2021

M.Sc.

Third Semester

DISCIPLINE SPECIFIC ELECTIVE – 02

CHEMISTRY

Course Code: MCHD 3.21

(Natural Products & Bioorganic Chemistry)

Total Mark: 70 *Pass Mark: 28*

Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. (a) Discuss with chemical equation for the biosynthesis of palmitic acid. 5

   (b) What do you mean by biogenesis? Discuss the biogenesis and synthesis of cis-jasmene. 5

   (c) Discuss the procedure for the solution of natural products. 4

2. (a) What are primary and secondary metabolites? 2

   (b) Discuss the classification of secondary metabolites. 3

   (c) Discuss the biosynthesis of fats. 5

   (d) Give a method of synthesis of muscone and exaltone. 4

UNIT–II

3. (a) What are enzymes? How are they nomenclated? Discuss in brief. 5

   (b) Discuss transition state theory and Fischer's lock and key theory of enzyme action. 2+2=4

   (c) Give the structure and function of NADH. 5

4. (a) Give the mechanism of enzyme chromotrypsin that catalyzes the hydrolysis of protein. 6

   (b) Give the structure and function of FAD. 5

   (c) Define the following terms: 3

   (i) holoenzyme

   (ii) cofactor

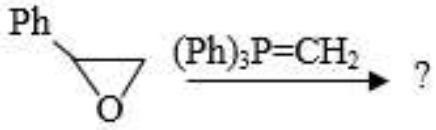
   (iii) apoenzyme

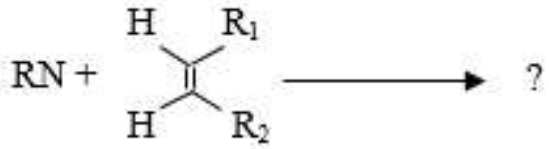
UNIT–III

5. (a) Establish the structure of morphine. 7
   (b) Write the synthesis and biosynthesis of morphine. 4
   (c) Write the general method for isolation of alkaloids. 3
6. (a) Write Hoffmann exhaustive methylation method for degradation of alkaloids. 4
   (b) Establish the structure of reserpine. 6
   (c) Write synthesis and biosynthesis of reserpine. 4

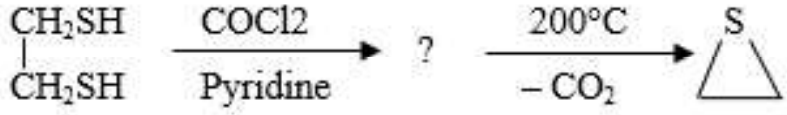
UNIT–IV

7. (a) What are aziranes? How is azirane prepared by Gabriel ring closure? 2+2=4
   (b) Give the product of the following reactions: 1½×2=3

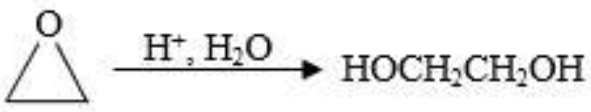
(i) 

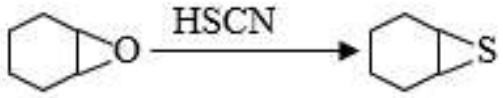
(ii) 

   (c) Explain Fischer's indole synthesis. 3
   (d) Explain Skraup synthesis of quinoline with mechanism. 4
8. (a) Quinoline gives electrophilic substitutions mainly at C-5 and C-8. Justify it by resonance structures. 4
   (b) Explain Smiles arrangement for preparation of phenothiazines. 3
   (c) What is thiirane? How do you bring about the following transformation? 4



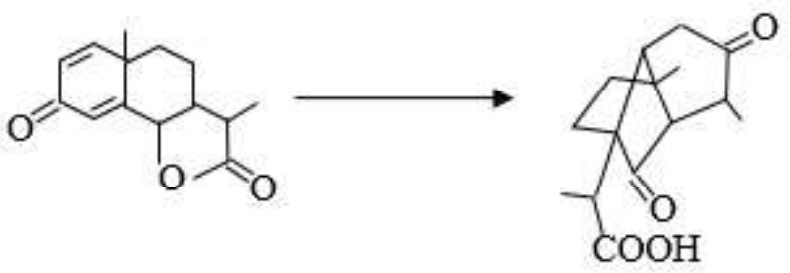
   (d) Write the simple reaction mechanism of the following: 1½×2=3

(i) 

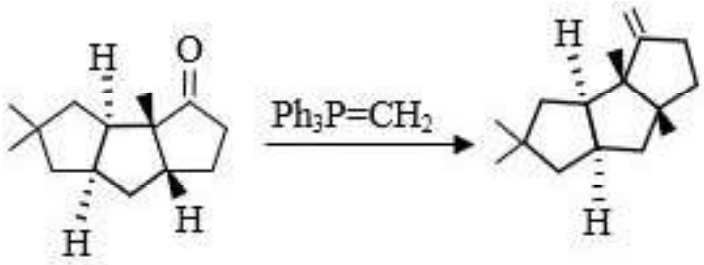
(ii) 

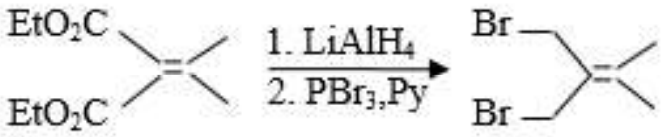
UNIT–V

9. (a) What is santonic acid? Explain how you can bring about the transformation of santonin to santonic acid. 2+4=6



(b) Write the mechanism of the following reaction. 3+3=6

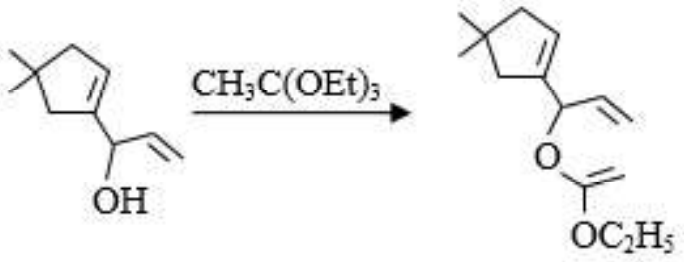
(i) 

(ii) 

(c) Explain briefly acyclic monoterpenoid and monocyclic monoterpenoid. 2

10. (a) Briefly explain trans-chrysanthemic acid. Explain how you can bring about the transformation of olefenic linkage to trans and cis-chrysanthemic acid. 2+3=5

(b) Write the following rearrangement mechanism reaction. 3+3=6

(i) 

(ii) 

(c) What are terpenoids? How do you confirm the presence of carbonyl ($>C=O$) group in terpenoids? 3
