NOTE:

1. Answers written with **Blue or Black** ink only to be evaluated.
2. Choose the correct answer and write with option code.
3. If one of them (option or answer) is wrong, then award Zero mark only.

MAXIMUM MARKS : 70

PART – I

15 x 1 = 15

	TYPE-A				TYPE-B	
Q. No	Option	Answers	Q. No	Option	Answers	
1	b	(1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)	1	b	$H_2N_2O_2$	
2	a	Electromagnetic separation	2	c	o-phenol sulphonic acid	
3	d	Sc	3	b	5F	
4	c	Therapeutic index	4	d	32%	
5	c	basic, acidic, basic	5	c	Both Assertion and Reason are true but Reason is not the correct explanation of Assertion	
6	b	TACGAACT	6	b	(1)-(ii), (2)-(i), (3)-(iv), (4)-(iii)	
7	c	2,4-dimethyl aniline	7	a	Electromagnetic separation	
8	b	5F	8	c	2,4-dimethyl aniline	
9	c	Both Assertion and Reason are true but Reason is not the correct explanation of Assertion	9	c	SN^2 reaction	
10	d	Lithium-ion battery	10	c	Therapeutic index	
11	b	$H_2N_2O_2$	11	d	Lithium-ion battery	
12	c	SN^2 reaction	12	d	Sc	
13	d	32%	13	a	half-life period	
14	a	half-life period	14	c	basic, acidic, basic	
15	c	o-phenol sulphonic acid	15	b	TACGAACT	

[1]

PART – II

Q.No. 24 is compulsory   2 × 6 = 12

16	Bleaching powder Correct equation Chlorine + calcium hydroxide (or) formula or name only (or) any correct explanation	2 1	2
17	(i) Tungsten- d block (ii) Ruthenium-d-block (iii) Promethium-f-block (iv) Einstenium-f-block (v)	4 × ½	2
18	(i) $[Cr(H_2O)_6]Cl_3$ (ii) $[Cr(H_2O)_5Cl]Cl_2.H_2O$ (iii) $[Cr(H_2O)_4Cl_2]Cl.2H_2O$ (Any two)	2 × 1	2
19	Octahedral void is **6** Tetrahedral void is **12**	2 × 1	2
20	Lewis acid : accept a pair of electron + any one example Lewis base: donate a pair of electron + any one example (or) any correct explanation + any one example	1 1 1+1	2
21	Dispersed phase : liquid Dispersion medium :solid	2 × 1	2
22	Pd/BaSO$_4$ BaSO$_4$ acts as catalytic poison to pd and prevents further reduction of aldehyde	1 ½ + ½	2
23	Correct Equation **(or)** not mentioning NaoH **(or)** Explanation only	2 1 ½ 1	2
24	due to the repulsive interaction between the two bulkier alkyl groups (or) due to steric effect (or) interaction	2	2

PART – III

Q.No. 33 is compulsory   3 × 6 = 18

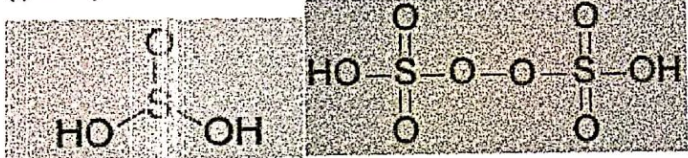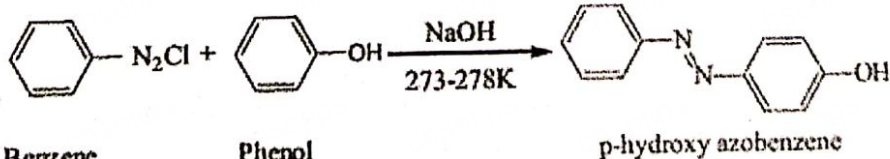| 25	Chromyl chloride test Balanced equation (only main equation) Unbalanced equation (or) Statement : (or) salt + Potassium dichromate + conc sulphuric acid gives red orange vapours	3 2 2 2	3

[2]

26	$[Sc(H_2O)_6]^{3+}$ colourless: (i) The Outer electronic configuration of central metal ion Sc^{3+} is $3d^0$ (ii) Due to presence of vacant or empty d-orbital (iii) d-d transition is not possible in this complex. So it is colourless.	1 1 1	3
27	Henderson equation $[H_3O^+] = K_a \dfrac{[acid]_{eq}}{[base]_{eq}}$ Or correct explanation for the above equation $-\log [H_3O^+] = -\log K_a - \log \dfrac{[acid]}{[salt]}$ $pH = pK_a + \log \dfrac{[salt]}{[acid]}$	1 1 1	3
28	Cathodic protection method: (i) By using metals such as Mg or Zn which is corroded more easily than iron can be used as sacrificial anode and the iron material act as cathode. (ii) Iron is protected, but Mg or Zn is corroded. (OR) Mere mentioning Mg, Zn	2 1 1	3
29	Shapes of colloids: (i) Spherical (ii) Disc or Plate like (iii) Rod like	1 1 1	3
30	(i) Formic acid contains both an aldehyde as well as an acid group, So formic acid reduces Tollens reagent. (ii) Acetic acid does not consist of aldehyde group, so it does not reduces Tollens reagent. (OR) Aldehyde group Carboxylic acid group	2 1 2	3
31	fibrous protein and globular proteins. <u>fibrous protein</u> linear molecules (or) insoluble in water (or) Example: Keratin (or)Collagen (or) any relevant explanation <u>globular proteins.</u> spherical shape (or) soluble in water (or) example : enzymes (or) myoglobin (or) Insulin (or) any relevant explanation.	1 1 1	3
32	<u>Advantages of food additives:</u>	3 x 1	3

	Any three advantages		
33	due to the presence of inner d and f-electrons which has poor shielding effect compared to s and p-electrons. (or) Any other relevant explanation	3	3

PART – IV

5 x 5 = 25

34 a	Zone refining fractional crystallization impurities will prefer to be in the molten region. Explanation Example Si (or) Ge(or) Ga (or semiconductors	1 1 2 1	5
(b)	(i) Conditions for catenation: Any two conditions. (ii) HF reacts with glass balanced equation (or) Any unbalanced equation (or) explanation	2 1 2 1	5
35 (a)	(i) Sulphurous acid – H_2SO_3 , Marshall's acid - $H_2S_2O_8$ (ii) IUPAC Name: (A) diamminesilver(I)ion (B) pentaamminechlorocobalt(III)ion (Hint: the ligand name "chloro" can also be written as "chlorido")	½ + ½ ½ + ½ 2 x 1 ½	5
(b)	(i) * Magnetic property: Unpaired electrons=4, or Paramagnetic Magnetic moment: $\mu_s = \sqrt{n(n+2)} = 4.899\,BM$ (ii) Frenkel defect: dislocation of ions / interstitial position. Explanation picture (or) example	1 ½ + ½ 1 1 1	5

[4]

36 (a)	Rate=k[A]^1 --------------------1 $$-\frac{d[A]}{dt} = k[A]^1$$ $$-\frac{d[A]}{[A]} = kdt \quad \text{--------------------1}$$ $$\int_{[A_0]}^{[A]} \frac{-d[A]}{[A]} = k\int_0^t dt \quad \text{--------------------1}$$ $$\ln\left(\frac{[A_0]}{[A]}\right) = kt \quad \text{--------------------1}$$ $$k = \frac{2.303}{t} \log\left(\frac{[A_0]}{[A]}\right) \text{----------1}$$ (or) Any correct equations		5	5

(b)	(i) pH value: (A) Vinegar – 2, or (acidic) (B) Black coffee – 5 or (acidic) (C) Baking soda – 9, or (basic) (D) Soapy water – 12 or (basic) (ii) $$\kappa = \frac{1}{R}\left(\frac{l}{A}\right)$$ $$\kappa = \frac{1}{15\Omega} \times \frac{1.5 \times 10^{-2}m}{4.5 \times 10^{-4}m^2}$$ $$= 2.22\, Sm^{-1}$$ $l = 1.5\ cm = 1.5 \times 10^{-2} m$ $A = 4.5\ cm^2 = 4.5 \times (10^{-4})m^2$ $R = 15\Omega$	$4 \times \frac{1}{2}$ 3×1	5

37 (a)	(i) <u>Differences between chemisorption and physisorption:</u> Any three differences (ii) Vulcanization Correct definition (or) Natural rubber and sulphur (mentioning these two only)	3×1 2 1	5
(b)	(i) <u>Coupling reaction of phenol:</u> Correct equation not mentioning NaoH (or) Explanation	2 $1\frac{1}{2}$ 1	5

[5]
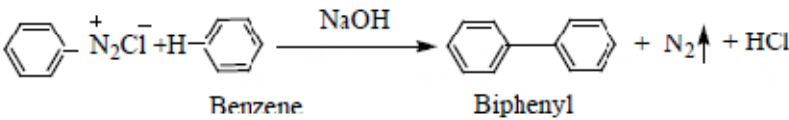
	(ii) <u>Preparation using Grignard reagent</u>:		$1^{1}/_{2}$	
	(A) Correct equation using H-CHO and C_2H_5-MgBr (OR) Any other correct equation (Grignard reagent must)		$1^{1}/_{2}$	

	(B) Correct equation using CH_3-CHO and CH_3-MgBr
	(OR)
	       Any other correct equation (Grignard reagent must)
	(OR)
	         Explanation only
			$½ + ½$	

38 (a)	(i) <u>Formalin</u>: 40% aqueous solution of formaldehyde is called formalin. Use : Any one use		1 1	5
	(ii) <u>Glycosidic linkage</u>: In disaccharides or (Oligo) or (Poly saccharides) two monosaccharide's are linked by oxide linkage called glycosidic linkage.		3	
(b)	(i) <u>Gomberg reaction</u>:Correct equation (OR) not mentioning NaOH - (or) Explanation only (ii) A – CH_3CN (or) Methyl cyanide (or) ethanenitrile B – CH_3NC (or) Methyl isocyanide.		3 $1½$ 1 1 1	5

38 (a)	(i) **Formalin:**		
	40% aqueous solution of formaldehyde is called formalin.	1	
	Use : Any one use	1	
	(ii) **Glycosidic linkage:**		5
	In disaccharides or (Oligo) or (Poly saccharides) two monosaccharide's are linked by oxide linkage called glycosidic linkage.	3	
	(OR)		
	Any correct structure showing Glycosidic linkage	3	
(b)	(i) **Gomberg reaction:**		
	Correct equation		
		3	
	(or)		5
	not mentioning NaOH -	2 ½	
	(or)		
	Explanation only	1	
	(ii) A – CH_3CN (or) Methyl cyanide (or) ethanenitrile	1	
	B – CH_3NC (or) Methyl isocyanide.	1	

Sd/-

DIRECTOR