U.G. 5th Semester Examination - 2020

CHEMISTRY

Course Code : BCEMCCHC502

Course Title : Organic Chemistry - V

Full Marks : 30 Time : 2 Hours

The figures in the right-hand margin indicate marks.

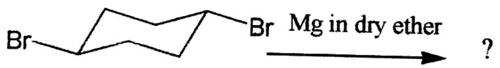
Candidates are required to give their answers in their own words as far as practicable.

1. Answer any **ten** of the following questions: $1\times10=10$

a) Amomg cis- and trans-4-t-butylcyclohexyl tosylates, which one undergoes solvolysis reaction at a faster rate?

b) Write the structure of D-Gluconic acid in Fischer projection.

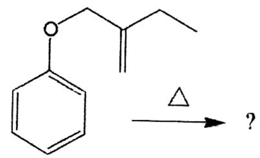
c) Complete the following reaction



d) Write down the structures of the γ-lactones obtained during the lactonisation of the aldaric acid obtained from D-mannose?

e) Write the structure of adenosine.

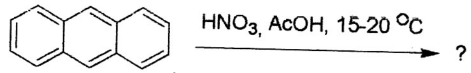
f) Identify the product of the following reaction



g) Write down the structure and absolute configuration of L-proline in R, S-nomenclature.

h) What is mutarotation of D-glucose?

i) Complete the following reaction



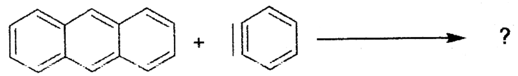
j) What is the use of DCC in peptide synthesis?

k) Which one is readily hydrolysed by alkali-RNA or DNA and why?

l) Write the structure of dansyl derivative of leucine.

m) How would you carry out the following conversation?

n) Write down the product of the following reaction:



o) Write the structure of HOMO of allyl anion π system.

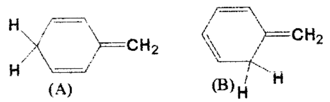
2. Answer any **five** of the following questions: $2\times5=10$

a) Are α-D-glucose and β-D-glucose enantiomers? Explain.

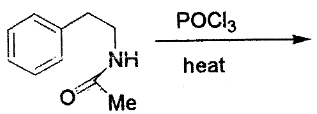
b) Write a reaction showing how 2,4-dinitrofluorobenzene could be used to identify the N-terminal amino acid of the peptide Ala-Val-Gly.

c) Cis-and trans-2-chlorocyclohexanol behave differently on treatment with alkali. Explain.

d) Explain why the compound (A) on heating readily converts into toluene but the compound (B) does not



e) Write down the product of the following reaction with mechanism:



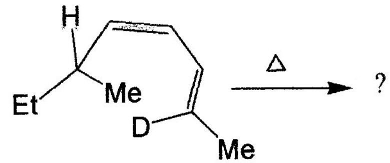
f) The specific rotation of α-anomer of D-glucopyranose is +112° and that of β-anomer is +19°. When either form is dissolved in water, the specific rotation value changes to the constant value of +52.7°. What is the percentage of the α and β-anomers of D-glucopyranose (neglect the percentage of open.-chain form)?

g) Carry out the synthesis of phenanthrene from naphthalene using Haworth method.

h) Describe the synthesis of Methionine.

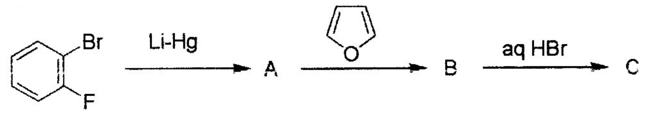
3. Answer any **two** from the following: $5\times2=10$

a) i) Predict the product(s) with stereochemistry of the following reaction. Designate the pericyclic step involved. 2



ii) The cis-isomer of 4-tert-butylcyclohexyl bromide reacts with sodium thiophenexide (PhSNa) in aqueous ethanol at a much faster rate than the trans-isomer. Explain. 3

b) i) Complete the following reaction with required mechanism:



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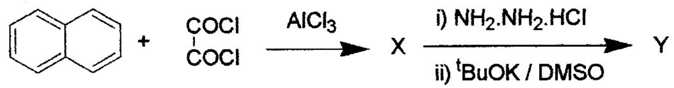
ii) What is X and Y in the following reaction:



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c) i) Draw a chair conformation for the form of a disaccharide in which two units of D- glucopyranose are joined by a β-1,3-glycosidic bond. Which carbon of an aldopentose determines whether the pentose has a D or L configuration?

2

ii) Synthesise glycine starting from N-potassiophthalimide and diethyl-malonate. In an electric field, to which electrode would one amino acid will migrate at a pH<pI. 3

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