Roll No.....

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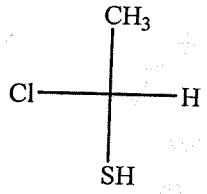
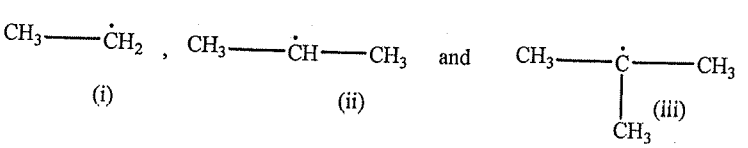
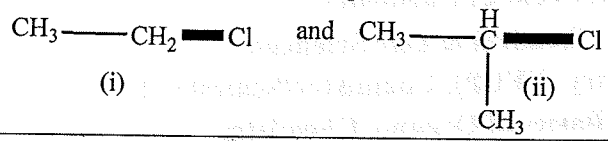
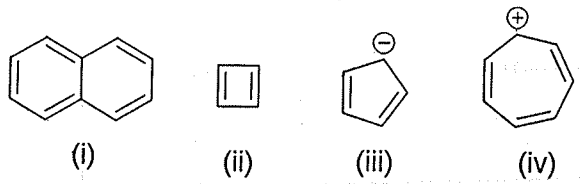
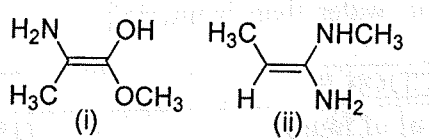
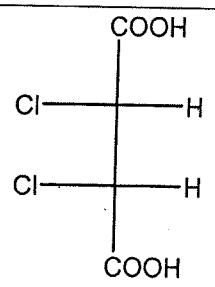
BSc. Hons. Chemistry (FYUP), Chemistry/Semester-II
Paper Title: Basics of Organic Chemistry
Paper Code: BCH-DSC201

Time: 2 ½ hours **Maximum Marks: 60**

Abbreviations Used: CLO- Course Outcome, PLO- Program Outcome, BTL- Bloom Taxonomy Level: BT level 1-Remember; BT level 2-Understand; BT level 3-Apply; BT level 4-Analyse; BT level 5-Evaluate, BT level 6-Create.

Q. No.		BTL	CLO	PLO
	SECTION A			
Very Short Type Questions (Attempt all):		**(1.5x10=15 marks)**		
A1	Assigning priority rule, determine R/S configuration of the following: 	3	1-3	1-3
A2	Arrange the four conformations of n-butane in decreasing order of their stabilities.	2-3	2-3	2-3
A3	Draw the Haworth projection formula of α-D-glucopyranose.	1-3	1-3	1-3
A4	Why meso compounds are optically inactive	2	1-5	1-5
A5	Define isoelectric point. Write the structure of glycine at its isoelectric point.	2	5	5
A6	Name the monosaccharide obtained by hydrolysis of sucrose.	1	1	1
A7	Arrange the following in increasing order of boiling point Pentane, hexane and 2,3-dimethylbutane.	2-4	2-4	2-4
A8	Draw the Erythro isomer of 2,3-dibromobutane.	3-6	3-6	3-6
A9	Name the four nucleotide bases present in RNA and what type of bond connects these bases.	3-6	3-6	3-6
A10	Why do ethers have less solubility in water than isomeric alcohols?	1	1	1
	SECTION B			
Long Type Questions (Attempt any two out of four):		**(10x2=20 marks)**		
B1	(a) Arrange the following free radicals in decreasing order of stability based on hyperconjugation.  (i) (ii) (iii)	2-3	2-3	2-3

	(b) Giving explanation indicate which of the following carbon-chlorine bonds (shown below as a thick line) will undergo heterolytic cleavage much faster?  (i) and (ii)			
B2	What is the N-terminal and C-terminal of polypeptide? Write the synthesis of a dipeptide of your choice using appropriate protecting groups by the Merrifield Solid Phase method. State two advantages of this method over the chemical method used for the synthesis of polypeptides.	2-6	2-6	2-6
B3	What do you understand by racemic mixture and its resolution? How would you resolve a racemic mixture of an amine ($\pm RNH_2$) using the formation of diastereomeric salt?	2-4	2-4	2-4
B4	Give appropriate reactions to establish the open chain and cyclic structure of glucose (configuration not required).	4-6	4-6	4-6
	SECTION C			
Short Type Questions (Attempt all Questions):		**(5x5=25 marks)**		
C1	(a) Define Huckel's rule for aromaticity. Identify the aromatic compounds from the following:  (i) (ii) (iii) (iv)	2-3	2-3	2-3
	OR			
	(bi) Out of *ortho*-nitrophenol and *para*-nitrophenol, which one is more volatile and why?	4-5	4-5	4-5
	(bii) Why is allylic carbocation more stable than alkyl carbocation?			
C2	**(a)** Draw different conformations of cyclohexane and arrange them in their decreasing order of stability, giving a suitable explanation.	2-3	2-3	2-3
	OR			
	(bi) Assigning priority order, explain how will you designate E-/Z- to the following  (i) (ii)	2-4	2-4	2-4
	(bii). Draw the Newman and Sawhorse projection diagrams for the most stable form of 2,3-dichloro-butan-1,4-dioic acid.			

				
C3	(a) By giving suitable examples explain how electrophoresis is used as a method for the separation of amino acids. **OR** **(b)** Define polynucleotides. How does the structure of DNA differ from RNA?	3-6 1-4	3-6 1-4	3-6 1-4
C4	(a) Differentiate between nucleoside and nucleotide. Give the structure of uridylic acid. **OR** (b) What are essential and non-essential amino acids? Give examples. Write a reaction for the synthesis of glycine.	3-5 4-5	3-5 4-5	3-5 4-5
C5	(ai) How will you convert D-glucose to D-fructose? (aii) What are the structural differences between starch and cellulose? **OR** (b) What happens when a solution of (+) glucose in water (specific rotation, $\alpha = 112^{\circ}$) is kept for some time? Name the phenomenon involved and discuss its mechanism	6 1-2	3/6 1-2	3/6 1-2