.	(i) (ii)	2, 5, 6 - Trimethyloctane 5-Oxohexanoic acid	1 1	2
10.		Correct definition of electrophile One example of electrophile Correct definition of nucleophile One example of nucleophile	1/2 1/2 1/2 1/2	2

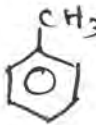

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
11.		Definition/explanation of acid rain Any one adverse effect	1 1	2
12.	(i) (ii)	2 Statement of law of multiple proportion Illustration / example	1 1 1	3
13.	(i) (ii)	No. of moles of $H_2 = \frac{3}{2} = 1.5 \text{ mol}$ No. of moles of $O_2 = \frac{30}{32} = 0.94 \text{ mol}$ (Correct equation for no. of moles - $\frac{1}{2}$ score) Limiting reagent : $H_2$ Amount of water formed = 1.5 mol or 27 g (Balanced equation only - $\frac{1}{2}$ score)	$\frac{1}{2}$ $\frac{1}{2}$ 1 1	3
14.	(i) (ii)	(B) $ns^2 np^3$ Within a group atomic radii increases regularly with atomic number Correct reason	1 1 1	3
15.	(i) (ii) (iii)	Definition of electronegativity Pauling Scale / Mullikan-Jaffe Scale/ Allred - Rochow Scale Fluorine	1 1 1	3

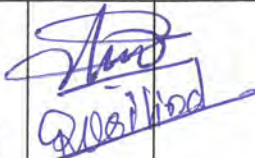
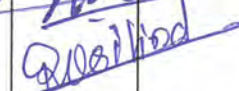
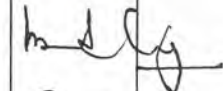


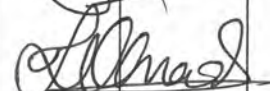

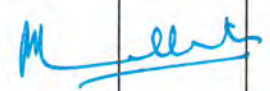
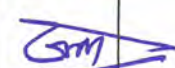

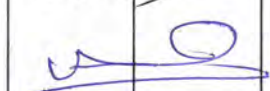
Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
16.		$V \propto \frac{1}{P}$ $V \propto T$ $V \propto n$ $V \propto \frac{nT}{P} / V = R \cdot \frac{nT}{P} /$ $PV = nRT$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $1 \frac{1}{2}$	3
17.	(i) (ii)	Definition of critical temperature Gas 'B' can be liquified easily When 'T <sub>c</sub> ' is high, intermolecular attraction holds the molecules close On cooling 'T <sub>c</sub> ' of gas 'B' is reached first.	1 1 1	3
18.	(i) (ii)	(D) $\Delta U \neq 0$ $w = -p\Delta V / w = p\Delta V$ $= -1 \text{ atm} \cdot (10-2) \text{ L} / = 1 \text{ atm} \cdot (10-2) \text{ L}$ $= -8 \text{ L atm} / = +8 \text{ L atm}$	1 1 1	3
19.	(i) (ii)	Since $Q_c > K_c$ , reaction will proceed in the direction of reactants (reverse direction) Increase in pressure favours forward reaction / Decrease in pressure favours backward reaction / explanation based on no. of moles	1 1	3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
		Increase in temperature favours reverse reaction (endothermic) / decrease in temperature favours forward reaction (exothermic)	1	
20.		$6 \text{Fe}^{2+}(\text{aq}) + \text{Cr}_2\text{O}_7^{2-}(\text{aq}) + 14 \text{H}^+(\text{aq}) \rightarrow$ $6 \text{Fe}^{3+}(\text{aq}) + 2 \text{Cr}^{3+}(\text{aq}) + 7 \text{H}_2\text{O}(\text{l})$ (Any two-correct steps - 2 score)	3	3
21.		Ionic / saline hydride One example Covalent / molecular hydride One example Metallic / non-stoichiometric / interstitial hydride One example	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
22.	(i)	(D) $(\text{CH}_3)_2\text{C} = \text{CHC}_2\text{H}_5$ Eclipsed conformation Staggered conformation	1 1 1	3
23.	(i) (ii)	(C) Nitrate Definition of smog One difference between classical smog and photochemical smog	1 1 1	3

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
24.		Two postulates of Bohr's model Two demerits of Bohr's model	2 2	4
25.		M.O. configuration of $N_2$ Bond Order = $\frac{N_b - N_a}{2}$ B.O. = 3 Diamagnetic behaviour	1 1 1 1	4
26.	(i) (ii) (iii)	Definition of entropy (a) Entropy decreases correct reason (b) Entropy increases correct reason $G = H - TS$ / $\Delta G = \Delta H - T\Delta S$	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1	4
27.	(i) (ii) (iii)	(D) $BCl_3$ Definition of buffer solutions Example of buffer solution (A) $CH_3COONa$	1 1 1 1	4



Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
28.	(i)	Any two similarities between Li & Mg	2	4
	(ii)	Biological importance of Na	1	
		Biological importance of Ca	1	
29.	(i)	Borax loses water molecules / swells up / turns to glass like material (borax bead) / correct equation	2	4
	(ii)	Correct equation / explanation	1	
	(iii)	$B_2H_6 \cdot 2NH_3$ / $B_3N_3H_6$ / Borazine / Inorganic benzene	1	
30.	(i)	(c) Carius method	1	4
	(ii)	Principle behind each technique (1-Score each)	3	
31.	(i)	$CH_2-CH_2-CH_2-Br$ / 1-Bromopropane	$\frac{1}{2}$	4
		$CH_3-\underset{\text{Br}}{\text{CH}}-CH_3$ / 2-Bromopropane	$\frac{1}{2}$	
		Major product : 2-Bromopropane	$\frac{1}{2}$	
		Minor product : 1-Bromopropane	$\frac{1}{2}$	
	(ii)	(a)  / Toluene / $C_6H_5-CH_3$	1	
	(b)  / Cyclohexane / $C_6H_{12}$	1		

Qn. No	Sub Qns	Answer Key/Value Points	Score	Total Score
1.	Indu.V. Gopan	9447045842		
2.	Rosilind Mathew	9847103443		
3.	BINESH : B	9495556880		
4.	SANIL R	9446064233		
5.	Jayaderan.P	9495473474		
6.	Setu Nadh. V.S	9447363199		
7.	Shibu.K.R	9447221515		
8.	Ratheesh, B	9497779551		
9.	Anil.D	9447585458		
10.	PREMJITH. K.M.	9447412423		
11.	Anand. N. S	9447591178		
12.	Jayam.N	9447015570	