RUBRICS: HSSC 1st ANNUAL EXAMINATION 2023
SUBJECT: CHEMISTRY HSSC-I (Local)

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
$2(i)$	Calculate the mass of ammonia by 8dm^3 of H_2.	Writing correct calculation of mass of NH_3 (RTP/STP) (3)	Partially correct calculation (2)	Some correct mathematical steps (1)	Wrong answer (0)			
$2(ii)$	Calculation of energy is required to remove an electron for Li^{+2} in J/atom and KJ/mole when n=1.	Writing correct calculation in J/atom (1.5)	Partially Correct calculation in J/atom (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct calculation in KJ/mole (1.5)	Partially Correct calculation in KJ/mole (1)	Some relevant information (0.5)	Wrong answer (0)			
$2(iii)$	Disadvantages of valence bond theory.	Writing any three Correct disadvantages of valence bond theory (3)	Any two Correct disadvantages of valence bond theory (2)	Any one Correct disadvantage of valence bond theory (1)	Some relevant information (0.5)	Wrong answer (0)		
$2(iv)$	Description of any two factors which affect the bond length with examples	Writing correct description of 1st factor with example (1.5)	Correct description of 1st factor without example (1)	Partially Correct description of 1st factor or only example (0.5)	Wrong answer (0)			
		Writing correct description of 2nd factor with example (1.5)	Correct description of 2nd factor without example (1)	Partially Correct description of 2nd factor or only example (0.5)	Wrong answer (0)			
$2(v)$	Describe the geometry of the given molecules on the basis of VSEPR theory a. SO_3 b. PCl_3	Writing correct description with diagram of SO_3 (1.5)	Partially correct response i.e either correct description or d (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct description with diagram of PCl_3(1.5)	Partially correct response (1)	Some relevant information (0.5)	Wrong answer (0)			
$2(vi)$	Definition/Description of isobar and Drawing the isobar at 1atm and its description on its position with the increase in pressure	Writing correct description of isobar(1)	Partially correct response (0.5)	Wrong answer (0)				
		Drawing the correct graph of isobar (1)	Drawing the partially correct graph of isobar (0.5)	Wrong answer (0)				
		Writing correct description/graph at	Partially Correct description/graph at	Wrong answer (0)				

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
		different pressures (1)	different pressure (0.5)					
$2(vii)$	Development of London dispersion forces in helium gas	Writing correct description for the development of London dispersion forces in He (diagram not required) (3)	Partially Correct description of London dispersion forces (2)	Some relevant information (1)	Wrong answer (0)			
$2(viii)$	Reasoning for strong London dispersion forces in given molecules	Writing correct reason of strong London dispersion force between Ar and Kr (1)	Partially Correct reason London dispersion force (0.5)	Wrong answer (0)				
		Writing correct reason of strong London dispersion forces between Br_2 and I_2 (1)	Partially Correct reason London dispersion force (0.5)	Wrong answer (0)				
		Writing correct reason of strong London dispersion force between C_2H_6 and C_4H_{10} (1)	Partially Correct reason London dispersion force (0.5)	Wrong answer (0)				
$2(ix)$	Role of hydrogen bonding in a. Cleansing action of soap b. Structure of DNA and protein molecules	Writing correct role of hydrogen bonding in Cleansing action of soap (1.5)	Partially Correct explanation role of hydrogen bonding (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct role of hydrogen bonding in Structure of DNA and protein (diagram not required) (1.5)	Partially Correct explanation role of hydrogen bonding (1)	Some relevant information (0.5)	Wrong answer (0)			
$2(x)$	Description of transition temperature by two examples	Writing correct description of transition temperature (2)	Partially correct description (01)	Some relevant information (0.5)	Wrong answer (0)			
		Writing any two correct examples of transition temperature (1)	Any one correct example of transition temperature (0.5)	Wrong answer (0)				
$2(xi)$	Differentiation between	Writing any three correct	Writing any two correct	Any one correct	Wrong answer			

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
	Hexagonal close packing and cubic close packing in the structure of metals	differentiations (3)	differentiations (2)	differentiation (1)	(0)			
$2(xii)$	Description/Definition of precipitation reaction and prediction of precipitate of CaF_2	Writing correct description of precipitation reaction (2)	Partially Correct description/Definition of precipitation (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct condition for the precipitation in CaF_2 (1)	Wrong answer (0)					
2(xiii)	Acetic acid/ sodium acetate buffer action by the addition of NaOH	Writing correct description of buffer solution resistance/Buffer action after the addition of NaOH (3)	Partially Correct description of buffer solution resistance/Buffer action after the addition of NaOH (2)	Some relevant information (1)	Wrong answer (0)			
$2(xiv)$	Decrease of vapor pressure of the solvent by the addition of non-volatile non-electrolyte solute	Writing correct description of decrease in vapor pressure of the solvent by the addition of non-volatile non-electrolyte solute (3)	Partially correct response (2)	Some relevant information (1)	Wrong answer (0)			
$2(xv)$	Description of reverse osmosis with one application	Writing correct description of reverse osmosis (2)	Partially Correct description of reverse osmosis (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing any one correct application (1)	Partially correct (0.5)	Wrong answer (0)				
2(xvi)	Calculating the mass of O_3 in per kg of air	Writing correct calculation of mass of O_3/kg of air (3)	Partially correct calculation of mass of O_3/kg of air (2)	Some relevant calculation (1)	Wrong answer (0)			
2(xvii)	Calculating the ΔH for the given reaction	Writing correct calculation of ΔH (3)	Partially Correct calculation of ΔH (2)	Some relevant calculation (1)	Wrong answer (0)			
2(xviii)	Calculating the heat of combustion of glucose when 1.8g of glucose is burnt.	Writing correct calculation of heat of combustion (3)	Partially Correct calculation of heat of combustion (2)	Some relevant calculation (1)	Wrong answer (0)			
2(xix)	Predicting the E^0 of Zn-Ni cell and writing this cell reactions	Writing correct prediction of E^0 cell (2)	Partially correct (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct reactions at	Correct reaction either at	Wrong answer (0)				

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
		cathode and anode OR complete redox reaction in one step (1)	cathode OR anode (0.5)					
2(xx)	Balancing of given equation by ion electron method	Correct balancing by logically correct steps (3)	Partially correct balancing (2)	Some relevant information (01)	Wrong answer (0)			
$3(a)$	Calculation of volume of H_2 gas and determination of mass of non-limiting reactant	Writing correct calculation (correct procedure with any atomic mass of Zn) of volume of H_2 gas by calculating limiting reactant by any method (3)	Partially Correct calculation (2)	Some relevant information/calculation (1)	Wrong answer (0)			
		Writing correct calculation of amount of excess reactant (3)	Partially Correct calculation (2)	Some relevant information/calculation (1)	Wrong answer (0)			
$3(b)$	Derivation of ΔE when electron drop from n_2 to n_1 in He^+ and calculation of ΔE when n_1=1 and n_2 =3 for He^+	Writing correct derivation of ΔE in five streps (starting from $\Delta E = E_2 - E_1$) (5)	Derivation involving any four correct steps (4)	Derivation involving any three correct steps (3)	Derivation involving any two correct steps (2)	Any one step is correct (1)	Wrong answer (0)	
		Writing correct calculation of ΔE (2)	Partially correct calculation of ΔE (1)	Any relevant calculation (0.5)	Wrong answer (0))			
4 (a)	Description/Definition of salt Hydrolysis by explaining the type of cations and anions that undergo Hydrolysis with the help of four types of salts.	Writing correct statement/description of salt hydrolysis (1)	Partially correct information (0.5)	Wrong answer (0)				
		Writing correct description of cation and anion (2)	Correct description of cation OR anion (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct description of four types of salts with one example of each (strong acid, strong base, weak acid, weak base) (4)	Writing correct description of any three types of salts with one example of each (3)	Correct description of any two types of salts with one example of each (2)	Correct description of any one type of salt with one example (1)	Some relevant information (0.5)	Wrong answer (0)	
4 (b)	Description of collision theory with reference to energy of activation, formation of activated complex and heat of reactions.	Writing correct statement/description of collision theory (1)	Partially correct response (0.5)	Wrong answer(0)				
		Writing correct description of energy of activation (2)	Partially correct response (1)	Some relevant information (0.5)	Wrong answer(0)			
		Writing correct formation of activated complex (2)	Partially correct response (1)	Some relevant information (0.5)	Wrong answer (0)			

Q.# /Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
		Writing correct description/Drawing potential energy diagram of heat of reactions (ΔH for exo and endothermic reactions) (1)	Partially correct response (0.5)	Wrong answer (0)				
5 (a)	State and explanation of Dalton's law and its derivation for the relationship between I. Partial pressure and number of mole II. Partial pressure and mole fraction	Writing correct statement (1)	Partially correct statement (0.5)	Wrong answer (0)				
		Writing correct explanation (2)	Partially Correct explanation (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct derivation of relationship between Partial pressure and number of mole (2)	Partially Correct derivation of Partial pressure and number of mole (1)	Some relevant steps (0.5)	Wrong answer (0)			
		Writing correct derivation of relationship Partial pressure and mole fraction (2)	Partially Correct derivation of Partial pressure and mole fraction (1)	Some relevant steps (0.5)	Wrong answer (0)			
5 (b)	Describing the fact of stated change on the reaction at the equilibrium position I. Decreasing the volume II. Increasing temperature III. Adding I_2	Writing correct description of decreasing the volume (2)	Partially correct description of decreasing the volume (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct description of Increasing temperature (2)	Partially Correct description of Increasing temperature (1)	Some relevant information (0.5)	Wrong answer (0)			
		Writing correct description of Adding I_2 (2)	Partially Correct description of Adding I_2 (1)	Some relevant information (0.5)	Wrong answer (0)			

Note: All the markers must know the solutions of all the question items of the question paper before starting marking.