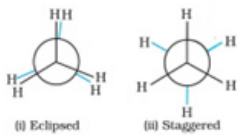



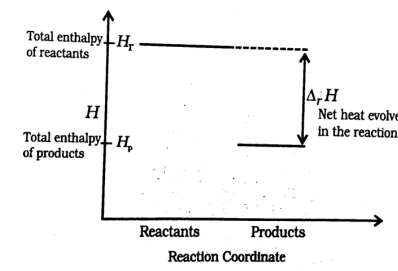


Chemistry Answer Key

Qn No	Value Points	Scores	Total
Qn No 1 to 5 (Answer Any 4) $4 \times 1 = 4$			
1	a) 4 b) 1	$\frac{1}{2} + \frac{1}{2}$	4
2	sp^2	1	
3	NH_3	1	
4	c) Carius tube	1	
5	117	1	
Qn No 6 to 15 (Answer Any 8) $8 \times 2 = 16$			
6	i Law of multiple proportion	1	2
	ii Statement	1	
7	i $^{29}Cu - [Ar]3d^{10} 4s^1$ $^{24}Cr - [Ar]3d^5 4s^1$	$\frac{1}{2} + \frac{1}{2}$	2
	ii Copper - extra stability is due to fully filled 3d orbitals Chromium - extra stability is due to half filled 3d orbitals	$\frac{1}{2} + \frac{1}{2}$	
8	i $^{23}_{11}Na^+$	1	2
	ii Mg^{2+}	1	
9	Definition of hydrogen bond Intermolecular hydrogen bonding and Intramolecular hydrogen bonding	1 1	2
	Extensive property - Internal energy, mass Intensive property - density, refractive index	$\frac{1}{2} + \frac{1}{2}$ $\frac{1}{2} + \frac{1}{2}$	
11	i Statement	1	2
	ii Pressure has no effect since there is no change in number of moles in the reaction	1	
12	i Any eg of disproportionation reaction with explanation	1	2
	ii $Mn(IV)O_2 (+4)$, $KMn(VII)O_4 (+7)$	$\frac{1}{2} + \frac{1}{2}$	
13	a 3-Ethyl-1,1-dimethylcyclohexane	1	2
	b Pentane -2,4-dione	1	
14	c,d	1+1	2
15	 <p>(i) Eclipsed (ii) Staggered</p>	1	2
Qn No 16 to 26 (Answer Any 8) $8 \times 3 = 24$			

Qn No	Value Points	Scores	Total
16	i $MF = n \times EF$	1	3
	ii No of molecules = $\frac{\text{mass in gram}}{\text{molar mass}} \times N_A$ $= \frac{36}{180} \times N_A = 0.2 \times 6.022 \times 10^{23}$	1	
	iii Molarity = $\frac{\text{Mass of solute}}{\text{Molar Mass} \times \text{Volume in mL}} \times 1000$ $= \frac{36}{180 \times 1000} \times 1000 = 0.2M$	1	
17	i It is impossible to determine simultaneously, the exact position and exact momentum of an electron.	1	3
	ii $\Delta v = \frac{h}{4\pi m\Delta x} = \frac{6.626 \times 10^{-34}}{4 \times 3.14 \times 0.25 \times 10^{-3} \times 3.313 \times 10^{-9}} = 0.6369 \times 10^{-22} \text{ m/s}$	2	
18	i This is due to stable electronic configuration of Nitrogen	1	3
	ii Absence of vacant d orbitals in Nitrogen	1	
	iii Boron is Anomalous due to its small size, high IE, high electron affinity and absence of vacant d orbitals	1	
19	i .i) The chemical and physical properties of elements are periodic function of their atomic numbers	1	3
	ii $(n-1)d^{1-10}ns^{0-2}$	1	
	iii Fluorine	1	
20	i $\sigma(1s)^2 \sigma^*(1s)^2 \sigma(2s)^2 \sigma^*(2s)^2 \sigma(2p_z)^2$ $\pi(2p_x)^2 = \pi(2p_y)^2$	1	2
	ii Bond Order = $\frac{1}{2}(Nb - Na) = \frac{1}{2}(10 - 4) = 3$ Value of bond order is positive so O_2^{2+} is stable. Since there are no unpaired electron in any orbital, the molecule is diamagnetic.	1	
21	i Spontaneous process which takes place without the help of an external agent	1	3
	ii The reaction becomes spontaneous at high temperature	1	
	iii c) melting of ice	1	
22	i Conjugate base - SO_4^{2-} Conjugate acid - H_2SO_4	1	3
	ii $[H_3O^+] = 2 \times 0.04 \text{ M}$, sulphuric acid is dibasic $pH = -\log [H_3O^+] = -\log [2 \times 0.04] = 1.096$	2	
23	i a) First reaction is a Redox reaction because here oxidation and reduction takes place b). Decomposition calcium carbonate is not Redox reaction because there is no change in oxidation number of any elements.	1	3

Join Now: https://join.hsslive.in				Scores	Total															
Qn No	Value Points																			
	ii	H ₂ S -reductant, Cl ₂ - Oxidant	1																	
	iii	HAu(III)Cl ₄ , Mn(IV)O ₂	1																	
24		Position Isomerism Butan-1-ol CH ₃ -CH ₂ -CH ₂ -CH ₂ -OH; Butan-2-ol CH ₃ -CH ₂ -CH(OH)-CH ₃ Functional group Isomerism Butan-1-ol CH ₃ -CH ₂ -CH ₂ -CH ₂ -OH; Ethoxyethane CH ₃ -CH ₂ -O-CH ₂ -CH ₃ Metamerism Ethoxyethane CH ₃ -CH ₂ -O-CH ₂ -CH ₃ ; Methoxypropane CH ₃ -O-CH ₂ -CH ₂ -CH ₃	3	3																
25	i	a) A is 2-Bromobutane, CH ₃ -CH ₂ -CHBr-CH ₃ b) B is 1- Bromobutane, CH ₃ -CH ₂ -CH ₂ -CH ₂ Br	1	3																
	ii	Rule behind the formation of A is Markovnikov Rule B is formed by Peroxide Effect/Kharasch effect/Anti Markovnikov Rule	2																	
26		<table border="1"> <thead> <tr> <th>Reactant</th> <th>Process</th> <th>Reagent and Condition</th> <th>Product</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Benzene </td> <td>Acetylation</td> <td>H, Pd</td> <td>BHC</td> </tr> <tr> <td>Reduction</td> <td>3Cl₂/hv 500K</td> <td>Acetophenone</td> </tr> <tr> <td>Chlorination</td> <td>CH₂COCl, Anhyd. AlCl₃</td> <td>Cyclohexane</td> </tr> </tbody> </table>	Reactant	Process	Reagent and Condition	Product	Benzene 	Acetylation	H, Pd	BHC	Reduction	3Cl ₂ /hv 500K	Acetophenone	Chlorination	CH ₂ COCl, Anhyd. AlCl ₃	Cyclohexane		3		
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Qn No 27 to 31 (Answer Any 4) 4 × 4 = 16																				
27	i	<table> <tr> <td>BF₃</td> <td>120</td> <td>Trigonal planar</td> </tr> <tr> <td>CH₄</td> <td>109.5</td> <td>Tetrahedral</td> </tr> <tr> <td>PCl₅</td> <td>120,90</td> <td>Trigonal bi pyramidal</td> </tr> <tr> <td>BeCl₂</td> <td>180</td> <td>Linear</td> </tr> <tr> <td>SF₆</td> <td>90</td> <td>Octahedral</td> </tr> </table>	BF ₃	120	Trigonal planar	CH ₄	109.5	Tetrahedral	PCl ₅	120,90	Trigonal bi pyramidal	BeCl ₂	180	Linear	SF ₆	90	Octahedral	½x8	4	
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28	i	Principal quantum number (n) Azimuthal quantum number (l) Magnetic quantum number (m) Spin quantum number (s)	1	4																
	ii	Principal quantum number (n)	1																	
	iii	(a)2s (b) 3p	1																	
	iv	b	1																	
29	i	It states that the enthalpy change in a chemical reaction is the same whether the reaction takes place in one step or several steps.	1	4																
	ii	$\text{Ans: } \Delta_r H = [\Delta_f H(N_2O) + 3\Delta_f H(CO_2)] - [\Delta_f H(N_2O_4) + 3\Delta_f H(CO)]$ $= [81 + 3 \times (-393)] - [9.7 + 3 \times (-110)] = -777.7 \text{ kJ}$	2																	

Qn No	Value Points		Scores	Total
	iii		1	
30	i	Acidic solution NH ₄ Cl PH<7 Basic solution CH ₃ COONa PH>7 Neutral solution NaCl PH=7	1 ½	4
	ii	Common ion effect is the suppression of the dissociation of a weak electrolyte by the addition of a strong electrolyte containing common ion. Eg: Dissociation of CH ₃ COOH can be suppressed by the addition of CH ₃ COONa or HCl	1 ½	
	iii	Acetic acid+ Sodium acetate	1	
31	i	Homolysis:-When a covalent bond breaks in such a way that each atom takes away one electron of the shared pair, it is called homolytic fission or homolysis. Heterolysis:-When a covalent bond breaks in such a way that both the electrons of the covalent bond are taken away by one of the bonded atoms, it is called heterolytic fission or heterolysis	2	4
	ii	The stability of carbocation increases in the order CH ₃ ⁺ < CH ₃ CH ₂ ⁺ < (CH ₃) ₂ CH ⁺ < (CH ₃) ₃ C ⁺	1	
	iii	Hyperconjugation	2	