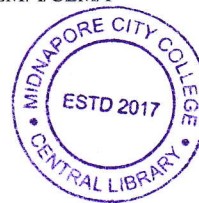


PG CBCS  
M.Sc. Semester-I Examination, 2022  
CHEMISTRY  
PAPER: CEM 102  
(ORGANIC CHEMISTRY-I)



Full Marks: 40

Time: 2 Hours

**GROUP – A**

1. Answer any **FOUR** questions from the following questions:  $2 \times 4 = 8$

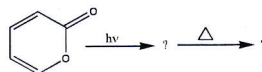
- a) All stereospecific reactions are stereoselective, but all stereoselective reactions are not necessarily stereospecific – explain.
- b) What are 'synthon' and 'synthetic equivalent'?
- c) What is *ipso* substitution reaction?
- d) State Woodward Hoffmann selection rule for electrocyclic reactions?
- e) Plant based chemicals can be termed as *renewable chemicals*. Justify.
- f) What is isoprene rule and what is biogenetic isoprene rule?
- g) Define an *ene reaction*. Give a suitable example.
- h) What is olefin metathesis reaction?

**GROUP - B**

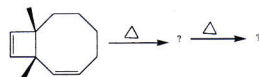
2. Answer any **FOUR** questions from the following questions:  $4 \times 4 = 16$

- a) Write the product and suggest the mechanism of the following reactions

(i)



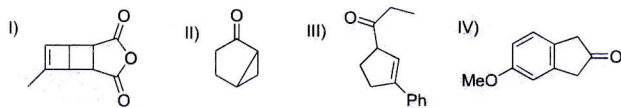
(ii)



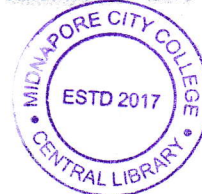
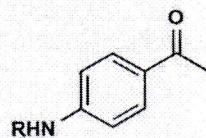
P.T.O.

(2)

- b) i). Explain why C-X disconnection is not fruitful for designing amine synthesis?  
 ii). Outline the synthesis of the following target molecules with proper retrosynthetic analysis. (attempt *any two*).

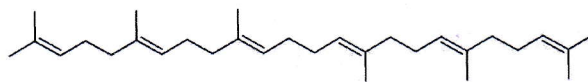


- c) How do you synthesize the following compound using (i) electrophilic aromatic substitution and (ii) nucleophilic aromatic substitution? Give proper explanation: which route is better and why?



- d) Explain the formation of the following from squalene via squalene epoxide by applying the "biogenetic isoprene rule" (answer any two, at least three examples each): 2+2

- (i) Monocyclic triterpenoids  
 (ii) Bicyclic triterpenoids



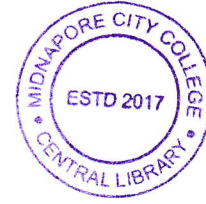
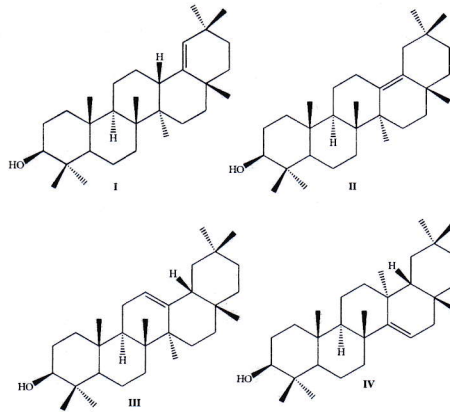
Squalene

- (iii) Tricyclic triterpenoids

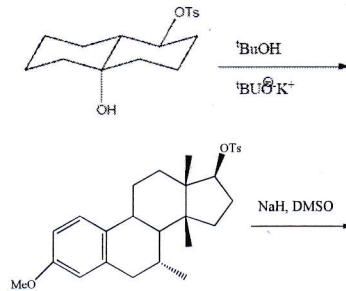
P.T.O.

(3)

- e) Synthesize *any two* of the following 6-6-6-6 pentacyclic triterpenoids I, II, III, IV from squalene following biogenetic isoprene rule: 2×2



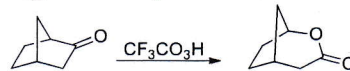
- f) Predict the product(s) and draw the mechanism. 2×2



- g) Answer *any two* questions

(2×2) = 4

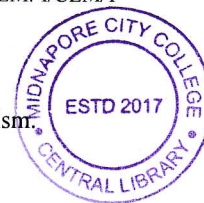
- (i) What is template effect?
- (ii) What is phase transfer catalyst? Give an example.
- (iii) Explain the regioselectivity of the reaction



P.T.O.

(4)

h) Write Barton reaction with an example. Explain with mechanism.



**GROUP - C**

3. Answer any **TWO** questions from the following questions: **8×2 = 16**

- a) Explain the correlation diagram of electrocyclic reaction for  $4n$  and  $4n+2$  electron systems.
- b) Draw the  $\pi$ - molecular orbital diagrams for pentadienyl cation, anion, and radical with node, symmetry with respect to  $\sigma\sigma$  plane and  $C_2$  axis, and mention HOMO and LUMO in each case.
- c) Write down the synthesis of quinine starting from *m*-hydroxybenzaldehyde and aminoacetal?
- d) (i) How can you prove that Geraniol contains two non-conjugated double bonds and a hydroxy methyl group? (ii) Nerol undergoes acid-catalyzed cyclization to  $\alpha$ -terpineol nine times faster than Geraniol. Explain. (iii) What is Hydramine fission? (iv) Terpenes usually have a multiple of five carbon units- why?

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