UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 5th Semester Examination, 2020

CC11-CHEMISTRY

ORGANIC

Full Marks: 40

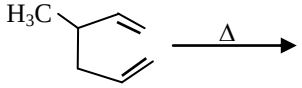
ASSIGNMENT

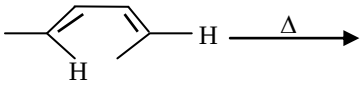
The figures in the margin indicate full marks.
All symbols are of usual significance.

Answer any *four* questions from the following 10×4 =40

1. (a) State the Woodward-Hoffmann rules in brief. 2

   (b) Predict the products of the following reactions and discuss the mechanism: $2\frac{1}{2}\times 2 = 5$

   (i) 

   (ii) 

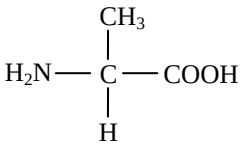
   (c) Cope rearrangement in most cases goes through a chair like transition state and not through a boat like transition state. — Justify. 3

2. (a) Thermal ring opening of *trans*-3,4-dimethyl cyclobutene and photochemical ring opening of *cis*-3,4-dimethyl cyclobutene gives same stereochemical outcomes. Explain the observation. 3

   (b) Arrange the following dienophiles according to the ascending order of their reactivity. $1\frac{1}{2}$

   $(NC)_2C=CH_2$, $H_2C=CH_2$, $H_2C=CHCN$

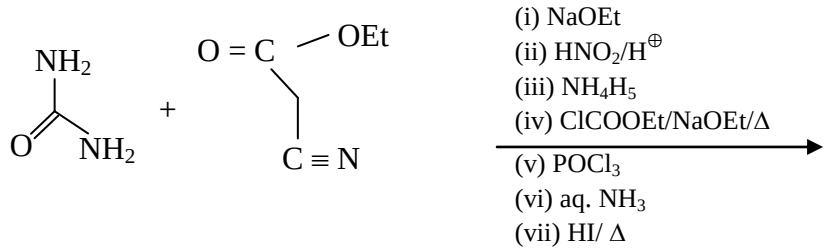
   (c) Convert diethyl malonate to $2\frac{1}{2}$

   (d) Account for the fact that in cycloaddition reaction of cyclopentadiene with maleic anhydride, the less stable endo adduct predominates. 3

3. (a) Prepare (±)-Alanine from acetaldehyde. $2\frac{1}{2}$

   (b) Complete the following reaction with suitable mechanism: 4

   (c) How will you determine C-terminal amino acids by reduction? $2\frac{1}{2}$

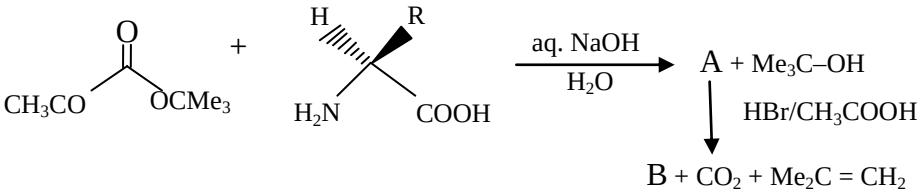
   (d) Draw the structure of a heterocyclic alpha amino acid. 1

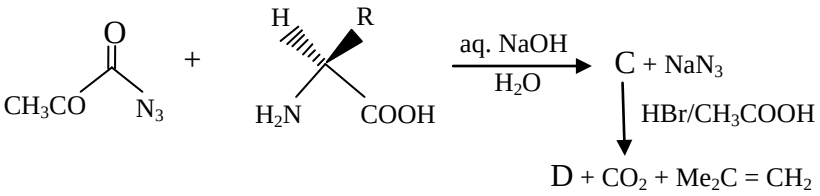
4. (a) Write down the possible tautomeric forms of adenine, guanine, cytosine and thymine. 4

(b) How do you convert thymine into 5-methyl cytosine? 3

(c) Discuss about the geometry of the peptide linkage. 3

5. (a) Identify the products: 4

(i) 

(ii) 

(b) How will you synthesize glycine from acetic acid? 2

(c) Convert ethyl chloride to alanine. 2

(d) Define rancidity. 2

6. (a) Comment on the following statements: 3

"All α-amino acids are optically active and have '*S*' absolute configuration at their chiral centre."

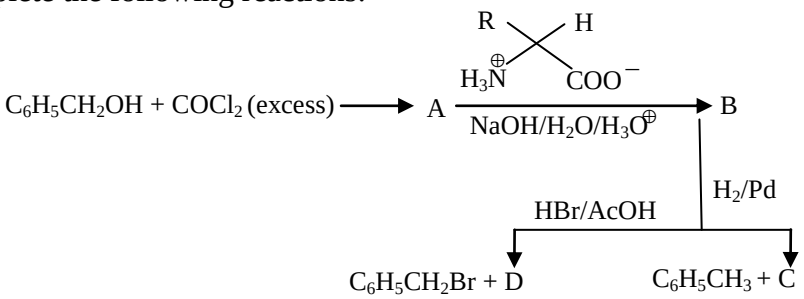
(b) RNA molecules undergo spontaneous hydrolytic cleavage about 100 times faster than DNA molecules. — Explain. 2

(c) Aspartic acid and arginine can be easily separated by electrophoresis. — Explain. 3

(d) Define saponification value of an oil. 2

7. (a) Form the structure of guanosine-adenine dinucleotide by combining GTP and ATP. 3

(b) Complete the following reactions: 4



(c) Explain Electrophoresis of amino acids. 3

8. (a) Discuss the *trans*-esterification of fats and oils. $2\frac{1}{2}$

(b) What is the effect of heat on α, β and γ amino acids? $2\frac{1}{2}$

(c) Write short notes on: $2\frac{1}{2} \times 2 = 5$

(i) Iodine value

(ii) Composition of fatty acids in oils and fats.

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