UG/5th Sem/CHEM(H)/T/19

2019

B.Sc. (Honours)

5th Semester Examination

CHEMISTRY

Paper - C 12-T

Organic Chemistry - V

Full Marks : 40 Time : 2 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group - A

1. Answer any *five* questions : 2×5=10

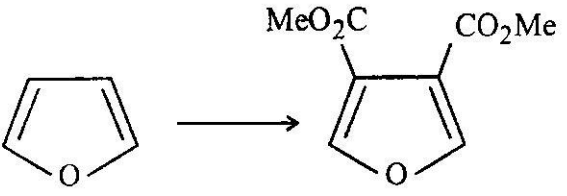
(a) Phenanthrene reacts with dichlorocarbene in its C-9 / C-10 positions but anthracene does not. Explain this fact.

(b) Between methyl α-D-glucopyranoside and methyl β-D-gluopyranoside which is more stable and why ?

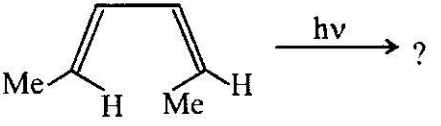
[Turn Over]

(c) Explain why the benzoyl group can not be used as an N-protecting group in peptide synthesis.

(d) Convert :



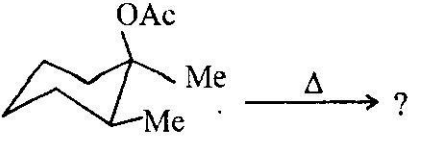
(e) Give the product(s) and show frontier orbital interaction.



(f) Write the difference between DNA and RNA.

(g) Why [1, 3] - sigmatropic shift of H atom is not observed under thermal condition — Explain.

(h) Predict the product(s) and give mechanism.



Group - B

Answer any *four* questions : 5×4=20

2. (a) What happens when an aldopentose is heated with conc. HCl ? Explain with mechanism. 2

   (b) Give the synthesis of (±) phenylalanine by azlactone method. 3

3. (a) Write down Bardhan-Sengupta synthesis of phenanthrene. 4

   (b) Predict the preferred conformation of *trans*-1, 4-di-tert-butylcyclohexane and give reason. 1

4. (a) Why *cis*-4-hydroxycyclohexanecarboxylic acid lactonizes on heating but the trans-isomer does not — Explain. 2

   (b) Carry out the following conversion :

   D-glucose ⟶ 3-O-methyl-D-glucose 2

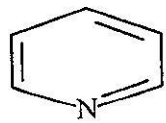
   (c) What do you mean by 'anomer' ? 1

5. (a) How would you prepare anthracene from naphthalene ? 2

[Turn Over]

(b) Identify the product(s) and give mechanism (any one) 3

(i) $Ph-NH_2 + \begin{matrix} CH_2OH \\ | \\ CH-OH \\ | \\ CH_2-OH \end{matrix} \xrightarrow[Ph-NO_2,\ 130\,^{\circ}C]{Conc.H_2SO_4} ?$

(ii)  $\xrightarrow[Ph-NMe_2,\ 100^{\circ}C]{NaNH_2} ?$

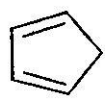
6. (a) According to Watson and Crick model draw the base pairs showing all the H-bonds in them. 2

(b) If one of the strands of DNA has the following sequence of bases running in the 5′-3′ direction

5′-G-G-A-C-A-A-T-C-T-G-C-3′

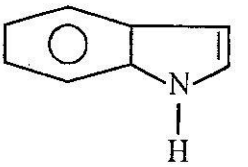
What is the sequence of base in the complementary strand ? 1

(c) Indicate the product(s) and explain with FMO approach.

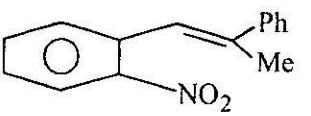
 $+ CH_2=CH-CHO \xrightarrow{\Delta} ?$ 2

7. (a) Outline a chemical method for C-terminal determination of peptide. 2

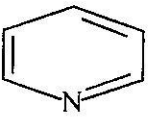
(b) Predict the product(s) (any *three*) 1×3

(i) 

$\xrightarrow[NaOH]{CHCl_3}$?

(ii) 

$\xrightarrow[\Delta]{P(OEt)_3}$?

(iii) 

$\xrightarrow[\text{ether, rt}]{E_tO_2C-C\equiv C-CO_2Et}$?

(iv) 

$\xrightarrow[\Delta]{Zn\,/\,MeOH}$?

(v) 

$\xrightarrow[EtOH]{NaI}$?

[Turn Over]

Group - C

Answer any *one* question : 10×1=10

8. (a) Which of the following reactions will occur at a faster rate and why ?

Oxidation of *cis*- and *trans*-4-t-butyl cyclohexanol by chromic acid. 3

(b) Convert :

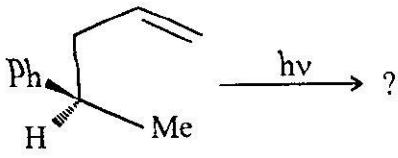
2

(c) Write down the Haworth synthesis of naphthalene. 3

(d) Compare the rates of alkaline hydrolysis of RNA and DNA. 2

9. (a) Using protection-deprotection prepare Gly-Ala dipeptide. 2

(b) Predict the product(s) and give FMO approach



2

(c) Give the name and structure of amino acid that contain indole ring. 1

(d) Subsituted pyrroles and pyridines can be synthesized by combining two aliphatic skeletal fragments. Outline the synthetic route for the synthesis of each pyrrole and pyridine from compounds having the following skeletal units as required. 2½×2