

**HSSC 1<sup>st</sup> ANNUAL EXAMINATION 2024**  
**Rubrics CHEMISTRY HSSC- II (D)**

**FINAL 15-05-2024**

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)	Reaction of Dil. HCl with Li <sub>2</sub> O	Writing correct reaction of Dil. HCl with Li <sub>2</sub> O (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of Dil. HCl with Na <sub>2</sub> O <sub>2</sub>	Writing correct reaction of Dil. HCl with Na <sub>2</sub> O <sub>2</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of Dil. HCl with KO <sub>2</sub>	Writing correct reaction of Dil. HCl with KO <sub>2</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
OR								
2 (i)	Significance of Dissolved Oxygen (DO)	Writing correct Significance of Dissolved Oxygen (DO) (1)	Partially correct response (0.5)	Wrong answer (0)				
	Significance of Biochemical Oxygen Demand (BOD)	Writing correct Significance of Biochemical Oxygen Demand (BOD) (1)	Partially correct response (0.5)	Wrong answer (0)				
	Significance of Chemical Oxygen Demand (COD)	Writing correct Significance of Chemical Oxygen Demand (COD) (1)	Partially correct response (0.5)	Wrong answer (0)				
2 (ii)	Role of effective nuclear charge in determining the	Writing correct role of effective nuclear charge in determining the atomic	Partially correct response (1)	Any 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)
	atomic radii of elements in 3rd period.	radii of elements in 3rd period. (2)						
	Role of number of electronic shells in determining the atomic radii of elements in 3 <sup>rd</sup> period.	Writing correct role of electronic shells in determining the atomic radii of elements in 3 <sup>rd</sup> period. (1)	Partially correct response (0.5)	Wrong answer (0)				

**OR**

2 (ii)	Justification of MgCl <sub>2</sub> is a high melting solid, AlCl <sub>3</sub> is sublime at 180°C and SiCl <sub>4</sub> is a volatile liquid.	Writing correct justification of MgCl <sub>2</sub> is a high melting solid, AlCl <sub>3</sub> is sublime at 180°C and SiCl <sub>4</sub> is a volatile liquid. (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
2 (iii)	Reason/Description of alkali metals give different colours to the flame.	Writing correct Reason/Description of alkali metals give different colours to the flame.(3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			

**OR**

2 (iii)	Mechanism of the given reaction 2CH <sub>3</sub> -OH	Writing correct mechanism in justified steps. (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
2 (iv)	Preparation of BaO	Writing correct preparation of BaO (1)	Partially correct response (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)
	Show by Chemical equation of when BaO is heated in air.	Writing correct Chemical equation of when BaO is heated in air.(1)	Partially correct response (0.5)	Wrong answer (0)				
	Show by Chemical equation of when resulting product is reacted with Dil H <sub>2</sub> SO <sub>4</sub> .	Writing correct show by Chemical equation of when resulting product is reacted with Dil H <sub>2</sub> SO <sub>4</sub> .(1)	Partially correct response (0.5)	Wrong answer (0)				

OR

2 (iv)	Identification of Ligands of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup>	Writing correct Identification of Ligands of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup> (1)	Partially correct response (0.5)	Wrong answer (0)				
	Identification of co-ordination number of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup>	Writing correct Identification of co-ordination number of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup> (1)	Partially correct response (0.5)	Wrong answer (0)				
	Identification of geometry of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup>	Writing correct identification of geometry of complex ion (Co en <sub>2</sub> Cl <sub>2</sub> ) <sup>+</sup> (1)	Partially correct response (0.5)	Wrong answer (0)				
2 (v)	Reaction of V <sub>2</sub> O <sub>5</sub> with HCl	Writing correct reaction of V <sub>2</sub> O <sub>5</sub> with HCl (1)	Partially correct response (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)
	Reaction of $V_2O_5$ with $HNO_3$	Writing correct reaction of $V_2O_5$ with $HNO_3$ (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of $V_2O_5$ with $SO_2$	Writing correct reaction of $V_2O_5$ with $SO_2$ (1)	Partially correct response (0.5)	Wrong answer (0)				

OR

2 (v)	Differentiation between atomic emission and atomic absorption spectroscopy	Writing any three correct Differentiation between atomic emission and atomic absorption spectroscopy (3)	Writing any two correct Differentiation between atomic emission and atomic absorption spectroscopy (2)	Writing any one correct Differentiation between atomic emission and atomic absorption spectroscopy (1)	Any relevant information (0.5)	Wrong answer (0)		
2 (vi)	Procedure of use of $KMnO_4$ in redox titration with acidified $FeSO_4$	Writing correct procedure of use of $KMnO_4$ in redox titration with acidified $FeSO_4$ (1)	Partially correct response (0.5)	Wrong answer (0)				
	Chemical equation of use of $KMnO_4$ in redox titration with acidified $FeSO_4$	Writing correct Chemical equation of use of $KMnO_4$ in redox titration with acidified $FeSO_4$ (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			

OR

2(vi)	Differentiation between secondary and tertiary structures	Writing correct Differentiation between secondary and tertiary structures of proteins (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
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Q.# / Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
	of proteins							
2(vii)	Similarities between the members of homologous series	Writing any two correct similarities between the members of homologous series. (2)	Writing any one correct similarity between the members of homologous series. (1)	Any relevant information (0.5)	Wrong answer (0)			
	Difference between the members of homologous series	Writing any one correct difference between the members of homologous series (1)	Partially correct response (0.5)	Wrong answer (0)				
<b>OR</b>								
2(vii)	Description of the process of spin flipping in NMR spectroscopy	Writing correct Description of the process of spin flipping in NMR spectroscopy (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
2(viii)	Name and drawing of the structure of any 1 <sup>st</sup> type of isomer of 1-propanol	Writing correct name and drawing of the structure of any 1 <sup>st</sup> type of isomer of 1- propanol (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Name and drawing of the structure of any 2 <sup>nd</sup> type of isomer of 1- propanol	Writing correct name and drawing of the structure of any 2 <sup>nd</sup> type of isomer of 1- propanol (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
<b>OR</b>								
2(viii)	Any three	Writing any three correct	Writing any two	Writing any one	Any relevant	Wrong		

Q.# / Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
	differences between SN <sub>1</sub> and SN <sub>2</sub>	differences between SN <sub>1</sub> and SN <sub>2</sub> (3)	correct differences between SN <sub>1</sub> and SN <sub>2</sub> (2)	correct difference between SN <sub>1</sub> and SN <sub>2</sub> (1)	information (0.5)	answer (0)		
2 (ix)	Mechanism of the given reaction	Writing correct mechanism in justified steps (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			

**OR**

2 (ix)	Product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> -CN	Writing correct product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> -CN (1)	Partially correct response (0.5)	Wrong answer (0)				
	Product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> COOC <sub>2</sub> H <sub>5</sub>	Writing correct product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> COOC <sub>2</sub> H <sub>5</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
	Product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> CONH <sub>2</sub>	Writing correct product of reaction of LiAlH <sub>4</sub> with CH <sub>3</sub> CONH <sub>2</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
2 (x)	Kinetic evidence of SN <sub>2</sub> mechanism.	Writing correct Kinetics evidence SN <sub>2</sub> mechanism. (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Stereo chemical evidence of SN <sub>2</sub> mechanism.	Writing correct Stereo chemical evidence of SN <sub>2</sub> mechanism.(1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			

**OR**

2 (x)	Any three adverse effects of	Writing any three correct adverse effects of	Writing any two correct adverse	Writing any one correct adverse	Any relevant	Wrong answer		
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Q.# / Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
	dissolved fertilizers present in water as pollutants	dissolved fertilizers present in water as pollutants (3)	effects of dissolved fertilizers present in water as pollutants (2)	effect of dissolved fertilizers present in water as pollutants (1)	information (0.5)	(0)		
2 (xi)	Reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with Acetyl chloride	Writing correct reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with Acetyl chloride (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with Acetaldehyde	Writing correct reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with Acetaldehyde (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with $\text{HNO}_2/\text{HCl}$	Writing correct reaction of $\text{CH}_3\text{-CH}_2\text{-NH}_2$ with $\text{HNO}_2/\text{HCl}$ (1)	Partially correct response (0.5)	Wrong answer (0)				

**OR**

2 (xi)	Description of the structural components of nucleotides of RNA	Writing correct Description of the structural components of nucleotides of RNA (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
2 (xii)	Preparation of Dimethyl ether by Williamson's synthesis	Writing correct Preparation of Dimethyl ether by Williamson's synthesis (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Preparation of Dimethyl ether from an alkyl halide	Writing correct Preparation of Dimethyl ether from an alkyl halide (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			

**OR**

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 (xii)	Preparation of propanoic acid from a Nitrile	Writing correct preparation of propanoic acid from a Nitrile (1)	Partially correct response (0.5)	Wrong answer (0)				
	Preparation of propanoic acid from a Grignard's reagent.	Writing correct preparation of propanoic acid from a Grignard's reagent.(1)	Partially correct response (0.5)	Wrong answer (0)				
	Preparation of propanoic acid from an Aldehyde	Writing correct preparation of propanoic acid from an Aldehyde (1)	Partially correct response (0.5)	Wrong answer (0)				
2 (xiii)	Reaction of 1-propanol with SOCl <sub>2</sub>	Writing correct Reaction of 1-propanol with SOCl <sub>2</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of 1-propanol with Conc.H <sub>2</sub> SO <sub>4</sub> /180°C	Writing correct reaction of 1-propanol with Conc.H <sub>2</sub> SO <sub>4</sub> /180°C (1)	Partially correct response (0.5)	Wrong answer (0)				
	Reaction of 1-propanol with K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> / H <sub>2</sub> SO <sub>4</sub>	Writing correct reaction of 1-propanol with K <sub>2</sub> Cr <sub>2</sub> O <sub>7</sub> / H <sub>2</sub> SO <sub>4</sub> (1)	Partially correct response (0.5)	Wrong answer (0)				
OR								
2 (xiii)	Composition and uses of fraction of petroleum refining of a. gasoline	Writing correct composition and uses of fraction of petroleum refining of a. gasoline (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Composition and uses of fraction of petroleum refining of b. Naphtha	Writing correct composition and uses of fraction of petroleum refining of b. Naphtha (1.5)	Partially correct response (1)	Any 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)
2(xiv)	Any first application of iodoform test with chemical equation	Writing any first correct application of iodoform test with chemical equation(1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Any second application of iodoform test with chemical equation	Writing Any second correct application of iodoform test with chemical equation (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
<b>OR</b>								
2 (xiv)	Determination of empirical formula of 0.240g of an organic compound contain 0.096g of carbon, 0.016g of hydrogen and 0.128g of oxygen	Determining the correct empirical formula (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
Q. 3.	Description of resonance	Writing correct description of resonance (1)	Partially correct response (0.5)	Wrong answer (0)				
	Description of resonance energy	Writing correct description of resonance energy(2)	Writing partially correct description of resonance energy(1)	Any 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)
	Calculation of resonance energy with the help of heat of hydrogenation	Writing three correct steps of calculation of resonance energy with the help of heat of hydrogenation(4)	Writing two correct steps of calculation of resonance energy with the help of heat of hydrogenation(3)	Writing one correct step of calculation of resonance energy with the help of heat of hydrogenation(2)	Any relevant information (1)	Wrong answer (0)		
OR								
Q.3	Description of polymerization	Writing correct description of polymerization (1)	Writing partially correct description (0.5)	Wrong answer (0)				
	Types of polymerizations	Writing two correct types of polymerizations (2)	Writing one correct type of polymerization (1)	Any relevant information (0.5)	Wrong answer (0)			
	Description 1 <sup>st</sup> type with chemical equation	Writing correct description of 1 <sup>st</sup> type with chemical equation(2)	Writing partially correct description of 1 <sup>st</sup> type with chemical equation(1)	Any relevant information (0.5)	Wrong answer (0)			
	Description 2 <sup>nd</sup> type with chemical equation	Writing correct description of 2 <sup>nd</sup> type with chemical equation (2)	Writing partially correct description of 2 <sup>nd</sup> type with chemical equation(1)	Any relevant information (0.5)	Wrong answer (0)			
Q. 4	Description of halogens acting as oxidizing agent	Writing correct description of halogens acting as oxidizing agent (1)	Writing partially correct description of halogens act as oxidizing agent (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)
	Representation of halogen as oxidizing property	Writing correct description of representation of halogen as oxidizing property(1)	Writing correct description of representation of halogen as oxidizing property(0.5)	Wrong answer (0)				
	Order of relative power of halogen as oxidizing agent	Writing correct Order of relative power of halogen as oxidizing agent (1)	Writing partially correct Order of relative power of halogen as oxidizing agent (0.5)	Wrong answer (0)				
	Verification of order of oxidizing agent halogen by chemical equation	Writing three correct verification of order of oxidizing agent halogen by chemical equation(3)	Writing two correct verification of order of oxidizing agent halogen by chemical equation(2)	Writing one correct verification of order of oxidizing agent halogen by chemical equation(1)	Any relevant information (0.5)	Wrong answer (0)		

OR

Q. 4	Chemical reaction of acetaldehyde with 2,4 DNPH	Writing correct Chemical reaction of acetaldehyde with 2,4 DNPH (1.5)	Writing partially correct Chemical reaction of acetaldehyde with 2,4 DNPH (1)	Any relevant information (0.5)	Wrong answer (0)			
	Chemical reaction of acetone with 2,4 DNPH	Writing correct Chemical reaction of acetone with 2,4 DNPH (1.5)	Writing partially correct Chemical reaction of acetone with 2,4 DNPH (1)	Any 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)
	Chemical reaction of acetaldehyde with $\text{NH}_2\text{NHCONH}_2$	Writing correct Chemical reaction of acetaldehyde with $\text{NH}_2\text{NHCONH}_2$ (1.5)	Writing partially correct Chemical reaction of acetaldehyde with $\text{NH}_2\text{NHCONH}_2$ (1)	Any relevant information (0.5)	Wrong answer (0)			
	Chemical reaction of acetone with $\text{NH}_2\text{NHCONH}_2$	Writing correct Chemical reaction of acetone with $\text{NH}_2\text{NHCONH}_2$ (1.5)	Writing partially correct Chemical reaction of acetone with $\text{NH}_2\text{NHCONH}_2$ (1)	Any relevant information (0.5)	Wrong answer (0)			
Q.5.	Description of trends of a. ionization potential of element of 3 <sup>rd</sup> period	Writing correct description of trends of ionization potential of element of 3 <sup>rd</sup> period (3)	Writing partially correct description. (2)	Any relevant information (1)	Wrong answer (0)			
	Description of trends of b. melting point and boiling point of element of 3 <sup>rd</sup> period	Writing correct Description of trends of melting point and boiling point of element of 3 <sup>rd</sup> period (3)	Writing partially correct description. (2)	Any relevant information (1)	Wrong answer (0)			
OR								
Q.5.	Preparation of phenol from chlorobenzene	Writing correct Preparation of phenol from chlorobenzene (2)	Partially correct response (1)	Any 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)
	Preparation of phenol from cumene	Writing correct Preparation of phenol from cumene (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Preparation of phenol from Aniline	Writing correct Preparation of phenol from Aniline (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
Q.6.	Description of directive influence of substitution of benzene ring	Writing correct Description of directive influence of substitution of benzene ring(1)	Partially correct response (0.5)	Wrong answer (0)				
	Classification of substituent on the basis of directive influence	Writing correct Classification of substituent on the basis of directive influence (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Example of 1 <sup>st</sup> Type of directive influence with chemical reaction	Writing correct 1 <sup>st</sup> example of directive influence with chemical reaction (2)	Writing partially correct 1 <sup>st</sup> example of directive influence with chemical reaction (1)	Any relevant information (0.5)	Wrong answer (0)			
	Example of 2 <sup>nd</sup> type of directive influence with chemical reaction	Writing correct 2 <sup>nd</sup> example of directive influence with chemical reaction (2)	Writing partially correct 2 <sup>nd</sup> example of directive influence with chemical reaction (1)	Any relevant information (0.5)	Wrong answer (0)			

OR

Q.# / Part #	Criteria	Level 1 (Marks)	Level 2(Marks)	Level 3 (Marks)	Level 4 (Marks)	Level 5 (Marks)	Level 6 (Marks)	Level 7 (Marks)
Q.6.	Description of IR spectroscopy	Writing correct Description of IR spectroscopy (1)	Partially correct response (0.5)	Wrong answer (0)				
	Discuss with reference to a. Reason for the absorption of IR radiation	Writing correct Reason for the absorption of IR radiation(2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Discuss with reference to b. IR spectra	Writing correct Discussion of IR spectra (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Discuss with reference to c. Application of IR spectroscopy	Writing correct Application of IR spectroscopy(2)	Partially correct response (1)	Any 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.**

**HSSC 1<sup>st</sup> ANNUAL EXAMINATION 2024**  
**Rubrics CHEMISTRY HSSC- II (B)**

**FINAL: 09-05-2024**

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)	Chemical equation a. When $\text{LiNO}_3$ is heated	Writing correct equation when $\text{LiNO}_3$ is heated (1)	Partially Correct equation (0.5)	Wrong answer (0)				
	Chemical equation b. When $\text{NaNO}_3$ is heated	Writing correct equation when $\text{NaNO}_3$ is heated (1)	Partially Correct equation (0.5)	Wrong answer (0)				
	Chemical equation c. When $\text{Mg}(\text{NO}_3)_2$ is heated	Writing correct equation when $\text{Mg}(\text{NO}_3)_2$ is heated (1)	Partially Correct equation (0.5)	Wrong answer (0)				
<b>OR</b>								
2 (i)	Differentiation between the functional group present in the pairs of compound a. Acid Halides and Acid Amides	Writing correct differentiation of Acid Halides and Acid Amides (1)	Partially Correct response (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)
	Differentiation between the functional group present in the pairs of compound b. Ether and Esters	Writing correct differentiation of Ether and Esters (1)	Partially Correct response (0.5)	Wrong answer (0)				
	Differentiation between the functional group present in the pairs of compound c. Aldehydes and Ketones	Writing correct differentiation of Aldehydes and Ketones (1)	Partially Correct response (0.5)	Wrong answer (0)				
2 (ii)	Electronic configuration of copper and chromium	Writing correct electronic configuration of copper and chromium (2)	Writing correct electronic configuration of copper or chromium (1)	Any relevant information(0.5)	Wrong answer (0)			
	Copper and chromium violate Aufbau principle	Writing correct violation of Aufbau principle (1)	Any relevant information(0.5)	Wrong answer (0)				
<b>OR</b>								
2 (ii)	Description of geometries of complex ion with coordination number 4	Writing correct description of geometries of complex ion with coordination number 4 (1.5)	Writing partially correct description of geometries of complex ion with coordination number 4 (1)	Any relevant information(0.5)	Wrong answer (0)			
	Description of geometries of complex ion with coordination number 6	Writing correct description of geometries of complex ion with coordination number 6 (1.5)	Writing partially correct description of geometries of complex ion with coordination number 6 (1)	Any 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)
2 (iii)	Statement of Fajan's rule	Writing correct statement of Fajan's rule (1)	Partially Correct statement (0.5)	Wrong answer (0)				
	justification of Fajan's rule with two examples	Writing two correct justification of Fajan's rule with two examples (2)	Writing one correct justification of Fajan's rule with one example (1)	Any relevant information(0.5)	Wrong answer (0)			
OR								
2 (iii)	Reaction of acetic anhydride with a. H <sub>2</sub> O	Writing correct Reaction of acetic anhydride with H <sub>2</sub> O (1)	Partially Correct reaction (0.5)	Wrong answer (0)				
	Reaction of acetic anhydride with a. NH <sub>3</sub>	Writing correct Reaction of acetic anhydride with NH <sub>3</sub> (1)	Partially Correct reaction (0.5)	Wrong answer (0)				
	Reaction of acetic anhydride with b. C <sub>2</sub> H <sub>5</sub> OH	Writing correct Reaction of acetic anhydride with C <sub>2</sub> H <sub>5</sub> OH (1)	Partially Correct reaction (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)
2 (iv)	Justification of the restricted rotation about C-C bond in 1,2dimethyl cyclopropane is responsible for geometrical isomerism	Writing correct Justification of the restricted rotation about C-C bond in 1,2dimethyl cyclopropane is responsible for geometrical isomerism (3)	Partially Correct response (2)	Any relevant information(1)	Wrong answer (0)			

OR

2 (iv)	Differentiation of Aldehydes and Ketones by two chemical tests	Writing two correct differentiation of Aldehydes and Ketones by two chemical tests (3)	Writing one correct differentiation of Aldehydes and Ketones by one chemical test (2)	Any relevant information(1)	Wrong answer (0)			
2 (v)	Propose reaction mechanism of SN1	Writing correct mechanism in justified steps (3)	Writing some correct justified steps of the mechanism (2)	Any relevant information(1)	Wrong answer (0)			

OR

2 (v)	1 <sup>st</sup> Differentiation between addition and condensation polymerization	Writing correct 1 <sup>st</sup> differentiation between addition and condensation polymerization (1)	Partially Correctly response (0.5)	Wrong answer (0)				
	2 <sup>nd</sup> Differentiation between addition and condensation polymerization	Writing correct 2 <sup>nd</sup> differentiation between addition and condensation polymerization (1)	Partially Correctly response (0.5)	Wrong answer (0)				
	3 <sup>rd</sup> Differentiation between addition and condensation polymerization	Writing correct 3 <sup>rd</sup> differentiation between addition and condensation polymerization(1)	Partially Correctly response (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)
2 (vi)	Existence of ions $\text{Cr}_2\text{O}_7^{2-}$ and $\text{CrO}_4^{2-}$ in equilibrium	Writing correct Existence of ions $\text{Cr}_2\text{O}_7^{2-}$ and $\text{CrO}_4^{2-}$ in equilibrium(1)	Partially Correct response(0.5)	Wrong answer (0)				
	Inter conversion of $\text{Cr}_2\text{O}_7^{2-}$ and $\text{CrO}_4^{2-}$ at equilibrium	Writing correct Inter conversion of $\text{Cr}_2\text{O}_7^{2-}$ and $\text{CrO}_4^{2-}$ at equilibrium (2)	Partially Correct response(1)	Any relevant information(0.5)	Wrong answer (0)			
OR								
2 (vi)	Description of enzyme inhibition	Writing correct description of enzyme inhibition (1)	Partially Correct response(0.5)	Wrong answer (0)				
	Types of Inhibition	Writing correct Types of Inhibition (2)	Partially Correct response(1)	Any relevant information (0.5)	Wrong answer (0)			
2 (vii)	Preparation of 1-Butyne from vicinal dihalides by chemical reaction with condition	Writing correct preparation of 1-Butyne from vicinal dihalides by chemical reaction with condition (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Preparation of 1-Butyne from geminal dihalides by chemical reaction with condition	Writing correct preparation of 1-Butyne from geminal dihalides by chemical reaction with condition (1.5)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
OR								
2 (vii)	Definition of Green House Effect	Writing correct definition of Green House Effect (1)	Writing partially correct definition (0.5)	Wrong answer (0)				
	Description of Green House Effect	Writing correct description of Green House Effect (2)	Writing partially correct description(1)	Any 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)
2 (viii)	Chemical reaction of conc. HNO <sub>3</sub> with phenol	Writing correct chemical reaction of conc HNO <sub>3</sub> with phenol (1)	Partially Correct reaction (0.5)	Wrong answer (0)				
	Chemical reaction of aq. Br <sub>2</sub> with phenol	Writing correct chemical reaction of aq Br <sub>2</sub> with phenol (1)	Partially Correct reaction (0.5)	Wrong answer (0)				
	Chemical reaction of conc. H <sub>2</sub> SO <sub>4</sub> with phenol	Writing correct chemical reaction of conc. H <sub>2</sub> SO <sub>4</sub> with phenol (1)	Partially Correct reaction (0.5)	Wrong answer (0)				
OR								
2(viii)	Describe the type of electronic transition for UV-Vis. radiation of 200-800nm wavelength are passed through CH <sub>2</sub> = CH-CH <sub>2</sub> -OH	Writing correct description of the type of electronic transition for UV-Vis. radiation of 200-800nm wavelength are passed through CH <sub>2</sub> = CH-CH <sub>2</sub> -OH (3)	Partially correct response (2)	Any relevant information (1)	Wrong answer (0)			
2 (ix)	1 <sup>st</sup> Differentiation between E1 and E2	Writing 1 <sup>st</sup> correct differentiation between E1 and E2 (1)	Partially Correctly response (0.5)	Wrong answer (0)				
	2 <sup>nd</sup> Differentiation between E1 and E2	Writing 2 <sup>nd</sup> correct differentiation between E1 and E2 (1)	Partially Correctly response (0.5)	Wrong answer (0)				
	3 <sup>rd</sup> Differentiation between E1 and E2	Writing 3 <sup>rd</sup> correct differentiation between E1 and E2 (1)	Partially Correctly response (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)
OR								
2 (ix)	Description of significance of functional group region and fingerprint region in IR spectrum	Writing correct description of significance of functional group region and fingerprint region in IR spectrum (3)	Writing partially correct response (2)	Any relevant information(1)	Wrong answer (0)			
2 (x)	Justification of $\text{Al(OH)}_3$ is amphoteric	Writing correct Justification of $\text{Al(OH)}_3$ is amphoteric (1.5)	Partially Correct response (1)	Any relevant information(0.5)	Wrong answer (0)			
	Justification of $\text{Mg(OH)}_2$ is basic	Writing correct Justification of $\text{Mg(OH)}_2$ is basic (1.5)	Partially Correct response (1)	Any relevant information(0.5)	Wrong answer (0)			
OR								
2 (x)	Reaction of $\text{CH}_3\text{-CH}_2\text{-Mg-Br}$ with a. Acetone	Writing correct reaction of $\text{CH}_3\text{-CH}_2\text{-Mg-Br}$ with Acetone (1.5)	partially correct reaction (1)	Any relevant information(0.5)	Wrong answer (0)			
	Reaction of $\text{CH}_3\text{-CH}_2\text{-Mg-Br}$ with b. $\text{CO}_2$	Writing correct reaction of $\text{CH}_3\text{-CH}_2\text{-Mg-Br}$ with $\text{CO}_2$ (1.5)	partially correct reaction (1)	Any relevant information(0.5)	Wrong answer (0)			
2 (xi)	Description of anomalous trends in the ionization energy of elements of 3 <sup>rd</sup> period	Writing correct description of anomalous trends in the ionization energy of elements of 3 <sup>rd</sup> period (3)	Writing partially correct description (2)	Any relevant information(1)	Wrong answer (0)			
OR								

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 (xi)	Reason/description Acetaldehydes is more reactive than acetone in nucleophilic addition reaction	Writing correct reason/description of Acetaldehydes is more reactive than acetone in nucleophilic addition reaction (3)	Writing partially correct description/reason (2)	Any relevant information(1)	Wrong answer (0)			
2(xii)	Two reactions in which O-H bond of alcohol is broken	Writing any two correct reactions in which O-H bond of alcohol is broken (2)	Writing any one correct reaction in which O-H bond of alcohol is broken (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reactivity order in the alcohol in these reactions	Writing correct reactivity order in the alcohol in these reactions (1)	Partially correct response (0.5)	Wrong answer (0)				

OR

2(xii)	Role of chlorofluorocarbon in the destroying the ozone layer in the stratosphere	Writing correct role of chlorofluorocarbon in the destroying the ozone layer in the stratosphere (3)	Partially Correct response (2)	Any relevant information(1)	Wrong answer (0)			
2(xiii)	Chemical reaction of calcium when heated in air containing O <sub>2</sub> and N <sub>2</sub> result in the formation of two compound	Writing correct chemical reaction of calcium when heated in air containing O <sub>2</sub> and N <sub>2</sub> result in the formation of two compound (2)	Partially correct response (1)	Any relevant information(0.5)	Wrong answer (0)			
	Chemical reaction of one of the above two compounds reacts with water to form pungent gas	Writing correct chemical reaction of one of the above two compounds reacts with water to form pungent gas (1)	Partially correct response (0.5)	Wrong answer (0)				

OR

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(xiii)	Calculation of relative atomic mass of Mg-24 mass=24amu %abundance=78.70% Mg-25 mass=25amu %abundance=10.13% Mg-26 mass=26amu %abundance=11.17%	Writing correct Calculation of relative atomic mass of Mg (3)	Partially correct calculation (2)	Any relevant information (1)	Wrong answer (0)			
2(xiv)	Conversion of ethene into a. Ethanol	Writing correct Conversion of ethene into Ethanol (1.5)	Partially Correct conversion(1)	Any relevant information(0.5)	Wrong answer (0)			
	Conversion of ethene into b. Ethylene chlorohydrin	Writing correct Conversion of ethene into Ethylene chlorohydrin (1.5)	Partially Correct conversion (1)	Any relevant information(0.5)	Wrong answer (0)			
OR								
2(xiv)	Reaction mechanism of aldol condensation of acetone	Writing correct mechanism in justified steps (3)	Writing some correct justified steps of the mechanism (2)	Any relevant information(1)	Wrong answer (0)			
Q.3.	Justification of CO <sub>2</sub> is acidic oxide	Writing the correct Justification of CO <sub>2</sub> is acidic oxide (1)	Writing partially correct justification of CO <sub>2</sub> is acidic oxide (0.5)	Wrong answer (0)				
	Differentiation of oxides of Ge, Sn and Pb from CO <sub>2</sub>	Writing the correct differentiation of oxides of Ge, Sn and Pb from CO <sub>2</sub> (2)	Writing partially correct differentiation of oxides of Ge, Sn and Pb from CO <sub>2</sub> (1)	Any 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)
	Explanation of any 1 <sup>st</sup> chemical reactions for each in the support of answer	Writing any 1 <sup>st</sup> correct chemical reaction for the support of answer (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			
	Explanation of any 2 <sup>nd</sup> chemical reactions for each in the support of answer	Writing any 2 <sup>nd</sup> correct chemical reaction for the support of answer (2)	Partially correct response (1)	Any relevant information (0.5)	Wrong answer (0)			

OR

Q.3.	Description of refining of crude oil	Writing correct description of refining of crude oil (1)	Writing partially correct description (0.5)	Wrong answer (0)				
	Statement of the basic principle of the crude oil	Writing correct Statement of the basic principle of the crude oil (1)	Writing partially correct statement (0.5)	Wrong answer (0)				
	Explanation of the steps involve in the refining of crude oil in industry	Writing correct explanation in the refining of crude oil in industry in the justified five steps (5)	Writing correct explanation in the refining of crude oil in industry in the any four steps (4)	Writing correct explanation in the refining of crude oil in industry in the any three steps (3)	Writing correct explanation in the refining of crude oil in industry in the any two steps (2)	Writing correct explanation in the refining of crude oil in industry in the any one step (1)	Any 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)
Q.4.	Description of Carbon and silicon showing +4 oxidation state	Writing correct description of Carbon and silicon showing +4 oxidation state (1.5)	Writing partially correct description of Carbon and silicon showing +4 oxidation state (1)	Any relevant information (0.5)	Wrong answer (0)			
	Description of Ge, Sn, and Pb show +4 as well as +2 oxidation state in their compound	Writing correct description of Ge, Sn, and Pb showing +4 as well as +2 oxidation state in their compound (1.5)	Writing partially correct description of Ge, Sn, and Pb showing +4 as well as +2 oxidation state in their compound (1)	Any relevant information (0.5)	Wrong answer (0)			
	Explanation of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb	Writing correct explanation of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb (1.5)	Writing partially correct explanation of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb (1)	Any relevant information (0.5)	Wrong answer (0)			
	Comparison of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb.	Writing correct Comparison of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb (1.5)	Writing partially correct Comparison of relative stability of +4 and +2 of oxidation state in Ge, Sn and Pb (1)	Any relevant information (0.5)	Wrong answer (0)			
OR								
Q.4.	Explanation of structure of benzene on the basis of molecular orbital concept	Writing correct explanation of structure of benzene on the basis of molecular orbital concept (3)	Writing partially correct explanation of structure of benzene on the	Any relevant information (1)	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)
			basis of molecular orbital concept (2)					
	Justification of stability of benzene	Writing correct Justification of stability of benzene (2)	Writing partially correct Justification of stability of benzene (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reason for the electrophilic substitution reaction in benzene	Writing correct reason for the electrophilic substitution reaction in benzene (1)	Writing partially correct reason. (0.5)	Wrong answer (0)				
Q.5.	Preparation of acetyl chloride from carboxylic acid	Writing correct preparation of acetyl chloride from carboxylic acid (1.5)	Writing partially correct preparation of acetyl chloride from carboxylic acid (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reaction of $\text{CH}_3\text{COCl}$ with a. Acetic acid	Writing correct reaction of $\text{CH}_3\text{COCl}$ with Acetic acid (1.5)	Writing partially correct reaction of $\text{CH}_3\text{COCl}$ with Acetic acid (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reaction of $\text{CH}_3\text{COCl}$ with b. Ethanol	Writing correct reaction of $\text{CH}_3\text{COCl}$ with Ethanol (1.5)	Writing partially correct reaction of $\text{CH}_3\text{COCl}$ with Ethanol (1)	Any 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)
	Reaction of CH <sub>3</sub> COCl with c. NH <sub>3</sub>	Writing correct reaction of CH <sub>3</sub> COCl with NH <sub>3</sub> (1.5)	Writing partially correct reaction of CH <sub>3</sub> COCl with NH <sub>3</sub> (1)	Any relevant information (0.5)	Wrong answer (0)			
OR								
Q.5.	Description of lipids	Writing correct description of lipids (1.5)	Writing partially correct description of lipids (1)	Any relevant information (0.5)	Wrong answer (0)			
	Differentiation between essential and Non-essential lipids	Writing correct differentiation between essential and Non-essential lipids (1.5)	Writing partially correct differentiation between essential and Non-essential lipids (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reaction of hydrolysis of triglyceride	Writing correct reaction of hydrolysis of triglyceride (1.5)	Writing partially correct reaction of hydrolysis of triglyceride (1)	Any relevant information (0.5)	Wrong answer (0)			
	Reaction of saponification of triglyceride	Writing correct reaction of saponification of triglyceride (1.5)	Writing partially correct reaction of saponification of triglyceride (1)	Any relevant information (0.5)	Wrong answer (0)			
Q.6.	Explanation of mass spectrometry	Writing correct Explanation of mass spectrometry(1)	Partially correct response (0.5)	Wrong answer (0)				
	Basic principle of mass spectrometry	Writing correct Basic principle of mass spectrometry (1)	Partially correct response (0.5)	Wrong answer (0)				
	Explanation , construction and working of mass spectrometer	Writing correct explanation , construction and working of mass spectrometer (5)	Writing correct explanation and construction or working of mass spectrometer (4)	Writing correct explanation or construction or working of mass spectrometer (3)	Writing partially correct explanation , construction	Any relevant information (1)	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)
					and working of mass spectrometer (2)			
OR								
Q.6.	Order of acidic strength of phenol, alcohol and carboxylic acid	Writing correct Order of acidic strength of phenol, alcohol and carboxylic acid (1)	Partially correct response (0.5)	Wrong answer (0)				
	Justification by $pK_a$ values	Writing correct Justification by $pK_a$ values (2)	Partially correct justification (1)	Any relevant information (0.5)	Wrong answer (0)			
	Justification of acidic strength of phenol and carboxylic acid on the basis of their conjugate bases	Writing correct Justification of acidic strength of phenol and carboxylic acid on the basis of their conjugate bases (2)	Partially correct justification (1)	Any relevant information (0.5)	Wrong answer (0)			
	Justification of acidic strength of phenol and alcohol on the basis of their conjugate bases	Writing correct Justification of acidic strength of phenol and alcohol on the basis of their conjugate bases (2)	Partially correct justification (1)	Any 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.**