Marking Scheme of Supplementary Exam-2024

Class- XI; Subject- Chemistry (043)

Session: 2023-24

Q.N.	Value points	Step wise marks	Total marks
1	(c) 0.1 mole of O_2	1	1
2	(b) 9	1	1
3	(d) sum of number of protons & neutrons is same but the number of protons is different.	1	1
4	(c) Electron	1	1
5	(a) B < Al < Mg < K Or (d) 101	1	1
6	(c) A_2B_3	1	1
7	(a) H_2O	1	1
8	(c) H_2S	1	1
9	(b) Alkyl halides	1	1
10	(b) $O_2NCH_2CH_2O^-$, due to -I effect.	1	1
11	(d) A & C	1	1
12	(a) CH_3Cl + anhyd. $AlCl_3$	1	1
13	(a) Or (d)	1	1
14	(c)	1	1
15	(a)	1	1
16	(a)	1	1
17	Law of multiple proportion. Correct statement.	1+1	2
18	(a) 1s (b) 3p (c) 4d (d) 4f	4 x ½	2
19	(i) NH_3 , correct reason. (ii) Correct reason.	1 x 2	2
20	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.	1 ½ + ½	2

	(ii) enthalpies of reactants and products (iii) bond enthalpies (iv) lattice energies of the crystalline solids Or Given equations- (i) $CH_3OH(l) + 3/2\ 0_2\ (g)$ ———-> $CO_2\ (g) + 2H_20\ (l)$; $\Delta_rH^- = -726kj\ mol^{-1}$ ……..(i) (ii) $C(s) + 0_2\ (g)$ ————>$C0_2\ (g)$; $\Delta_CH^- = -393\ kj\ mol^{-1}$ ……(ii) (iii) $H_2(g) + ½\ 0_2(g)$ ————->$H_20\ (l)$; $\Delta_fH^- = -286\ kj\ mol^{-1}$ ……..(iii) Required equation: $C(s) + 2H_2(g) + l/20_2(g)$ ———> $CH_3OH\ (l)$; $\Delta_fH^- = \pm?$ On multiplying eqn. (iii) by 2 and adding to eqn. (ii), we get- $C(s) + 2H_2(g) + 20_2(g)$ ————->$C0_2(g) + 2H_20(l)$ ……..(iv) $\Delta H = (-393) + (2 \times -286) = -965\ kJ\ mol^{-1}$ On subtracting eqn. (i) from eqn. (iv)- Subtract: $C(s) + 2H_2(y) + l/20_2(g)$ ———-> $CH_3OH(Z)$ $\Delta_fH = -965kj\ mol^{-1} - (-726\ kJ\ mol^{-1}) = -239\ kj\ mol^{-1}$	1 1	2
21	(i) 4-Oxopentanoic acid (ii) Correct structure.	1 1	2
22	(i) Correct statement. (ii) Balmer series, visible region. (iii) Correct definition.	1 1	3
23	(i) Correct reason. (ii) Correct reason. (iii) Correct reason.	1 1 1	3
24	Correct definitions of C_p and C_v and correct derivation. OR a) Correct definition and example. b) Correct difference with example.	1 + 2	3
25	Correct steps of balanced half oxidation & reduction equations. Correct balanced equation.	1 + 1 1	3
26	Correct differences. Nucleophiles: HS^- ,$C_2H_5O^-$: have an unshared pair of electrons which can be donated and shared with an electrophile. Electrophile: BF_3 ,Cl^+ : have only six electrons which can accept electrons from a nucleophile.	1 1 1	3

27	Mass of the compound = 0.3780 g Mass of silver chloride = 0.5740 g $\text{Percentage of chlorine} = \frac{35.5}{143.5} \times \frac{\text{Mass of siliver chloride}}{\text{Mass of compound}} \times 100$ $= \frac{35.5}{143.5} \times \frac{(0.5740\ \text{g})}{(0.3780\ \text{g})} \times 100 = \mathbf{37.57\ g}$	 1 1+1	3
28	Correct statement. Characteristics: Planarity, (4n+2)pi electrons & complete delocalisation of pi-electrons in the ring.	1 2	3
29	(1) 3 g of H_2 require $O_2 = \frac{32 \times 3}{4} = 24.0$ g. Therefore, H_2 is the limiting reagent. (2) Correct definition and reason (3) (iii) $C_6H_{12}O_6$ (4) (ii) C & D	½ + ½ 1 1 1	4
30	(i) (d) ΔS = -ve & ΔH = -ve (ii) ΔG = ΔH - T ΔS, At equilibrium, ΔG = 0 so that ΔH = T ΔS or T = $\frac{H}{S} = \frac{-10000}{-33.3}$ = 300.3 K Or For the given reaction, $\Delta G° = \Delta H° - T\Delta S° = -12.98\ \text{kJ} - 298(-44.1 \times 10^{-3}\ \text{kJ}) = 0.16\ \text{kJ}$ As ΔG° comes out to be positive, the reaction will not occur spontaneously. (iii) (a) Spontaneous at all T conditions. (b) Spontaneous at high T and non-spontaneous at low T.	1 ½ ½ 1 1 1 ½ ½	4
31	Correct definition. PCl_5 – sp^3d & SF_6 – sp^3d^2. Correct reason. Or (a) Correct resonating structure. (b) B.O. of $O_2 = 2$ & $N_2 = 3$, relative stability $N_2 > O_2$. O_2 – Paramagnetic & N_2 – Diamagnetic.		1+2+2
32	(a) $Q_c = [NH_3]^2 / [N_2]\,[H_2]^3 = 2.0 \times 10^2$ As $Q_c > K_c$, the reaction mixture is not in equilibrium and the net reaction will be in the backward direction. (b) Common ion effect & correct explanation. (c) NH_4^+ => NH_3 (Conjugate base) and CO_3^{2-} => HCO_3^- (Conjugate acid) Or (a) Δng = 3-2 = 1		1 1 1+1 ½ + ½ ½ 1

	$K_c = K_p / (RT)^{\Delta ng} = (1.8 \times 10^{-2}$ atm) / (0.0821 L atm K^{-1} mol^{-1} x 500 K)^1 $= 4.4 \times 10^{-4}$ mol L^{-1}. (b) $K_{sp} = (2y)^2(3y)^3 = 108\ y^5$ (c) Correct definition and types with one example of each.		½ 1 1+1
33	(a) Correct structure and IUPAC name: 3-Ethylhex-3-ene. (b) Correct equations. (c) Cyclic polymerisation leading to formation of benzene. Correct equation. Or (a) (i) Correct reaction (ii) Correct reaction (b) correct statement with example (c) (i) Correct reaction (ii) Correct reaction.		½ + ½ 1+1 1+1 1 1 1 1 1