

M.SC. CHEMISTRY
FOURTH SEMESTER
ADVANCED ORGANIC CHEMISTRY
MSC - 402A [SPECIAL REPEAT]
[USE OMR FOR OBJECTIVE PART]

**SET
A**

Duration: 3 hrs.

Full Marks: 70

Time: 30 min.

(Objective)

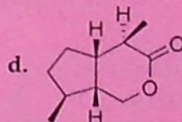
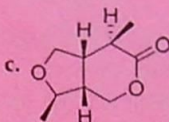
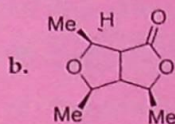
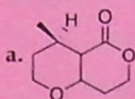
Marks: 20

Choose the correct answer from the following:

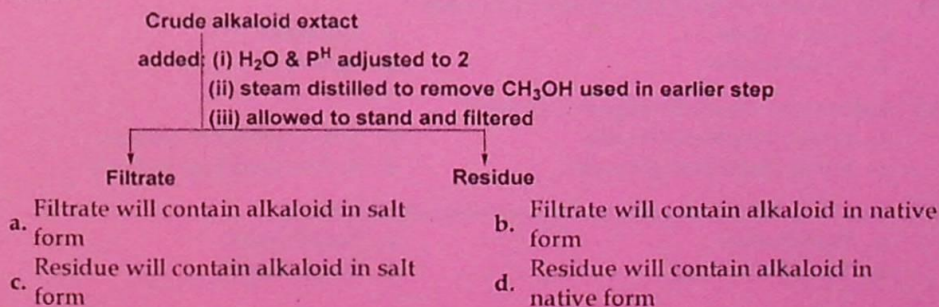
1×20=20

1. Fernisol is an example of
a. monoterpene
b. diterpene
c. triterpene
d. sesquiterpene

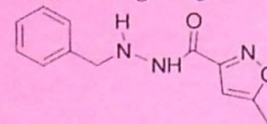
2. The example of cyclopentato monoterpene lactone is



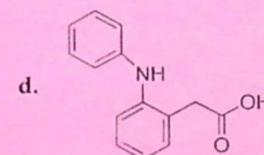
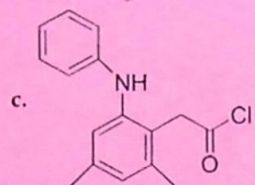
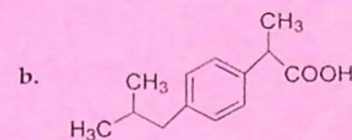
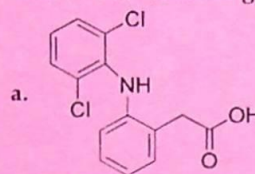
3. Biosynthesis of geraniol, β -carotene and cholesterol has a common starting material, which is:
a. L-Phenylalanine
b. Shikimic acid
c. CH_3COSCoA
d. CoASH
4. Biosynthesis of Morphine starts from an amino acid which is
a. L-Proline
b. L-tyrosine
c. L-Tryptophan
d. Phenylalanine
5. The correct statement during extraction of an alkaloid, as shown in the following scheme:



6. Which of the following is an example of inhibitory neurotransmitter
- GABA
 - Epinephrine
 - Norepinephrine
 - Glutamate
7. Mephalan is an example of which of the following drug?
- Anti-inflammatory
 - Anti-neoplastic
 - Anti-tubercular
 - Anti-histamine
8. The name of the following drug is



- Diphenhydramine
 - Aspirin
 - Isocarboxazid
 - Halothane
9. Which of the following structures represents diclofenac?



10. Ethambutol belongs to which of the following drug?
- Anti-inflammatory
 - Anti-neoplastic
 - Anti-tubercular
 - cardiovascular
11. Na⁺ channel in lipid bilayer is developed by
- Crown ether
 - Monensin A
 - Cyclodextrin
 - Spherand
12. Calixarenes are cyclic oligomers having
- p-functionalised phenols
 - p-functionalised anilines
 - m-functionalised phenols
 - m-functionalised anilines
13. Lock-Key theory in supramolecular chemistry is given by
- Emil Fischer
 - Paul Ehrlich
 - Daniel Koshland
 - None of them

14. Cyclodextrin is an example of
- Acyclic oligosaccharides
 - Acyclic Amino-ethers
 - Cyclic oligosaccharides
 - Cyclic Amino-ethers
15. The Binding-energy of Host-Guest complex is calculated with the help of
- Contour plot
 - Job's plot
 - 3-D plot
 - None of them
16. Hexagonal COFs can be designed by using the
- $[C_4 + C_2]$ and $[C_4 + C_4]$ combinations
 - $[C_3 + C_2]$ and $[C_3 + C_3]$ combinations
 - $[C_2 + C_2 + C_2]$ and $[C_3 + C_3]$ combinations
 - $[C_4 + C_2]$ and $[C_3 + C_3 + C_2]$ combinations
17. MOF named MIL-101 and MIL-100 contain
- Fe metal
 - Zn metal
 - Cr metal
 - Cu metal
18. In Metal-Organic Frameworks the pore size and shape determined by
- The size of the metal ions
 - The length and flexibility of the organic ligands
 - The temperature and pressure during synthesis
 - The pH of the reaction mixture
19. The characteristic property of COF is
- Ionic bonding
 - Porous structure
 - Metallic bonding
 - High electrical conductivity
20. The *dia* network in COF can be designed by the $[Td + C_2]$
- $[Td + C_2]$
 - $[Td + C_3]$
 - $[C_2 + C_4]$
 - $[Td + C_2]$

(Descriptive)

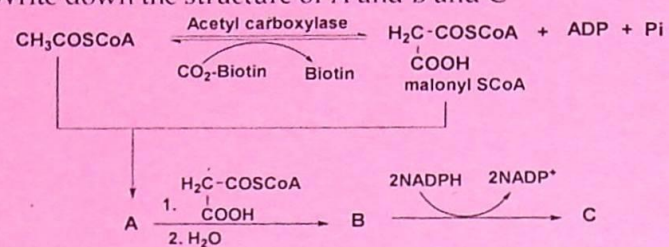
Time : 2 hrs. 30 mins.

Marks : 50

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

1. a. Write down the structure of A and B and C

3+2+3+2
=10



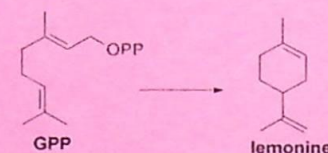
- b. What are neurotransmitters? Mention its different classes with examples.

- c. If the Host = [18] crown 6, Guest = K^+ , Solvent = MeOH having $K = 10^6 \text{ M}^{-1}$ for host-guest complexation, find the value of ΔG° in K.J. mol^{-1}

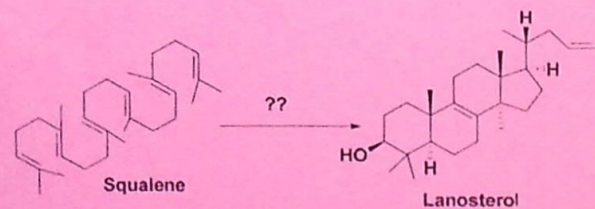
- d. Draw the structure of COF-1. Name linkage is there in COF-1.

2. a. Sketch out biosynthetic route for synthesis of lemonine from geranyl pyrophosphate(GPP)

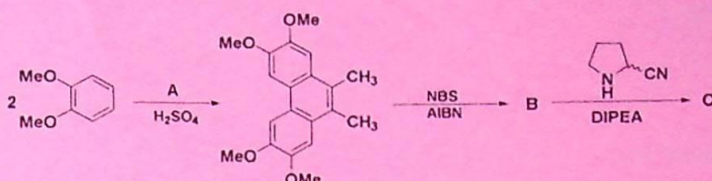
3+3+4
=10



- b. Sketch out the biosynthetic route for the following conversion? Justify the stereochemistry in the product.



- c. Write down the structure of A, B and C in the following sequence of reactions. What is the role of AIBN in step II and DIPEA in step III? Give mechanism of formation of C from B.

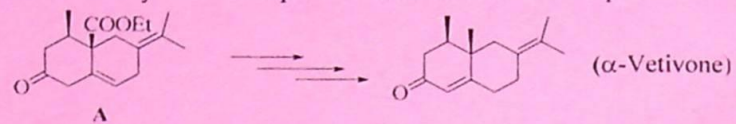


3. a. What are anaesthetics? Explain the four different stages of anaesthetic activity. 3+4+3
=10
- b. What is enflurane? Draw its structure. Give the industrial scale synthesis of enflurane.
- c. What is hepatotoxicity? Explain the oxidative metabolism of enflurane.
4. a. What are NSAIDs? Draw the R- and S- configurations of ibuprofen. 3+4+3
=10
- b. Describe the green synthesis of ibuprofen and justify that your method is green.
- c. What are antidepressant drugs? Write the name and structure of two antidepressant drugs.
5. a. Discuss the Key-Lock concept in host guest chemistry 2+4+4
=10
- b. What is meant by molecular recognition? Discuss how the host-guest chemistry can be utilized for the sensing of metal ion?
- c. What is Lariat Ether? Discuss its synthesis

6. a. What are primary and secondary metabolites?

2+3+5
=10

b. Show the synthetic steps of α -Vetivone from compound A



c. Write a short note on Catenane.

7. a. Mention two structure analysis techniques for COF materials and discuss.

4+4+2
=10

b. When diboronic acid reacts with HHTP which COF will form? Write the full reaction.

c. Write the structure of building blocks of COF materials having C_3 symmetry and $-NH_2$ group.

8. a. What is MOF? Draw the schematic diagram of structure of MOF.

3+2+3+2
=10

b. Draw the structure of ligands containing sulfur and phosphorous used for the synthesis of MOFs.

c. What is BioMOFs-explain. Write two applications of BioMOFs.

d. Mention one synthesis method for the preparation of COF material.

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