

**Course Name:- Master of Science**

**Subject Code:- 81566**

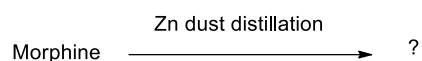
**Subject Name:- M.SC. Part No - 2(Sem-4) CBCS - Chemistry of Natural Products**

Questions for question number 1.

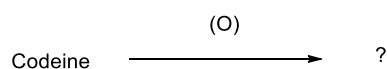
**Shorts answers questions/Multiple choice/Fill in the blanks/ one sentence answers/one word answers.**

**Note: Please consider only integer number for number of questions.**

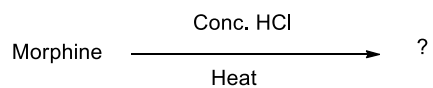
- 1). Write the structure of the starting materials used in the synthesis of riboflavin.
- 2) Enlist any two adrenocortical hormones.
- 3) Calculate the double bond equivalent in camphor.
- 4) Enlist any two biological functions/applications of prostaglandins.
- 5) Reserpine on hydrolysis gives -----.
- 6) Oestrone contains ----- chiral centers.
- 7) Santonin on distillation with Zn dust gives -----, -----and ----- as the products.
- 9)



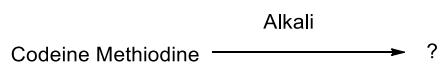
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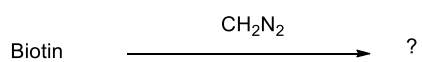
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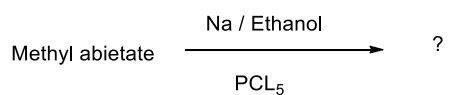


14) State the uses of Reserpine in medicine.

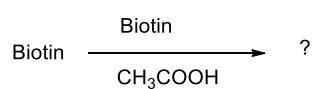
15) What are primary and secondary metabolites?

16) What are Vitamins and provitamins?

17)

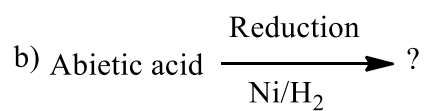


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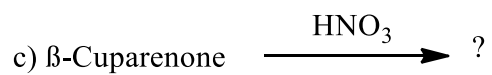


19) How will you confirm  $\alpha$ -Santonin is  $\gamma$ -Lactone?

20.)



21.)



22.) What is isopyrene rule?

23) Draw the structure of aldosterone?

24).

g) Methyl reserpate  $\xrightarrow{\text{Se}}$  ?

25.

h) Camphor  $\xrightarrow{\text{HNO}_3}$  ?

26.)

j) Cholesterol  $\xrightarrow[\text{Heat}]{\text{Se}}$  ?

27) What are fatty acids?

28) Write the structure of Cholesterol.

29) Write the structure of methyl morphol.

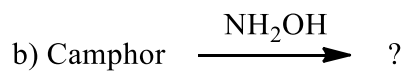
30) Define the term vitamins.

31) State any two medicinal uses of morphine?

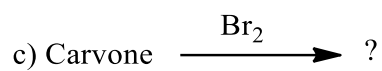
32) Give any two functions of Vit-B6



34.)



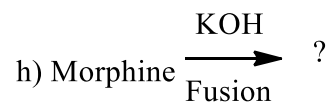
35.)



36) What are Vitamins and pro-vitamins?

37) Give any two physiological functions of progesterone.

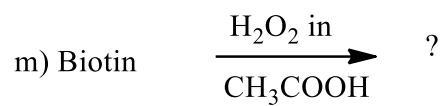
38.)



39) What are sex hormones?

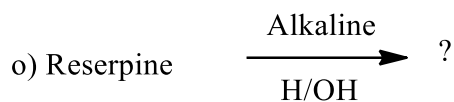
40) What are lipids? Give one examples.

41)



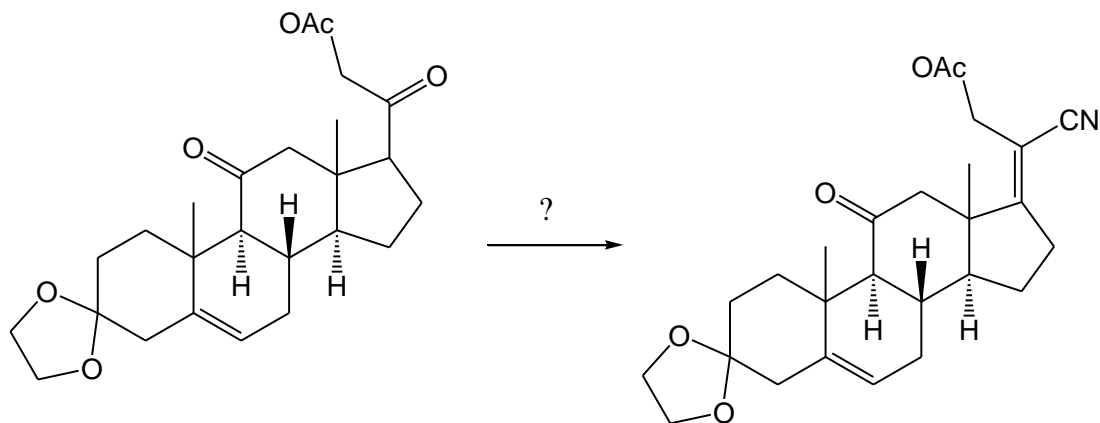
42) Define the term biosynthesis?

43.)



44.) What are the major five classes of lipids?

45). Identify class of reaction involved in following transformation.



a) Elimination    b) Substitution    c) Addition    d) Addition followed by Elimination

46). Which of the following can be used as a precursor for synthesis of sex hormones?

- a) Androsterone    b) Cortisone  
c) Aldosterone    d) Diosgenin

47). Which of the following hormone can be synthesized from Diosgenin ?

- a) Androsterone    b) Cortisone  
c) Aldosterone    d) Progesterone

48). Which of the following is not recognized as sex hormone?

- a) Testosterone    b) Cortisone  
c) Estrone    d) Progesterone

49). Which of the following best describes hormones?

a) Hormones are relatively unstable and work only in the area adjacent to the gland that produced them.

b) Hormones are stable, long-lasting chemicals released from glands.

c) All hormones are lipid-soluble.

d) Hormones are chemical messengers that are released into the environment.

50.) The biosynthetic precursor for the steroids is \_\_\_\_\_.

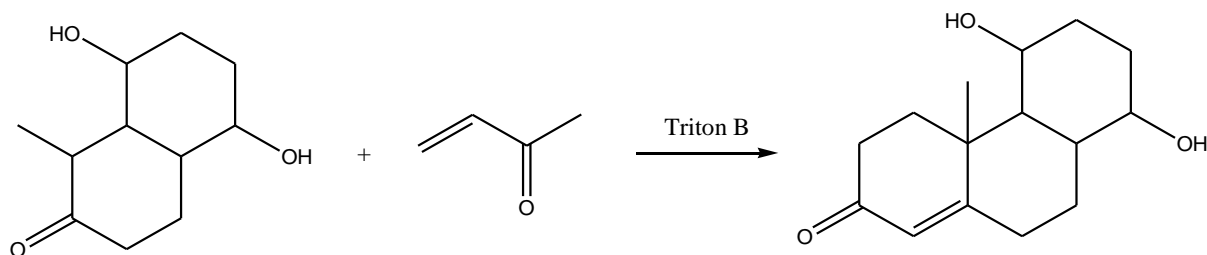
a) secologanin

b) shikimic acid

c) mevalonic acid

d)  $\alpha$ -ketoglutaric acid

51.) Identify the name reaction by which following transformation can be carried out.



a) Michael addition

b) Aldol condensation

c) Robinson annulations

d) Dickmann condensation

52.) The most important compound in the synthesis of cortical hormones is \_\_\_\_\_.

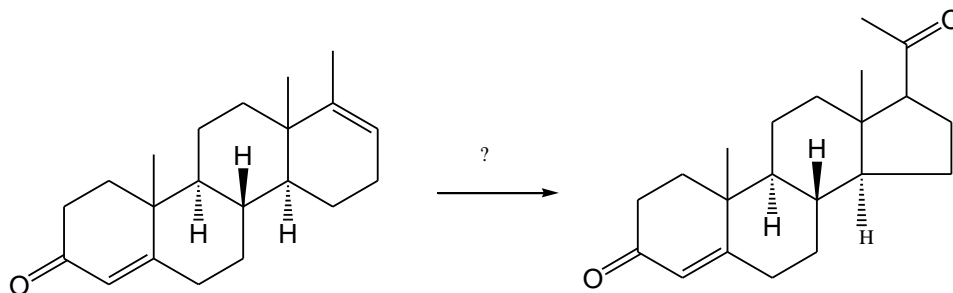
a) Sarette's ketone

b) Aldosterone acetate

c) Cortisone

d) Cortisone acetate

53.) Correct order of reagents in following transformation is .....



a)  $\text{OsO}_4$ ,  $\text{MsCl}$  : Pyridine,  $t\text{-BuOK}$

b)  $t\text{-BuOK}$ ,  $\text{MsCl}$  : Pyridine,  $\text{OsO}_4$

c)  $\text{MsCl}$  : Pyridine  $\text{OsO}_4$ ,  $t\text{-BuOK}$

d)  $\text{OsO}_4$ ,  $t\text{-BuOK}$ ,  $\text{MsCl}$  : Pyridine



- d. None of these.
- 61.)  $\alpha$ -yohimbine on KOH fusion gives.....
- Tetrahydro harmine
  - Iso-phthalic acid
  - Oxalic acid
  - Both b and c.
- 62.) Reserpine on treatment with ----- gives  $\gamma$  lactone.
- LTA
  - Ac<sub>2</sub>O
  - PPA
  - I<sub>2</sub>
- 63.) Reserpine on reaction with Hg(OAc<sub>2</sub>) produces.....
- 3-hydroreserpine
  - 3-dehydroisoreserpine
  - Collidine
  - No reaction.
- 64.) How many methoxy groups present in deserpidine?
- Five
  - four
  - Three
  - None of these.
- 65.) Codenine on oxidation with CrO<sub>3</sub> forms.....
- Morpholine
  - Reserpine acid
  - Tnebeinine
  - Codeinone
- 66.) What is product of reduction of Codeine with H<sub>2</sub> and Pt?
- Tetrahydro codeine
  - Dihydrocodeine
  - Codeinone
  - None of these.
- 67.) Codeine on reaction with CH<sub>3</sub>I produces.....
- Codeine Methiodide
  - $\alpha$ -codeimethnine
  - Morphenol
  - dihydrocodeine.
- 68.) Morphine produces.....on reacting with Conc. HCl.
- Dihydro Morphine
  - dihydroapomorphine
  - Apomorphine
  - Morphenol



- 69.) Thebaine on treatment with concentrated HCl gives.....
- a. Thebainine b. Morphine c. apomorphine d. none of these.
- 70.) How many moles of  $\text{CH}_3\text{I}$  requires to quaternize codeine?
- a. Four b. Two c. Three d. One.
- 71.) Which color is formed when codeine treated with  $\text{FeCl}_3$ ?
- a. Violet b. Red c. Blue d. None of these.
- 72.) Morphine on reaction with  $\text{Me}_2\text{SO}$  produces.....
- a. Dimethyl codeine b. codeine c. Thebaine d. None of these.
- 73.) Which one of the example belongs from terpenoids class?
- a. Abietic acid b. Morphine c. Ascorbic acid d. Cholesterol.
- 74.) What is molecular formula of isoprene unit?
- a.  $\text{C}_{12}\text{H}_{24}$  b.  $\text{C}_5\text{H}_8$  c.  $\text{C}_{10}\text{H}_{12}$  d.  $\text{C}_6\text{H}_6$
- 75.) How many  $-\text{COOH}$  groups are present in Abietic acid?
- a. Two b. Three c. Four d. One
- 76.) Which type of diene system present in Abietic acid?
- a. Homoannular diene system b. Heteroannular diene system c. Both a and b d. None of these.
- 77.) How many double bonds are present in Abietic acid?
- a. Two b. Three c. Four d. One
- 78.) What type of carboxylic group present in Abietic acid?
- a. Primary b. Secondary c. Tertiary d. Quaternary

- 79.) What is mol. Formula of camphor?
- a.  $C_{10}H_{16}O$  b.  $C_5H_8$  c.  $C_{10}H_{12}O$  d.  $C_6H_6$
- 80.) How will you confirm  $\alpha$ -Santonin is  $\gamma$ -Lactone?
- a. IR spectra b. Mass spectra c. Both a and b d. None of these
- 81.) Camphor on oxidation with  $HNO_3$  gives.....
- a. Tetrahydroxy Abietic acid b. Camphoric acid c. Fatty acid d. Biotin.
- 82.) Camphor on treatment with  $NH_2OH$  gives.....
- a. Ketone b. Aldehyde c. Carboxylic acid d. Oxime.
- 83.)  $\beta$ -Cuparenone on oxidation with  $HNO_3$  gives...
- a. Benzene 1,4-dicarboxylic acid b. Benzene 1,3-dicarboxylic acid c. Benzene 1,2-dicarboxylic acid d. 1,4-dicarboxylic acid.
- 84.) Which one of the following is poly-terpenoids?
- a. Abietic acid b. Zingiberene c. Cholesterol d. Rubber.
- 85.) How isoprene units are attached in terpenoids shown by Sci. Ingold?
- a. Head to Head b. Head to Tail c. Tail to Head d. Tail to Tail.
- 86.) Abietic acid on dehydrogenation with Se and charcoal gives.....
- a. Retene b. 1-methyl-7-isopropyl phenanthrene c. Both a and b d. All of these
- 87.) Abietic acid has..... $\lambda_{max}$  ( $\pi \rightarrow \pi^*$ )

- a. 214 nm   b. 190 nm   c. 239 nm   d. 320 nm
- 88.) Zingiberene on reduction with Hydrogen and Pt in acetic acid produces.....
- a. Tetrahydro zingiberene   b. Dihydro-zigiberene
- c. Hexahydro zingiberene   d. None of these.
- 89.) Sat. formula of zingiberene is  $C_{15}H_{30}$ . So it is .....
- a. Bicyclic in nature.
- b. Tricyclic in nature
- c. Both a and b
- d. Monocyclic in nature.
- 90.) What type of diene system is present in zingiberene?
- a. Homoannular.
- b. Heteroannular
- c. Acyclic
- d. All of these.
- 91.) Santonin on treatment with red phosphorous and HI gives.....
- a. d-santonous acid .
- b. dl-santonous acid
- c. Santinic acid
- d. Both a and b.
- 92.) Abietic acid evolves .....gas when warm with  $H_2SO_4$ .
- a.  $CO_2$    b. CO   c.  $H_2$    d.  $CH_4$
- 93.). Camphor is .....
- a. Bicyclic in nature.
- b. Tricyclic in nature
- c. Acyclic in nature

d. Monocyclic in nature.

94.) Camphor on oxidation gives compound A. A has mol. Formula  $C_{10}H_{16}O_4$ .

Where A is a .....

- a. Monocarboxylic acid.
- b. Dicarboxylic acid
- c. Tricarboxylic acid.
- d. Tetracarboxylic acid

95.) Which is true in case of vitamin biotin?

- a. It is a monocarboxylic acid
- b. It is an optically active compound
- c. It contains N and S
- d. All of these

96.) Which side chain is present in Vit. H or Biotin?

- a. n-propyl side chain
- b. 1-methyl-butane side chain
- c. n-butyl side chain
- d.  $\delta$ -valeric acid side chain

97.) What is hydrolysis product of biotin with barium hydroxide?

- a. Di-amino carboxylic acid
- b. butyric acid
- c.  $\delta$ -valeric acid side chain
- d. Adipic acid

98.) Riboflavin on acetylation forms tetra-acetyl derivative, which confirms..... ..

- a. Riboflavin contains two double bonds
- b. It possesses four hydroxyl groups
- c. It is bi-cyclic in nature
- d. None of these.

99.) Riboflavin on oxidation with lead tetra acetate gives..... ..

- a. Carboxylic acid.
- b. One mole of acetone
- c. One mole of formaldehyde
- d. None of these.

100.) Vit. D deficiency causes.....disorders.

- a. Night Blindness
- b. Rickets
- c. Beriberi
- d. None of these.

101.) Which one of the following ring is present in structure of Vit. B6?

- a. Thiophene
- b. Furan
- c. Pyrrole
- d. Pyridine

102.) What are the sources of Vit. C?

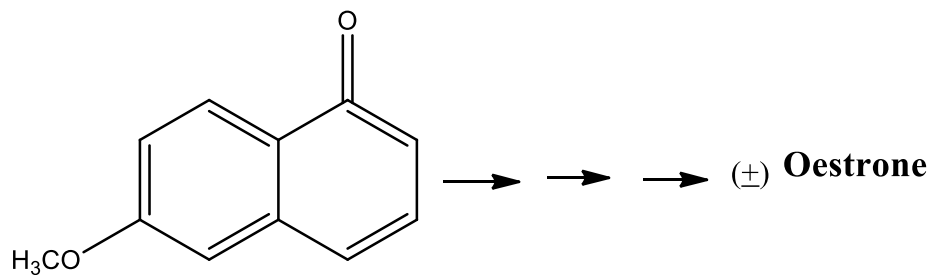
- a. Lemon
- b. Citrus fruits
- c. Orange Fruits
- d. All of these

103.) How many nitrogen atoms are present in lactoflavin?

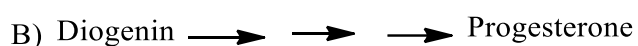
- a. Two b. Three c. Four d. One
- 104.) Vit. B2 on treatment with acetone forms di-acetone acetate. What this observation indicates?
- a. Presence of glycol linkage b. Presence of alcoholic hydroxyl groups c. Both a and b d. All of these.
- 105.) What is one of the main functions of PGE<sub>2</sub>?
- a. Gastric acid secretion b. Uterus contraction c. Inhibit platelet d. All of these.
- 106.) What is one of the main functions of PGF<sub>2</sub>?
- a. Gastric acid secretion b. Uterus contraction c. Urinary bladder contraction d. Both b and c.
- 107.) From which prostaglandins are synthesized in the cell?
- a. arachidinic acid b. valeric acid c. Uric acid d. None of these.
- 108.) Lipids are made from.....
- a. Fatty acids b. Uric acid c. Fatty acids and glycerol d. Glycerol.
- 109.) Which of the following belongs from the lipids?
- a. Triglycerides b. Uric acid c. Cholesterol d. Both a and c
- 110.) Biotin is composed of .....
- a. Ureido ring fused with a tetrahydrothiophene ring.  
b. δ-valeric acid side chain  
c. Both a and b  
d. All of these.
- 111.) Vitamin H is a.....
- a. Dicarboxylic acid. b. Monocarboxylic acid  
c. Hydrocarbon d. Tertiary Carboxylic acid.

**Long answer Questions and Short Notes. (For question no. 2 to 7)**

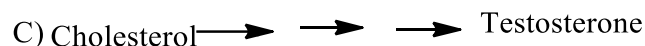
1. Outline the steps involved in the conversion of



2.



3.



4. How will you establish the following?

- i) Nature and position of ethanamine side chain in morphine
- ii) Position of hydroxyl group and ethereal linkage in morphine
- iii) Stereochemistry of reserpine at C<sub>15</sub> and C<sub>20</sub>.

5. What are prostaglandins? How they are classified? Describe Corey's approach for the synthesis of PGE<sub>2</sub>.

6. Outline the synthesis of Biotin.

7. Establish the structure of camphor on the basis of analytical evidences.

8. How will you prove position of two double bonds in Abietic acid?

9. Discuss the biosynthesis of lanosterol.

10. Outline biogenesis of coniine.

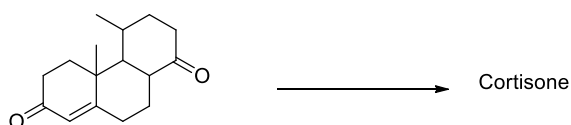
11. Synthesis of  $\alpha$ -santonin.

12. Classifications and functions of lipids.

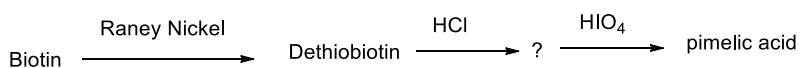
13. Biological functions of Vitamin D and E.

14. Discuss the synthesis of reserpine investigated by Woodward.

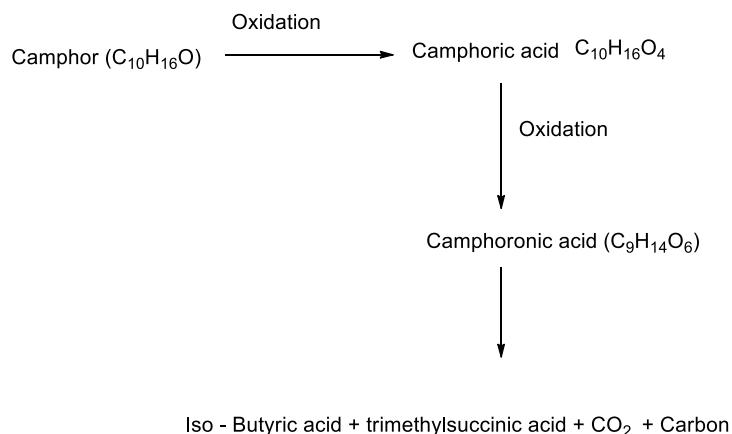
15. Discuss the biogenesis of terpenoids taking suitable examples.
16. Nature and position of the double bond in the structure of cholesterol
17. Stereochemistry of morphine at C<sub>5</sub> and C<sub>6</sub>
18. Structure of Vitamin B6 on the basis of synthetic evidence
19. Give the analytical evidence for the structure of Vitamin E
21. How is the structure of abietic acid established?
22. Give the synthetic ingredients for the structure of β-Cuparenone.
- 23.



24. Give evidence for the nature of sulfur in Biotin.
25. Abietic acid shows a Maxima at 238 nm (E 16,000) in UV.Explain.
26. Discuss the various steps involved in identification of important structural features of Morphine (Stereochemical details are not expected).
27. Predict the product and justify your answer.



28. Interpret the observations of the following reactions in order to establish the structure of the camphor.



29. Outline anyone synthesis of riboflavin.
30. Give analytical evidences to establish the position of two double bonds in Zingiberene.
31. Discuss in brief chemistry of prostaglandins with special reference to their origin, classification and biological functions.
32. Progesterone from Ergosterol.
33. Barbier Wieland degradation.
34. Cis-fusion rings in biotin.
35. Total synthesis of Santonin.
36. Discuss the synthesis of morphine investigated by Gates.
37. How is the structure of santonin established?
38. Discuss the various approach for the synthesis of PGF<sub>2</sub>α.
39. Diel's hydrocarbon
40. Synthesis of vitamin-B<sub>1</sub>.
41. Point out the steps involved in the synthesis of progesterone from cholesterol.
42. How will you establish structure of carvone on the basis of analytical evidences?
43. How will you prove the structure of Camphoric acid?
44. How will you confirm the following?
  - i) Configuration of ephedrine.
  - ii) Stereochemistry of morphine of C<sub>14</sub>



iii) Stereochemistry of Reserpine at C<sub>3</sub>.

45. What are Vitamins? Give functions of it in brief and discuss the analytical evidences in support of structure of Vit. B1.
46. Give an account on physiological functions of prostaglandins.
47. How will you establish the position of two rings and functional nature in biotin?
48. Point out the synthesis of cholesterol.
49. Outline the synthesis of Sarett ketone using appropriate reaction sequences as well as reagents
50. Discuss the classifications of lipids.
51. Write a note on biogenesis of prostaglandins.
52. Highlights the role of lipids in physiology.
53. Write a note on classification of terpenoids based on number of isoprene units.
54. Elaborate the biosynthesis of the morphine.
55. How will synthesize lysergic acid?
56. Explain in detail the structure of the papaverine.
57. Point out the total synthesis of papaverine.
58. Write a note on structure of lysergic acid.
59. Explain the biosynthesis of reserpine.
60. Discuss the synthesis of camphor, camphoric acid and camphoronic acid.
61. Comment on the biogenesis of the Abietic acid.
62. Establish the structure of carvone.
63. How will synthesize carvone?
64. Write a note on occurrence and nomenclature of steroids.
65. Discuss the basic skeleton of the steroids.

Seat No.	
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**M.Sc. (Part - II) (Semester - IV) (CBCS) Examination,  
November - 2019**

**ORGANIC CHEMISTRY (Paper - XV)  
Chemistry of Natural Products  
Sub. Code : 61432**

**Day and Date : Thursday, 21 - 11 - 2019**

**Total Marks : 80**

**Time : 03.00 p.m. to 06.00 p.m.**

- Instructions :**
- 1) Attempt in all five questions.
  - 2) Q.1 is compulsory.
  - 3) All questions carry equal marks.
  - 4) Answer to the all questions (Section - I and II) should be written in the same answer book.
  - 5) Figures to the right indicate marks.
  - 6) Attempt at least two questions from Section - I and any two questions from Section - II.

**Q1) Answer the following (One mark each) : [16]**

- a) State the isoprene rule.
- b) Which steroid is useful in treatment of asthma?
- c) How will you prove presence of gamma lactone in santonin?
- d) State the common amino acids involved in biogenesis of alkaloids.
- e) Give any two functions of corticosteroids.
- f) How many and what type of methyl groups present in Abietic acid?
- g) Write the name and structure of the product when morphine is treated with Zn-dust.
- h) Write the structure of shikimic acid.
- i) What is oxidation product of codeine?

**P.T.O.**

- j) How many chiral centre's present in naturally occurring oestrogen molecule?
- k) Define the term biosynthesis.
- l) Give any two important functions of Vit. B<sub>1</sub>.
- m) Give the name of any one 'Hemlock Alkaloid'.
- n) Name any two adreno-cortical hormones.
- o) How many stereoisomers are present in ephedrine?
- p) Enlist the functions of Vit. H.

### SECTION - I

**Q2)** Suggest suitable routes, reagents and steps for the following conversions. (Any two) : [16]

- a) Diosgenin -----→ Progesterone
- b) Cholesterol -----→ Testosterone
- c) Sarett's ketone -----→ Aldosterone

**Q3)** How will you establish the following?

- a) Nature and position of double bond in the structure of cholesterol. [6]
- b) Structure of Vit. B<sub>6</sub> on the basis of synthetic evidence. [6]
- c) The presence of angular methyl group at C<sub>10</sub> in Abietic acid. [4]

**Q4)** How will you prove the following in morphine.

- a) Stereochemistry of morphine at C<sub>5</sub> and C<sub>6</sub>. [8]
- b) Phenanthrene nucleus. [4]
- c) Structure of camphoronic acid on the basis of synthetic evidence. [4]

**SECTION - II**

- Q5)** a) How would you establish the structure of santonin on the basis analytical evidences. [12]  
b) Presence of heteroannular diene system in Abietic acid. Explain. [4]
- Q6)** Discuss the synthesis of reserpine investigated by Woodward. [16]
- Q7)** Write short notes on following (Any Two) : [16]  
a) Classification of prostaglandins.  
b) Biosynthesis of cholesterol from squalene.  
c) Synthesis of zingiberene.



Seat No.	
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**M.Sc. (Part - II) (Semester - IV) Examination, November - 2018**

**ORGANIC CHEMISTRY (Paper - XV) (CBCS)**

**Chemistry of Natural Products**

**Sub. Code : 61432**

**Day and Date : Wednesday, 28 - 11 - 2018**

**Total Marks : 80**

**Time : 02.30 p.m. to 05.30 p.m.**

- Instructions :**
- 1) Attempt in all five questions.
  - 2) Q. 1 is compulsory.
  - 3) All questions carry equal marks.
  - 4) Answer to the all questions (Section-I AND II) should written in the same answer book.
  - 5) Figures to the right indicate marks.
  - 6) Attempt at least two questions from Section-I and any two questions from Section-II.

**Q1) Answer the following. (One mark each) : [16]**

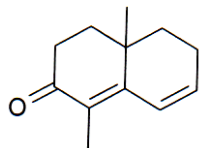
- a) What is biogenesis and biosynthesis?
- b) Give the stereoisomers of ephedrine.
- c) What are vitamins? How they will differ from hormones.
- d) Draw the structure of Testosterone.
- e) State the important biological functions of Aldosterone.
- f) Write the structure of cholesterol.
- g) Enlist the functions of Vit. B<sub>1</sub>.
- h) Identify the chiral centres in biotin.
- i) \_\_\_\_\_ steroids are used in treatment of asthma.
- j) Oestrone contains \_\_\_\_\_ chiral centres.
- k) How will confirm bicyclic nature of caryophyllene.
- l) Write the structure of Vit. H
- m)  $(C_5H_8)_n \xrightarrow[\text{distillation}]{\text{Destructive}}$  ?
- n)  $\beta$  - Cupranenone  $\xrightarrow{O_3}$  ?
- o) Give the name of any one 'Hemlock Alkaloid'.
- p) State any two medicinal uses of morphine.

**P.T.O.**

**SECTION - I**

- Q2)** a) Highlights the classification of vitamins. Discuss the structure of riboflavin on the basis of analytical evidences. [10]  
 b) Explain biosynthesis cholesterol from squalene. [6]
- Q3)** a) How will you prove the following in morphine. [10]  
 i) Phenanthrene nucleus  
 ii) Cyclic tertiary nature of Nitrogen.  
 iii) Relation of C<sub>5</sub>-oxygen to C<sub>6</sub> hydrogen in morphine.  
 b) Explain the stereochemistry of reserpine at C<sub>16</sub> and C<sub>18</sub>. [6]
- Q4)** a) Give an outline of various analytical evidences to establish the structure of caryophyllene. [12]  
 b) Abietic acid shows absorption at 238 nm in Ultra Violet spectroscopy. Explain. [4]

**SECTION - II**

- Q5)** a) What are hormones? Explain the key steps in conversion of diosgenin into progesterone. [10]  
 b) How will you convert Sarett's ketone to Aldosterone? [6]
- Q6)** Outline the following conversion with appropriate reagents and steps involved in it.
- a) Cholesterol  $\longrightarrow$   $\longrightarrow$   $\longrightarrow$  Testosterone. [8]
- b)   $\longrightarrow$   $\longrightarrow$   $\longrightarrow$  Santonin. [8]

- Q7)** Write short notes on following (Any Four) : [16]  
 a) Stereochemistry of reserpine at C<sub>16</sub>, C<sub>17</sub> and C<sub>18</sub> positions.  
 b) Classification and Physiological Functions of prostaglandins.  
 c) Barbier-Wieland degradation.  
 d) Synthesis of zingiberene.  
 e) Configuration of ephedrine.



Seat No.	
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**M.Sc. (Part-II) (Semester-IV) (CBCS) Examination, April - 2019**  
**ORGANIC CHEMISTRY**  
**Chemistry of Natural Products (Paper-XV)**  
**Sub. Code: 61432**

Day and Date : Monday, 08 - 04 - 2019

Total Marks : 80

Time : 11.00 a.m. to 2.00 p.m.

- Instructions :
- 1) Attempt in all five questions.
  - 2) Question no. one is compulsory.
  - 3) All questions carry equal marks.
  - 4) Answer to the all questions (Section-I And II) must be written in the same answer book.
  - 5) Figure to the right indicate marks.
  - 6) Attempt at least two questions from Section-I and any two questions from Section-II.

Q1) Answer the following. (One mark each) [16]

- a) How will you prove that santonin contains lactone ring?
- b) What is physiological action of (-) ephedrine?
- c) What are disadvantages of morphine as an analgesic drug?
- d) Write the structure of heroin.
- e) Provide the structure of ergocalciferol.
- f) State the structure of cholesterol with its stereochemistry.
- g) Give any two examples of steroid hormones.
- h) State any two important functions of vitamin E.
- i) Which precursors used in biogenesis of indole alkaloids?
- j) What do you mean by sesquiterpenoids?

*P.T.O.*

- k) Abietic acid  $\xrightarrow[H_2SO_4]{\text{Warm}}$  ?
- l) Santonin  $\xrightarrow[KMnO_4]{[O]}$  ?
- m) Morphine  $\xrightarrow{\text{Conc.HCl}}$  ?
- n) Reserpine acid  $\xrightarrow[\text{Fusion}]{\text{KOH}}$  ?
- o) Draw the structure of Aldosterone.
- p) What are sex hormones?

### SECTION-I

- Q2) a)** Discuss the structure of (-) ephedrine on the basis of analytical evidences. [8]
- b) How would you establish the 'Trans' relationship between C<sub>5</sub> oxygen to C<sub>6</sub> hydrogen in morphine? [8]
- Q3) a)** Discuss the total synthesis of progesterone with its desired stereochemistry and comment on its physiological role in human body. [16]
- Q4) a)** Illustrate the structure of zingiberene on the basis of analytical evidences. [12]
- b) Illustrate the functional nature of nitrogen in reserpine. [4]

### SECTION-II

- Q5) a)** Outline the biogenetic route of the tyrosine. [10]
- b) How would you establish the nature sulfur in biotin? [6]
- Q6) a)** Point out the steps involved in the synthesis of abietic acid reported by Sci. Storck. [10]
- b) What are sex hormones? How diosgenin is converted into estrone?. [6]



Q7) Write short notes on following. (Any Two)

- a) Synthesis of vitamin E.
- b) Clinical importance of prostaglandins.
- c) Biosynthesis of Conin.

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Seat  
No.

M.Sc. (Part - II) (Semester - IV) (CBCS) Examination,  
March - 2023

ORGANIC CHEMISTRY

Chemistry of Natural Products (Paper - XV)

Sub. Code : 81566/86731

Day and Date : Friday, 16 - 06 - 2023

Total Marks : 80

Time : 10.30 a.m. to 01.30 p.m.

- Instructions :
- 1) Attempt all five questions.
  - 2) Question no. 1 is compulsory.
  - 3) All questions carry equal marks.
  - 4) Answer to the all questions (section-I and II) must be written in the same answer book.
  - 5) Figure to the right indicate marks.
  - 6) Attempt at least two questions from section-I and any two questions from Section-II.

Q1) Answer the following :

[16]

- a) Zingiberene  $\xrightarrow{O_3}$  ?
- b) What is molecular formula of isoprene unit?
  - i)  $C_{12}H_{24}$
  - ii)  $C_{10}H_{12}$
  - iii)  $C_5H_8$
  - iv)  $C_6H_6$
- c)  $\beta$ -Cuparenone on oxidation with  $HNO_3$  gives \_\_\_\_\_.
  - i) Benzene 1,4-dicarboxylic acid
  - ii) Benzene 1,3-dicarboxylic acid
  - iii) Benzene 1,2-dicarboxylic acid
  - iv) 1,4-dicarboxylic acid
- d) Camphor  $\xrightarrow[+HCN]{\text{Iso-amyl nitrite}}$  ?
- e) The biosynthetic precursor for the steroids is \_\_\_\_\_.
  - i) secologanin
  - ii) shikimic acid
  - iii) mevalonic acid
  - iv)  $\alpha$ -ketoglutaric acid

P.T.O.

- f) What are Vitamins and pro-vitamins?
- g) Which of the following is not recognized as sex hormone?  
 i) Testosterone  
 ii) Cortisone  
 iii) Estrone  
 iv) Progesterone
- h) How many moles of  $\text{CH}_3\text{I}$  requires to quaternize cocaine?  
 i) Four  
 ii) Two  
 iii) Three  
 iv) One
- i) How many chiral centers are present in oestrone?
- j) Riboflavin  $\xrightarrow{\text{light}}$  ?
- k) What are sex hormones?
- l) What are lipids? Give one examples.
- m) Biotin  $\xrightarrow[\text{CH}_3\text{COOH}]{\text{H}_2\text{O}_2, \text{in}}$  ?
- n) Define the term biosynthesis?
- o) Codeine on oxidation with  $\text{CrO}_3$  forms \_\_\_\_\_  
 i) Morpholine  
 ii) Reserpine acid  
 iii) Thebeine  
 iv) Codeinone
- p) What are the major five classes of lipids?

### SECTION - I

- Q2) a) Outline the synthesis of ( $\pm$ ) oestrone using two different starting materials. [8]
- b) Point out the steps involved in the synthesis of progesterone from cholesterol. [8]
- Q3) a) How will you establish structure of Abietic acid on the basis of analytical evidences? [10]
- b) How will you prove the structure of Camphoric acid? [6]

Q4) How will you confirm the following?

- a) Configuration of ephedrine.
- b) Stereochemistry of morphine of  $C_{11}$ .
- c) Stereochemistry of Reserpine at  $C_7$ .

SECTION - II

Q5) a) What are Vitamins? Give functions of it in brief and discuss the analytical evidences in Support of structure of Vit. B1. [10]

b) Give an account on physiological functions of prostaglandins. [6]

Q6) a) How will you establish the position of two rings and functional nature in biotin? [8]

b) Point out the synthesis of cholesterol. [8]

Q7) Write a note on the following (Any two): [16]

a) Synthesis of Zingiberene.

b) Biogenesis of Conin.

c) Biogenesis of Lanosterol.

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