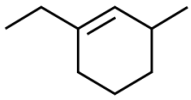
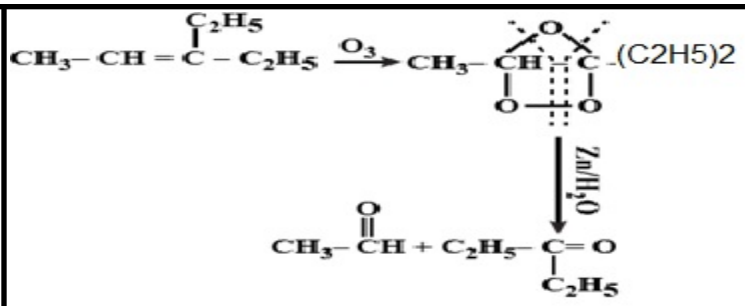
Marking Scheme of SEE-2023 Question Paper SET-1

Chemistry XI

2022-23

Q.No.	Value points	Step wise marks	Total marks
1	(d)	1	1
2	(a)	1	1
3	(b)	1	1
4	(a) or (c)	1	1
5	(d)	1	1
6	(c)	1	1
7	(b)	1	1
8	(a)	1	1
9	(b)	1	1
10	(d)	1	1
11	(c)	1	1
12	(d)	1	1
13	(a)	1	1
14	(c)	1	1
15	(b)	1	1
16	(d)	1	1
17	(a) Or (d)	1	1
18	(a)	1	1
19	Moler Mass of $CaCO_3$- 100gm Mol^{-1},Ca 40%,C 12% ,O 48%	½,1/2,1/2,1/2	2
20	Correct definition of extensive and intensive properties with one example of each.	4 x ½	2
21	Given equations-		

	(i) $CH_3OH(l) + 3/2\ 0_2(g) \longrightarrow CO_2(g) + 2H_20(l)$; $\Delta_rH^- = -726 kj\ mol^{-1}$ ……..(i) (ii) $C(s) + 0_2(g) \longrightarrow C0_2(g)$; $\Delta_CH^- = -393\ kj\ mol^{-1}$ ……(ii) (iii) $H_2(g) + ½\ 0_2(g) \longrightarrow H_20(l)$; $\Delta_fH^- = -286\ kj\ mol^{-1}$ ……..(iii) Required equation: $C(s) + 2H_2(g) + l/20_2(g) \longrightarrow CH_3OH(l)$; $\Delta_fH^- = \pm?$ On multiplying eqn. (iii) by 2 and adding to eqn. (ii), we get- $C(s) + 2H_2(g) + 20_2(g) \longrightarrow C0_2(g) + 2H_20(l)$ ……..(iv) $\Delta H = (-393) + (2 \times -286) = -965\ kJ\ mol^{-1}$ On subtracting eqn. (i) from eqn. (iv)- Subtract: $C(s) + 2H_2(y) + l/20_2(g) \longrightarrow CH_3OH(Z)$ $\Delta_fH = -965 kj\ mol^{-1} - (-726\ kJ\ mol^{-1}) = -239\ kj\ mol^{-1}$ Or Correct statement of Hess's Law of constant heat summation and any two applications – i.e., to determine …. (i) the heat of formation, combustion etc. (ii) enthalpies of reactants and products (iii) bond enthalpies (iv) lattice energies of the crystalline solids	1 1 1 ½ + ½	2 2
22	$\Delta n = 3-2 = 1$ Since, $K_p = K_c . (RT)^{\Delta n}$ Or $K_c = \frac{K\,p}{(RT)\,n} = \frac{(1.8\ x\ 10\text{^}-2\ )}{(0.0821\ x\ 500)} = 4.4 \times 10^{-4}\ mol\ L^{-1}$	½ ½ 1	2
23	(i) 2,5-Dimethylheptane (ii) 	1+ 1	2
24	Mass of the compound = 0.468 g Mass of barium sulphate= 0.668 g $\text{Percentage of sulphur} = \frac{32}{233} \times \frac{\text{Mass of barium sulphate}}{\text{Mass of compound}} \times 100$ $= \frac{32}{233} \times \frac{(0.668\ g)}{(0.468\ g)} \times 100 = \mathbf{19.60\%}$	1 1	2
25		1	2

	 IUPAC name: 3-Ethylpent-2-ene	1	
26	(*i*) 1 mol of N_2 *i.e.*, 28 g react with 3 mol of H_2, *i.e.*, 6 g of H_2 $\therefore$ 2000 g of N_2 will react with $H_2 = \frac{6}{28} \times 200$ g = 428.6 g. Thus, N_2 is the limiting reagent while H_2 is the excess reagent. 2 mol of N_2, *i.e.*, 28 g of N_2 produce NH_3 = 2 mol = 34 g $\therefore$ 2000 g of N_2 will produce $NH_3 = \frac{34}{28} \times 2000$ g = **2428.57 g** (*ii*) H_2 will remain unreacted. (*iii*) Mass left unreacted = 1000 g – 428.6 g = 571.4 g	1 1 ½ ½	3
27	(i) Correct statement. (ii) Correct configuration. (iii) Correct structure	1 1 1	3
28	(a) (i) F > N > C > B > Si (ii) Cl > F > Br > I (b) (i) 3rd period, group = 16 (ii) 4th period, group = 4	½ + ½ 1 + 1	3
29	Given that, ΔH = 40.0 kJ mol^{-1} = 40000 J mol^{-1}, ΔS = 120.0 JK^{-1} mol^{-1} , T= 300 K Since, $\Delta G = \Delta H - T.\Delta S$ = 40000 J mol^{-1} – 300K x 120.0 JK^{-1} mol^{-1} ΔG = (40000 – 36000) J mol^{-1} = 4000 J mol^{-1} Since ΔG comes out to be positive (i.e., $\Delta G > 0$), the reaction is not feasible in the forward direction.	½ + ½ 1 1	3
30	Correct steps of balanced half oxidation & reduction equations. Correct balanced equation.	1 + 1 1	3
31	(i) (a)NH_2^- (C.B.) □NH_3□ NH_4^+ (C.A.) (b) CO_3^{2-} (C.B.)□HCO_3^-□H_2CO_3(C.A.) (ii) Kw= $[H^+][OH^-]$=1x10^{-14} at 25 ^oC	1	

	For neutral $[H^+] = [OH^-]$ $Kw=[H+]^2=1x10^{-14}$ $[H^+]$=1x110-7 gmionLitre^{-1} (iii) Conc.^{n} of HCl = 2X10^{-6} M, therefore $[H^+]$ from HCl = 2X10^{-6} M Now, pH = $-\log_{10} [H^+] = -\log_{10} (2 \times 10^{-6}) = 5.699$	1 1+1	4
32	(i) $O_2NCH_2CH_2O^-$, due to -I effect of $-NO_2$ group. (ii) Correct resonating structures. (iii) $CH_3+ < CH_3CH_2+ < (CH_3)_2CH+ < (CH_3)_3C+$	1 1+1 1	4
33	(a) Correct statement. (b) Since, Δx. mΔv = h/4π $\Delta v = \frac{h}{4\, m\, .\, x}$ $= \frac{6.626\ x\ 10^\wedge-34}{4\ x\ 3.14\ x\ 10^\wedge-2\ x\ 10^\wedge-5}$ $= 5.27 \times 10^{-28}$ m/s Or (a) Correct derivation. (b) Since λ = h/mv = $(6.626 \times 10^{-34}\ kg\ m^2\ s^{-1}) / (9.1 \times 10^{-31}\ kg) \times (2.05 \times 10^7\ ms^{-1})$ = 3.55×10^{-11} m.	1+1 1	5 1 1 2 1 1 1
34	(a) Correct definition (b) Correct differences (any two). (c) PCl_5 – sp^3d , trigonal bipyramidal , NH_3 – sp^3 , pyramidal. Or (a) Due to intermolecular hydrogen bonding present between water molecules. (b) Correct Structure of SF_6 (c) O_2 : B.O.=2 , paramagnetic O_2^- : B.O.=1.5 , paramagnetic & O_2^2 : B.O.=1 , diamagnetic	1 1+1 1+1 1 1 1+1+1	5
35	(a) Planarity of molecule, follows Huckel's rule of aromaticity. (b) Correct named reactions. Or (a) Correct conversions. (b) (i) CH_3-CH(Br)-CH_3 (ii) CH_3-CH_2-CH_2-Br (iii) CH_3-CH=CH-CH_3	2 1+1+1 1+1 1+1+1	2 + 3 2 3