

## III Semester M.Sc. Examination, January 2019

(CBCS)

## CHEMISTRY

## 302 – OC : Chemistry of Natural Products

Time : 3 Hours

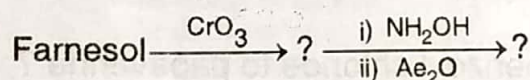
Max. Marks : 70

**Instruction :** Answer question No. 1 and any five of the following.

1. Answer any ten of the following :

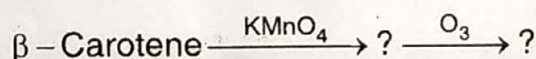
(10×2=20)

a) Predict the products in the following :



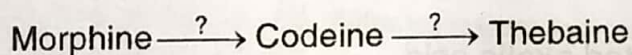
b) What is isoprene rule ? Explain with example.

c) Formulate the reaction in the following :

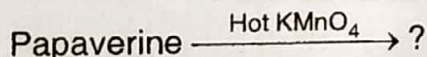


d) How the presence of secondary amino group in ephedrine was confirmed ?

e) How the following interconversion is achieved ?



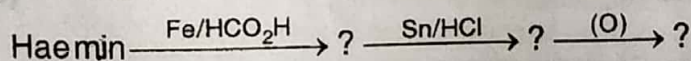
f) Predict the product.



g) Draw the structure of purine base present in nucleic acids.

h) What are the deficiency diseases of Vitamin B<sub>12</sub> ?

i) Formulate the reaction in the following :



j) Write the stereochemical structure of PGE1 and PGE2. Indicate the differences between them.

k) Explain the role of insect pheromones in pest control.

l) What are prostaglandins ? Give any two biological functions of prostaglandins ?

P.T.O.

2. a) Outline the steps involved in the synthesis of menthol, starting from m-cresol.
  - b) Give evidences to prove the presence of carboxyl group in abietic acid at position – 4. (5+5=10)
3. a) How santonin was converted into desmotroposantonin ?
  - b) Explain any one synthesis of  $\beta$ -Carotene. (3+4+3=10)
  - c) How camphor was commercially synthesized ?
4. a) Explain the photochemical synthesis of Nuciferine. (4+6=10)
  - b) Sketch the synthesis of dimethyl morphal.
5. a) How do you convert 3, 4-dimethoxy benzoyl chloride to papaverine ?
  - b) Write notes on :
    - i) Arndt-Eiestert synthesis
    - ii) Von-Braun degradation. (4+6=10)
6. a) Indicate the relationship between chlorophyll-a and chlorophyll-b. Formulate their reaction with
  - i) KoH Solution
  - ii) Ethanotic solution of hydrated oxatic acid.
  - b) How the structure of nucleotide have been established ? (6+4=10)
7. Write notes on :
  - a) Hydroxy protecting groups.
  - b) Methods of formation of internucleotide bonds.
  - c) Biosynthesis of Prostaglandin. (3+3+4=10)
8. a) Outline the synthesis of Brevicommin.
  - b) Explain the up John's synthesis of PGE3. (4+6=10)

III Semester M.Sc. Examination, December 2016  
(CBCS)  
CHEMISTRY

302-OC : Chemistry of Natural Products

Time : 3 Hours

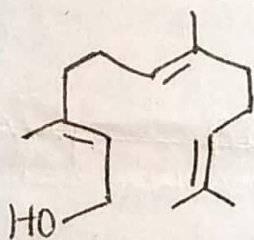
Max. Marks : 70

**Instruction :** Answer Question No. 1 and **any five** of the remaining questions.

1. Answer **any ten** of the following :

(2×10=20)

a) Identify the isoprene units in the following compound.



- b) Formulate the synthesis of  $\alpha$ -terpineol.  
 c) Give the mechanism of Wagner-Meerwein rearrangement of camphene.  
 d) How do you establish the presence of methylenedioxy group in an alkaloid ?  
 e) Propose a method of synthesis of coniine.  
 f) Give the synthesis of cocaine.  
 g) Predict the products in the following  

$$\text{Haemin} \xrightarrow{\text{Sn/HCl}} ?$$
  
 h) What are nucleotides and nucleosides ?  
 i) Draw the structure of cohyric acid.  
 j) Draw the stereochemical structure of thromboxane B<sub>2</sub>.  
 k) Give a short synthesis of multistriatin.  
 l) What are pheromones ? Illustrate their role in pest control.

P.T.O.



2. a) Mention the steps involved in the synthesis of reserpine. (6+4)  
b) Elucidate the structure of Lysergic acid.
3. a) Sketch the synthesis of Haemin. (6+4)  
b) How do you synthesise 5, 6 - dimethyl benzimidazole ribofuranoside.
4. a) Illustrate phosphotriester approach and its utility in the formation of internucleotide bonds with suitable examples. (6+4)  
b) Formulate the synthesis of ribonucleotides using phosphoramidate approach.
5. Discuss the steps involved in the synthesis of morphine. 10
6. a) Elucidate in detail the structure of PGE<sub>3</sub>. (6+4)  
b) Sketch the synthesis of (+)-disparlure.
7. a) Outline the synthesis of Farnal. (6+4)  
b) Sketch the synthesis of PGE<sub>1</sub> by Corey's approach.
8. a) Show the steps involved in the preparation of  $\beta$ -carotene by Isler's method. (4+6)  
b) Elucidate the structure of  $\alpha$ -santonin.



III Semester M.Sc. Examination, December 2015  
(CBCS)

## CHEMISTRY

## 302-OC : Chemistry of Natural Products

Time : 3 Hours

Max. Marks : 70

**Instruction :** Answer Question No. 1 and **any five** of the remaining questions.

1. Answer **any ten** of the following : (2×10=20)
- What is special isoprene rule ? Explain.
  - Discuss classification of Terpenoids.
  - Give the method of isolation of carotenoids.
  - Give a synthesis of Ephedrine.
  - Propose a method to identify the methylenedioxy group in alkaloids.
  - Explain Emde's degradation with an example.
  - Draw the structure of Vitamin B<sub>12</sub>.
  - How DCC helps in the formation of internucleotide bonds ? Explain with a mechanism.
  - Give a synthesis of adenosine.
  - Write briefly on the classification of prostaglandins.
  - Write any one synthesis of (+) – Disparlure.
  - What are pheromones ? Give their classification and applications.
2. a) Elucidate the structure of  $\alpha$ -Pinene. (5+5=10)  
b) Sketch a biosynthesis of Fenchone.
3. a) Outline a synthesis of  $\beta$ -carotene. (5+5)  
b) Elucidate the structure of PGE<sub>1</sub>.

P.T.O.

4. a) Sketch the synthesis of morphine. (6)
- b) Elucidate the structure of papaverine. (5+5)
5. a) Outline the synthesis of haemin. (5+5=10)
- b) Explain how the structure of nucleotides established by degradation studies any one. (6+4)
6. a) Describe a solid phase synthesis of any one oligonucleotide. (3+4+3)
- b) Sketch the UpJohn's synthesis of  $PGE_3$ .
7. a) How is the structure chlorophyll a elucidated ?
- b) Outline the synthesis of brevicomin.
8. a) Sketch a synthesis of bombykol.
- b) Give a stereoselective synthesis of faranil.
- c) Outline the biosynthesis of hygrine.



III Semester M.Sc. Examination, January 2018  
(CBCS Scheme)

## CHEMISTRY

## C 302 : OC : Chemistry of Natural Products

Time : 3 Hours

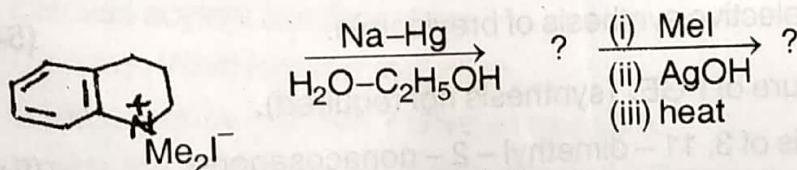
Max. Marks : 70

**Instruction :** Answer Question No. 1 and **any five** of the remaining.

1. Answer **any ten** of the following :

(10×2=20)

- What is special isoprene rule ? Write the structure of limonene and mark the isoprene units.
- Write the mechanism of the conversion of borneol to camphene.
- How are carotenoids isolated ?
- Write the structures of any two medicinally important alkaloids. Mention their medical applications.
- Predict the product(s) and name the degradation for the following :



- Write the biosynthetic pathway of coniine from labelled acetic acid.
- Complete the following reaction and write the structures of the products and name them  
$$\text{Haemin} \xrightarrow[\text{heat}]{\begin{matrix} \text{HI} \\ \text{CH}_3\text{COOH} \end{matrix}}$$
- Name the bases present in DNA and RNA. Write the structures of pyrimidine bases of DNA.
- How hydroxy groups of sugar in nucleic acids are protected ?
- Highlight the biological functions of prostaglandins.
- How are insect pheromones classified ?
- Sketch a synthesis of disparture.

P.T.O..



2. a) Describe the structural elucidation of  $\beta$ -carotene.  
b) Indicate the biosynthetic steps for conversion of equalene to  $\alpha$ -lanosterol. (5+5=10)
3. a) Outline the synthesis of Fenehone.  
b) Write the photochemical synthesis of nuciferine.  
c) Convert morphine to  
i) heroin  
ii) codeine. (4+3+3=10)
4. a) Discuss the structural elucidation of papaverine.  
b) Sketch the synthesis of quinine from quininic acid. (5+5=10)
5. a) Outline the synthesis of haemin.  
b) Discuss the alcoholic KOH degradation products of chlorophyll. (6+4=10)
6. a) Sketch the synthesis of internucleotide bonds by the phosphotriester approach.  
b) Outline the stereoselective synthesis of brevicomin. (5+5=10)
7. a) Elucidate the structure of PGE<sub>1</sub> (synthesis not required).  
b) Outline the synthesis of 3, 11 - dimethyl - 2 - nonacosanone. (5+5=10)
8. a) Sketch the synthesis of PGE<sub>3</sub> by Upjohn's approach.  
b) Outline the synthesis of Adenosine. (5+5=10)