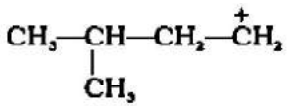
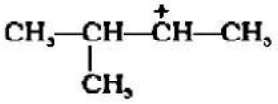
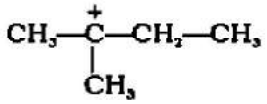
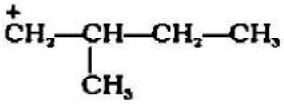
(v) Answer Key/Value Points

Sl No.		Answer Key/Value Points	Score	Total
1	a.	Avogadros Law	(1)	4
	b.	(b) 2 g	(1)	
	c.	For determining number of moles	(1)	
		For determining correct EF (CH_3)	(1)	
2	a.	(c) 3 (No. radial nodes – n-l-1 – 5-1-1–3)	(1)	5
	b.	Correct scehmatic diagram	(1)	
		Three correct observations	(1 ½)	
		Three correct conclusions	(1 ½)	
		OR	**OR**	
		A set of numbers which give information like size, shape and orientation of the orbials.	(1)	
		For writing the four quantum numbers	(1)	
		For writing the values of each	(1)	
		For writing the significance of each	(1)	
3	a.	The physical and chemical properties of the elements are periodic functions of their atomic numbers.	(1)	4
		Elements are arranged in the increasing order of atomic numbers	(½)	
		An element's location in the periodic table reflects the quantum numbers of the last orbital filled. (Or any two relevant features).	(½)	
	b.	Ionisation enthalpy decreases from top to bottom in group 1.	(1)	
		Elements are arranged in the increasing order of atomic numbers	(½)	
		Down the group increase in shielding outweighs the increasing nuclear charge.	(½)	
4	a.	For drawing the correct Lewis structure.	(1 ½)	5
		For assigning formal charge to each atom	(1 ½)	
	b.	For writing correct electronic configuration.	(1)	
		For calculating bond order (=3)	(1)	
		OR	**OR**	
		BCl_3 - sp^2 - Trigonal Plannar	(1)	
		NH_3 - sp^3 - Trigonal Pyramidal	(1)	
5	a.	**(iii)** $p_1 < p_2 < p_3 < p_4$	(1)	4
	b.	Correct derivation ($d = \frac{pM}{RT}$)	(1)	
		Correct substitution	(1)	
		Correct answer with unit (1.3 g L^{-1})	(1)	

Sl No.	Answer Key/Value Points	Score	Total
6	**a.** **No** In the given reaction $CaCO_3$ is not formed from its constituent elements in their reference state. **b.** Correct formulation of given datat into three thermochemical equations Correct substitution [(Eq 1) + 2x(Eq 2) +-(Eq 3)] Correct answer with unit (-74.8 kJ mol^{-1})	**(1)** **(1)** **(½)** **(1)** **(½)**	**4**
7	**a.** (iv) 2 **b.** **(iii)** 0.1 mol dm^{-3} NH_4OH and 0.05 mol dm^{-3} HCl **c.** Since the forward reaction is exothermic low temperature increases the yield. An optimum temperature of about 700 K is used to ensure attainment of equilibrium. Since number of moles decreases in the forward reaction a high pressure increases the yiled of NH_3. A pressure of about 200 atm is applied. When an inert gas argon is added at constant volume the equilibrium remains undisturbed because it does not change the partial pressures or the molar concentrations of the substance involved in the reaction.	**(1)** **(1)** **(1)** **(1)** **(1)**	**5**
8	For writing the correct balanced equation with all the required steps. $6Fe^{2+}_{(aq)} + Cr_2O_7^{2-}{}_{(aq)} + 14\,H^+_{(aq)} \rightarrow 6Fe^{3+}_{(aq)} + 2Cr^{3+}_{(aq)} + 7H_2O_{(l)}$ [If only the balanced equation is written credit 2 scores and if only the correct oxidation states are written credit only 1 score.] **OR** Special type of redox reactions in which an element in one oxidation state is simultaneously oxidised and reduced. In the given reaction P (oxidation state = 0) is reduced to PH_3 (oxidation state of P is -3) and oxidised to $H_2PO_{2\,(aq)}^-$ (oxidation state of P is +1)	**(3)** **OR** **(1)** **(2)**	**3**
9	**a.** **(i) & (ii)** **b.** Acidifying hydrated barium peroxide and removing excess water by evaporation under reduced pressure. For drawing non-planner structure of H_2O_2 For drawing the bent structure of H_2O	**(½ + ½)** **(1)** **(1)** **(1)**	**4**

Sl No.		Answer Key/Value Points	Score	Total
10	a.	((ii) Calcium nitrate	(1)	4
	b.	Compound 'A' - CaO Compound 'B' - $Ca(OH)_2$ Compound 'C' - $CaCO_3$ Compound 'D' - $Ca(HCO_3)_2$ Milkiness is due to the formation of while $CaCO_3$ insoluble in water. When excess of CO_2 is passed through it the $Ca(HCO_3)_2$ formed in soluble in H_2O.	(½) (½) (½) (½) (1)	
11	a.	By the oxidation of sodium borohydride with iodine (Or correct chemical equation)	(1)	4
	b.	Correct structure Correct explanation of bonding specifying the hybridisation (sp^3) and 3-centre-2-electron bond.	(1) (2)	
12	a.	For writing the structural formulae of the three isomers.	(1 ½)	3
	b.	For writing the three IUPAC names (Pentane, 2-Methylbutane and 2,2-Dimethylpropane)	(1 ½)	
13		For writing the following four carbocations:  (I)  (II)  (III)  (IV)	(2)	3
		For writing the correct increasing order of stability as I < IV < II < III OR	(1) OR	

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		Nitrogen and Sulphur	(1)	
		During the preparation of sodium fusion extract sodium thio cyanate (NaSCN) is formed (With chemical equation)	(1)	
		The thiocyanate ions react with Fe^{3+} ions to form blood red coloured ferric thiocynate, $[Fe(SCN)]^{2+}$ (With chemical equation)	(1)	
14	a.	(i) & (ii)	(½ + ½)	5
	b.	Nitrobenzene	(1)	
		Correct mechanism involving 3 steps	(3)	
15	a.	CO	(1)	3
	b.	CFC's are stable compounds. These undergo decomposition in presence of sunlight. **Reactions:**		
		$CF_2Cl_2\ (g) \xrightarrow{UV} \dot{C}l\ (g) + \dot{C}F_2Cl\ (g)$		
		$\dot{C}l\ (g) + O_3\ (g) \longrightarrow Cl\dot{O}\ (g) + O_2\ (g)$		
		$Cl\dot{O}\ (g) + O\ (g) \longrightarrow \dot{C}l\ (g) + O_2\ (g)$		
		Chain reactions continue in which ozone layer is depleted.	(2)	