DEPARTMENT OF GOVERNMENT EXAMINATIONS
HIGHER SECONDARY SECOND YEAR EXAMINATION - MARCH – 2018
KEY ANSWERS FOR CHEMISTRY

Note : 1. Answers written only in BLUE or BLACK should be evaluated.
2. In Part – I the correct answer should have been written with the option code.
3. If one of them (option or answer) is wrong, then award zero mark only .

PART - I

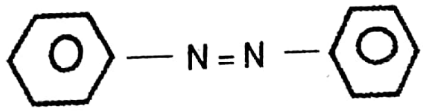
Q.No.		TYPE - A	Q.No.		TYPE - B
1	b	Formaldehyde	1	d	2
2	a	Hydrolysed to only glucose	2	d	gel
3	b	p- benzoquinone	3	a	$CH_3\ CH_2COOH < CH_3COOH < HCOOH < ClCH_2COOH$
4	b	Less boiling point and low solubility in water	4	b	0.025
5	a	Equal to k_c	5	d	$C_2H_5 - O - C_2H_5$
6	b	Ferric chloride	6	d	1 – nitro 2 - propanol
7	d	gel	7	a	3α , 4β
8	b	Sc^{3+}	8	d	3
9	a	3α , 4β	9	b	Sc^{3+}
10	c	$[Rn]\ 5f^{0-14}\ 6d^{0-2}\ 7s^2$	10	b	Less boiling point and low solubility in water
11	a	$CH_3\ CH_2COOH < CH_3COOH < HCOOH < ClCH_2COOH$	11	a	Promethium
12	d	It is only partially ionized	12	a	Larger halogen
13	d	4	13	c	Hydrazo benzene
14	d	d- block elements	14	b	Spontaneous
15	b	spontaneous	15	b	p- benzoquinone
16	d	1- Nitro -2 – propanol	16	a	Less than 21 Cal deg^{-1} $mole^{-1}$
17	d	Protonation	17	a	It forms multimolecular layers on adsorbate
18	a	Larger halogen	18	d	Protonation
19	c	Hydrazo benzene	19	b	formaldehyde
20	a	Less than 21 Cal deg^{-1} $mole^{-1}$	20	d	d-block elements
21	d	Order	21	a	Hydrolysed to only glucose
22	a	It forms multimolecular layers on adsorbate	22	d	Electron affinity of elements having $d^{10}s^2$ configuration is negative
23	b	Glycine	23	a	Phenol
24	a	Phenol	24	b	Glycine
25	d	2	25	b	Ferric chloride
26	d	Electron affinity of elements having $d^{10}s^2$ configuration is negative	26	c	$[Rn]\ 5f^{0-14}\ 6d^{0-2}\ 7s^2$
27	d	3	27	d	Order
28	b	0.025	28	d	4
29	a	Promethium	29	a	Equal to k_c
30	d	$C_2H_5 - O - C_2H_5$	30	d	It is only partially ionised

388-36 (4,500 Cps)-1

PART – II

15×3=45

Q. NO			
31	Correct statement	1	3
32	$d_{(si-c)} = r_{(si)} + r_{(c)}$ (or) $r_{(si)} = d_{(si-c)} - r_{(c)}$ $r_{(si)} = 1.93 - 0.77$ $r_{(si)} = 1.16A^0$	1 ½ + ½ 3×1	3
33	Uses of Neon Any Three uses	1 2	3
34	Tri basic acid : H_3PO_4 (or) Phosphoric acid (or) ortho phosphoric acid Correct electron dot structure	1 ½	3
35	(i) Small size and high positive charge density (ii) Presence of vacant (n-1) d orbitals which are of appropriate enegy to accept lone pair or unshared pair of electrons from the ligands for bonding with them	1 ½	
36	$2\ K_2CrO_4 + H_2SO_4 \rightarrow K_2Cr_2O_7 + K_2SO_4 + H_2O$ Yellow colour to orange red Un balanced equation or mere statement ..... (1)	2 1	3
37	$\tau = \frac{t\ 1/2}{0.693}$ (or) $\tau = \frac{1}{\lambda}$ $\tau = 1.44\ t\ ½$ $\tau = \frac{140}{0.693}$ **(OR)** $\tau = 1.44$ X 140 τ =202.02 days $\tau = 201.6$ days	1 1 ½ + ½	3
38	Super Conducting Transition temperature Correct definition		3
39	Entropy change $\Delta S_{trans} = \frac{\Delta H\ trans}{T\ trans}$ $\Delta S_{trans} = \frac{2090}{286}$ $\Delta S_{trans} = 7.307\ JK^{-1}mol^{-1}$	1 1 ½ + ½	3
40	Reaction Quotient Correct definition (Without mentioning non – equilibrium Condition) ..... (2) $Q = \frac{[L]^l\ [M]^m}{[A]^a\ [B]^b}$ Only..... (1)		3
41	Identifying type of Complex reaction a) Parallel/side reaction b) Opposing/Reversible reaction c) Consecutive/sequential reaction	1 1 1	
42	Characteristics of first order Any two characteristics	2 × 1 ½	

43	Tyndall Effect Correct explanation		3
44	Phenolphthalein The PH value changes from 6.5 to 10 Working range of phenolphthalein is 8.3 to 10	1 1 1	3
45	Racemic Mixture Correct statement any one example	 2 1	 3
46	Complete the reaction $CH_3CH_2OH \xrightarrow[620\ K]{Al_2O_3} CH_2 = CH_2$ (or) C_2H_4 Name : Ethylene or Ethene	 2 1	 3
47	Reason for not formation of Ethanol Formaldehyde is easily oxidised than benzaldehyde		3
48	Malachite green is triphenyl methane dye Correct equation without conc. H_2SO_4 or Mere Statement 1	1 2	3
49	Trans esterification Correct equation without H^+ (or) acid ..... (2) mere explanation ..... (1)		3
50	$C_6H_5CONH_2 \xrightarrow[KOH]{Br2} C_6H_5NH_2 \xrightarrow{CoCl_2} (C_6H_5\text{-}NH)_2C{=}O$ (A) Benzamide (B) Aniline / amino benzene (Or) Just mentioning name (or) structure (C) s- diphenyl urea	3×1	3
51	CHROMOGEN  (or) Azo Benzene CHROMOPHORE - N = N – (or) Diazo AUXOCHROME - OH (or) Hydroxy	1 1 1	3
	PART III SECTION-A		**7×5=35**
52	O_2 molecule MO diagram ➢ Electronic configuration of oxygen Z=8 only ..... ½ ➢ Molecular Electronic configuration of O_2 oxygen molecule =16e only .... ½ ➢ MO energy level diagram ➢ Bond order =2	1 1 2 1	5

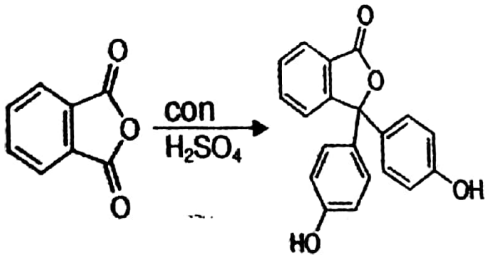
53	Zinc Extraction Ore : Zinc Blende Or ZnS Concentration:- Froth Floatation Process Roasting ;- Balanced Correct Equation Unbalanced Equation (**Or**) without temperature (**Or**) Mere Explanation. . (1) Reduction:- Correct Equation Without temperature (**Or**)Mere Explanation .....(½) Purification: Anode:- Impure Zn Cathode:- Pure Zn Electrolyte :- $ZnSO_4$+Dil.H_2SO_4	½ ½ 1 ½ 1 ½ ½ ½	5
54	Uses of lanthanides and actinides Three uses of lanthanides (3x1) Two uses of actinides (2x1)	3 2	5
55	$[Ni(pph_3)_2Cl_2]$ (i) IUPAC name :Dichlorobis (triphenylphosphine)nickel (II) (ii) Central metal ion :- nickel II **(OR)** Ni^{2+} **(OR)** Ni(II) (iii) Ligands : pph_3,cl^- **(OR)** Triphenylphosphine, chloro (iv) Co-ordination number : 4 (v) Nature of the complex: neutral	1 1 ½+½ 1 1	5
56	Section B Statements of II law of Thermodynamics 5 Statements	5×1	5
57	Relation between k_p and k_c General equation Expression for k_c Expression for k_p $C_i = p_i / RT$ (or) $p_i = C_i RT$ Substitution $K_c=K_P/(RT)^{\Delta ng}$ (or) $K_P= K_C(RT)^{\Delta ng}$	½ 1 1 ½ 1 1	5
58	Rate constant for the decomposition of H_2O_2 $H_2O_2 \xrightarrow{Pt} H_2O + 1/2\ O_2$ Explanation : The progression of the reaction is followed by titrating equal volumes of reaction mixture at regular time intervals against std $KMnO_4$ $V_0 \ \alpha \ a$ $V_t \ \alpha \ (a-x)$ $K_1 = \frac{2.303}{t} \log \frac{V_0}{V_t}$	1 1 1 1 1	5

59	Standard Free Energy $E^{o}_{cell} = E^{o}_{R} - E^{o}_{L} = -0.25-(-0.76)$ (1) (1/2) $E^{o}_{cell} = +0.51$ v ---------- (½ + ½) $\Delta G^{o} = -nfE^{o}_{cell}$ $\Delta G^{o} = -2\times96495\times0.51$ $\Delta G^{o} = -97460$ J (or) -97.46 KJ (or) 98425J (or) 98.425KJ	1 ½ 1 1 ½ ½ + ½	5
60	Section C Anisole prepration Williamson 's synthesis Using diazomethane Manufacture of anisole without NaOH ..... (1) Mere statements ..... (1+1+1)	2 1 ½ 1 ½	5
61	Claisen Schmidt reaction mechanism $CH_3CHO \xrightarrow{NaOH} \bar{C}H_2CHO$ $C_6H_5CH=O + \bar{C}H_2CHO \xrightarrow{NaOH} C_6H_5CH(\bar{O})CH_2CHO$ $C_6H_5CH(\bar{O})CH_2CHO \xrightarrow{H^+} C_6H_5CH(OH)CH_2CHO$ $C_6H_5CH(OH)CH_2CHO \xrightarrow[-H_2O]{} C_6H_5CH=CH-CHO$ Instead of acetaldehyde acetone can also be used.	2 1+1 1	5
62	ISOMERISM Chain isomerism:- Explanation + example (1 ½) (1) Functional isomerism:- Explanation + example (1 ½) (1)	2 ½ 2 ½	
63	Rocket propellants / chemical propellants Definition Oxidiser, fuel Working of propellants Newton's third law one example	1 1 1 1 1	

PART - IV

4x10=40

64 (a)	Electron affinity	1	5
	Electron affinity $\alpha \frac{1}{atomic\ size}$	1	
	Electron affinity α effective nuclear charge	1	
	Electron affinity $\alpha \frac{1}{shielding\ effect}$	1	
	Electronic configuration Complete (or) half filled electronic configuration leads to zero (or) low electron affinity	1	
	Example Mere mentioning of four factors (4x½=2)		
64 b)	Isolation of Fluorine	1	5
	Diagram	1½	
	Explanation		
	$KHF_2 \rightarrow KF+HF$ $HF \rightarrow H^+ + F^-$ $2H^+ + 2e^- \rightarrow H_2$ at cathode $2F^- - 2e^- \rightarrow F_2$ at anode (5 × ½)	2½	
	purification $NaF+HF \rightarrow NaHF_2$ (or) statement		
65 a)	Hydrate (solvate) and linkage isomerism	3	5
	Correct explanation (1½ +1 ½)	2	
	Example (1+1)		
65 b)	Uses of radio active isotopes		5
	In Photosynthesis	1½	
	Explanation	1	
	Equation		
	Unbalanced equation ..... ½		
	In ester hydrolysis	1½	
	Explanation	1	
	Equation		
66 a)	Ionic Crystals		5
	1. Heat of vapourisation – high	½	
	2. Vapour pressure at ordinary temperature – low	½	
	3. Melting and boiling point – very high	1	
	4. Hard and brittle	1	
	5. Insulators in solid state	½	
	6. Soluble in water and polar solvents	1	
	7. Good conductors when dissolved in water	½	
b)	Adsorption theory	1	5
	Equation	4	
	4 steps, Explanation with diagram.....(4×1)		
	Diagrams & Headings.....(4×½ =2)		
	Diagrams (or) Headings only ..... (4×¼ =1)		
67 a)	Evidences in Favour of Arrhenius theory		5
	1 to 4 points .....(4x1)	4	
	5th point	½	
	6th point	½	

b)	**Nernst – equation** $A+B \leftrightarrows C+D$ $-\Delta G = -\Delta G^{o} - RT \ln J$ Explanation of J $-\Delta G = -\Delta G^{o} - RT \ln \frac{ac \times a_D}{a_A \times a_B}$ (4 X½)	2	
	$-\Delta G = nFE$	1	5
	$E = E^0 - \frac{RT}{nF} \ln \frac{ac \times a_D}{a_A \times a_B}$ (or) $E = E^0 - \frac{RT}{nF} \ln \frac{[C][D]}{[A][B]}$	1	
	$E = E^0 - \frac{RT}{nF} \ln K$ (or) $E = E^0 - 2.303 \frac{RT}{nF} \log K$	1	
68 a)	**Cis – trans isomerism** Cis explanation Structure of cis form Trans explanation Structure of trans form	1½ 1 1½ 1	5
68 b)	**Oxalic acid Preparation** (i) Laboratory method : correct balanced equation without con HNO_3/V_2O_5 (or)Mere explanation (or)Unbalanced equation.. (1) (ii) Industrial method Correct equations ..... (1+1+1) Mere statements ..... (½+½+½ = 1½)	2 3	5
69 a)	**Differences between primary secondary, tertiary amines** Five differences	5x1	5
69 b)	**Polysaccharides** General formula $(C_6H_{10}O_5)_n$ Oxide bridge / glycosidic linkages (or) polymers of monosaccharides (or) hydrolysed to give monosaccharides Example Explanation about starch (or) cellulose (Two points).....(2x1)	1 1 1 2	5
70 a)	$C_6H_5OH \xrightarrow{Zn} C_6H_6 + ZnO$ (A) (B)	1	
	$2\,C_6H_5OH$ +  (C)	1 1	5
	(A) Phenol (or) Structure (B) Benzene (or) Structure (C) Phenolphthalein (or) Structure	1 1 1	

70 b)

$2Cu + O_2 \xrightarrow{\text{Below 1370 k}} \underset{(B)}{2\ CuO}$ — 1

$4\ Cu + O_2 \xrightarrow{\text{above 1370k}} \underset{(C)}{2\ Cu_2O}$ — 1

$Cu + 4\ HNO_3(con) \rightarrow \underset{(D)}{Cu(NO_3)_2} + 2NO_2 + 2H_2O$ — 1

Unbalanced equation ..... (½+½+½=1½)

A) Copper (or) Cu
B) Cupric oxide (or) CuO
C) Cuprous oxide (or) Cu_2O
D) Cupricnitrate (or) $Cu(NO_3)_2$

.....4x½ — 2

5

70 (c)

$3\ C_6H_5CHO + 2NH_3 \rightarrow \underset{(A)}{C_6H_5CH=N-CH-N=CHC_6H_5} + 3H_2O$ — 1

(B)

$2\ C_6H_5CHO \xrightarrow{\text{Alcoholic KCN}} \underset{(C)}{C_6H_5CH(OH)COC_6H_5}$ — 1

A) Benzaldehyde (or) phenylmethanal (or) C_6H_5CHO — 1
B) Hydrobenzamide (or) Structure — 1
C) Benzoin (or) $C_6H_5CHOHCOC_6H_5$ — 1

5

70 d)

Henderson equation

$$PKa = -logKa = -\log(1.34 \times 10^{-5})$$ — 1+1

$$PKa = 4.87$$ — ½

$$PH = Pka + \log\frac{[salt]}{[acid]}$$ — 1

$$PH = 4.87 + \log\frac{[0.5]}{[0.5]}$$ — 1

$$PH = 4.87$$ — ½

5

(OR)

$C_2H_5COOH \rightleftarrows C_2H_5COO^- + H^+$

(or)

$C_2H_5COOH \rightarrow C_2H_5COO^- + H^+$

.....(1)

$K_a = \frac{[C_2H_5COO^-][H^+]}{[C_2H_5COOH]} = \frac{0.5 \times [H^+]}{0.5}$ .....(½+½)

$= [H^+]$ .....(½)

$pH = -log[H^+]$ .....(½)

$= -logK_a = -\log(1.34 \times 10^{-5})$ .....(½+½)

$pH = 4.87$ .....(1)