

M.Sc. CHEMISTRY
FOURTH SEMESTER
NATURAL PRODUCT CHEMISTRY
MSC - 401A

(Use Separate Answer Scripts for Objective & Descriptive)

Duration : 3 hrs.

Full Marks : 70

[PART-A: Objective]

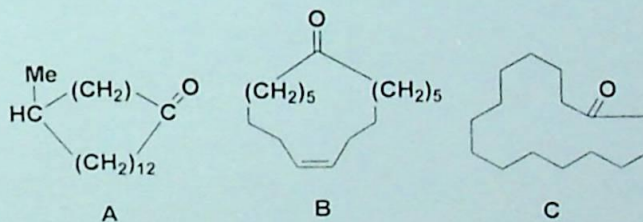
Time : 20 min.

Marks : 20

Choose the correct answer from the following:

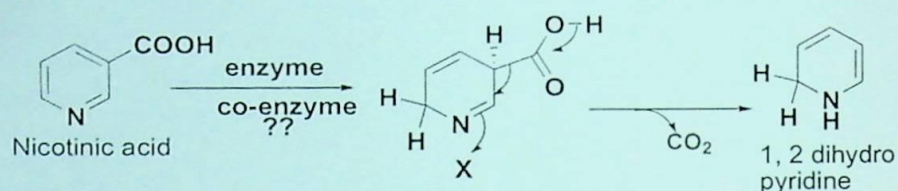
1X20=20

- Steroids have the basic skeleton of
 - Cyclopenta-phenanthrene type ring
 - Cyclopenta-naphthalene type ring
 - Cyclohepta-phenanthrene type ring
 - Anthracene type ring
- Squalene is a
 - monoterpene
 - diterpene
 - triterpene
 - none of these
- Vitamins are, in generally
 - Synthesized in body
 - Manufactured in body
 - Supplied by food
 - none of these
- Folic acid is
 - Vitamin B9
 - Vitamin B7
 - Vitamin A
 - Vitamin C
- Lycopene is a
 - Vitamin
 - Non-provitamin A
 - Provitamin A
 - Steroids
- The following macrocyclic ketones A, B and C are respectively:-

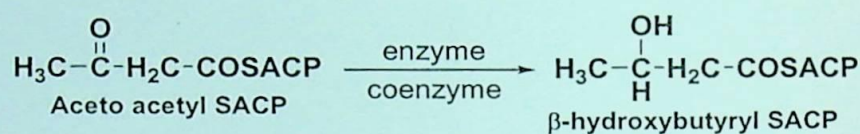


- Civetone, musone and exaltone
 - Exaltone, musone and civetone
 - Musone, civetone and exaltone
 - Musone, exaltone and civetone
- Which of the following statement is correct about CH_3COSCoA ?
 - involved in TCA cycle
 - synthesis of terpenoids and steroids
 - formed from fatty acid
 - formed from glucose
 - (ii) and (iv) are correct
 - only (i) is correct
 - (i), (ii) and (iii) are correct
 - All statements are correct

8. Which of the enzyme/coenzyme system will be most appropriate during biosynthetic route of converting nicotinic acid to the compound X in the following set of reactions?

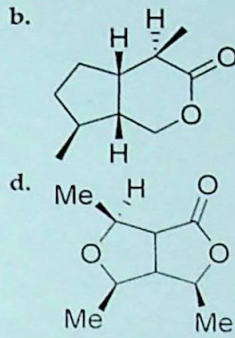
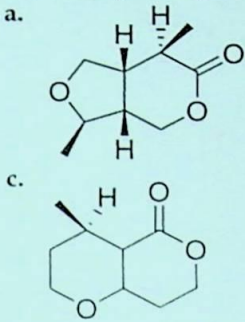


- a. a reductase with NADPH b. an oxidase with NADP⁺
 c. a reductase with NAD⁺ d. an oxidase with NADH
9. In the following step during biosynthetic route of fatty acid, the enzyme and coenzyme system are:



- a. ACP reductase and NADP⁺ b. ACP reductase and NADPH
 c. ACP reductase and FAD d. ACP oxidase and FADH₂
10. The fragrance in Jasmin flower is due to two chemical ingredients (i) cis-jasmonone and (ii) methyl jasmonate. They belong to which class of bio molecules?
- a. cis jasmine is a terpenoid and methyl jasmonate is a lipid b. cis jasmine is a lipid and methyl jasmonate is a terpenoid
 c. both are terpenoids d. both are lipids
11. Base sequence in DNA strand is 3'-GTCCTCGA-5', its corresponding m-RNA base sequence will be
- a. 5'-CAGGAGCT-3' b. 5'-CAGGAGCU-3'
 c. 3'-CAGGAGCT-5' d. 5'-GUCCUCGA-3'
12. Bio-synthesis of peptides take place from
- a. C-terminal to N-terminal direction b. N-terminal to C-terminal direction
 c. N-terminal to N-terminal direction d. At random directions
13. Which of the following statement is **wrong** about DNA molecules.
- a. 3 different helical structures are available b. % of guanine concentration is same as cytosine.
 c. m-RNA is formed complementary to sense strand of DNA d. All statements are correct
14. Which is correct about the four bases in DNA?
- a. A + U = G + T b. A + T = G + C
 c. A + C = G + T d. A + G = T + C
15. The example of a hemiterpene is
- a. 2-methyl-but-1-ene b. 2-methyl-but-1,3-diene
 c. 3-methyl-but-1-ene d. 2-methyl-butane

16. The example of cyclopentato monoterpene lactone is



17. In the biosynthesis of *trans*-chrysanthemic acid, the cyclopropane ring formation takes place due to the reaction between

- a. DMAPP & DMAPP
b. DMAPP & IPP
c. FPP & IPP
d. IPP & IPP

18. Longifolene is an example of

- a. monoterpene
b. sesterpene
c. diterpene
d. sesquiterpene

19. The DMAPP & IPP are formed in the plastid from

- a. acetyl-CoA
b. mevalonic acid
c. acetoacetyl-CoA
d. pyruvic acid & D-glyceraldehyde-3-phosphate

20. The total number of carbon atom present in sesterpenoids is

- a. 10
b. 15
c. 20
d. 25

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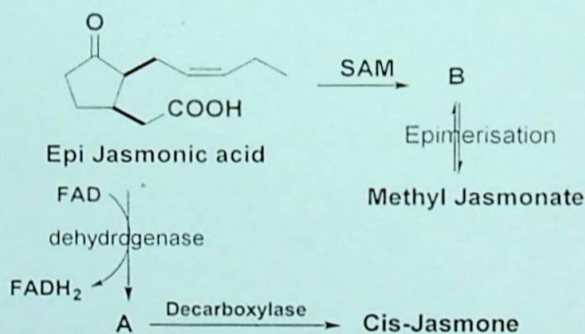
(PART-B : Descriptive)

Time : 2 hrs. 40 min.

Marks : 50

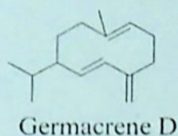
[Answer question no.1 & any four (4) from the rest]

1. a. Write notes on prostaglandins. 5
 b. What is corticosteroid? How many types of corticosteroids are there? 1+1+1
 Draw the structure of aldosterone and cortisol. =3
 c. Write the structure of DMAPP and IPP 2
2. a. Write down the structure of the coenzyme pyridoxyl phosphate. Give the steps involved during de-carboxylation of α -amino acids in biosynthesis of alkaloids. 3+3+4 =10
 b. Write down the structure of intermediates A and B and the end products Cis Jasmone and Methyl Jasmonate in the following biosynthetic



- c. Sketch out the bio synthesis of palmatic acid.
3. a. Write the structures of the four bases found in DNA. Comment on the base pairing in DNA. 4+6=10
 b. Give a short account of bio-synthesis of proteins.
4. a. What are nucleotides and nucleosides? Give a short account of different components and their connectivity in DNA and RNA. 5+5=10
 b. Write notes on exons and introns.

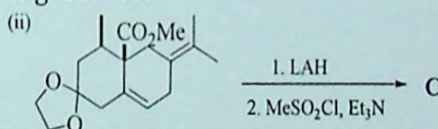
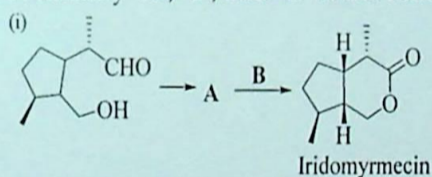
5. a. What are lipids? Write in details classifications of lipids. 5+5=10
 b. What is Marker degradation of diosgenin? How progesterone will produce via Marker degradation.
6. a. Write short note on Squalene and describe its synthesis. 5+5=10
 b. Draw the structure of Vitamin C. Write a short note on Vitamin C mentioning its activity.
7. a. Write the structure of β -carotene and describe its synthesis. 1+4 = 5
 b. Write down the mechanistic pathway of the biosynthesis of germacrene-D and draw the structures of both the enantiomers of germacrene-D indicating the 'R' & 'S' notations. 3+2 = 5



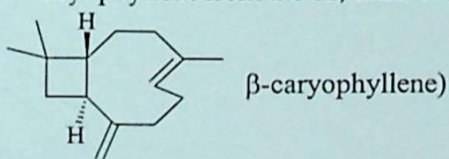
8. a. Write the biosynthetic route of trans-chrysanthenic acid from IPP 4+3+3 = 10



- b. Identify 'A', 'B', and 'C' of the following reactions



- c. Show the trans-annular cyclization route in the biosynthesis of β -caryophyllene from the cis, trans-farnesyl.



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