

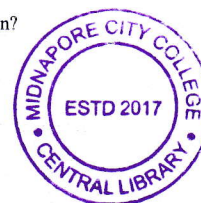
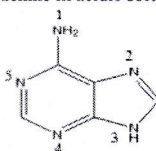
PG CBCS
M.Sc. Semester-IV Examination, 2022
CHEMISTRY
 PAPER: CEM 402 (SPL PAPER)
(ADVANCED ORGANIC CHEMISTRY-III)

Full Marks: 40

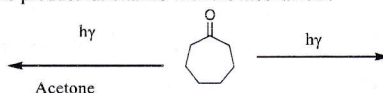
Times: 2 Hours

GROUP-A1. Answer any **four** questions from the following questions: **2×4 = 8**

- a) Pyrrole is more aromatic than furan – explain.
- b) Explain the reactivity order of the reactivity: pyrrole > Furan > Thiophene > Benzene
- c) Electrophilic aromatic substitution occurs at 3-position in five membered heterocyclic systems – explain with reasons.
- d) Photochemical [2+2]-cycloadditions of benzophenone with *cis*- and *trans*-2-butenes result in the same product mixture. Explain the results.
- e) What are Vitamins?
- f) What is a nucleotide?
- g) The mono protonation of adenine in acidic solution occurs in which position?

**GROUP - B**2. Answer any **four** questions from the following questions: **4×4 = 16**

- a) Describe Watson crick model of DNA.
- b) Describe the different sources and uses of Vitamin A1.
- c) Describe the elementary structure of RNA. Write the different types of RNA.
- d) What do you mean by Penicillin? Write about the applications of Penicillin.
- e) Write the names of two fat soluble vitamins and mention their applications.
- f) (i) Predict the product rationalize with the mechanism.



(ii) Photolysis of ethyl methyl ketone gives biacetyl and n-butane, whereas that of butyrophenone gives acetophenone and ethylene as products. Explain.

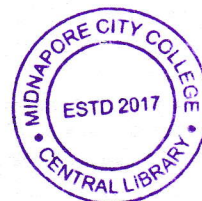
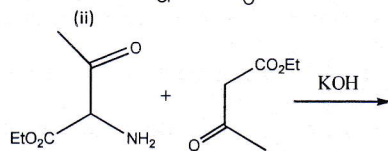
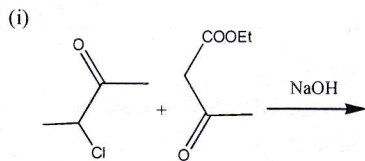
- (i) Write an account of the various factors affecting enzyme activity.
- (ii) What are the four cardinal requirements of a substance to be called an 'antibiotic'?

(P.T.O.)

(2)

GROUP - C**3. Answer any two questions from the following questions: 8×2 = 16**

a) Write the product(s) in each case and suggest the mechanisms for following reactions: 4 + 4



b) Answer the following 3 + 2.5 x 2

(i) Two isomeric mono - nitro derivatives, $C_5H_6N_2O_2$, are formed in a ratio of 6 : 1, by treating 2 - methyl pyrrole with Ac_2O/HNO_3 . What are their structures and which would you predict to be the major product?

OR

Hydrolysis of 2-methoxy furan with aqueous acid produces 4 - hydroxybut - 2 - enoic acid lactone and $MeO_2C(CH_2)_2CH = O$; write sequences involving protonation and reaction with water to rationalise formation of each of these.

(ii) What is the mechanism of the conversion of 3-dimethyl amino methyl indole into 3-cyano methylindole on reaction with NaCN?

(iii) How could one convert 2- bromoaniline into 2-phenylindole 4 + 4

c) Write a short note on solid phase peptide synthesis. Write the base pairing in DNA with structure.

d) Write notes on 4 + 4

i. Fischer Indole Synthesis

ii. Skraup synthesis of quinolone

e) Predict the structure including stereochemistry of the expected product(s) for the following reactions. For the reactions, where more than one product is formed, indicate the major and minor products with justification. (attempt any four). 4 x 2

