

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI-86
(For candidates admitted from the academic year 2019-20 & thereafter)

M. Sc. DEGREE EXAMINATION, APRIL 2024
BRANCH IV- CHEMISTRY
FOURTH SEMESTER

COURSE : CORE
PAPER : SYNTHETIC ORGANIC CHEMISTRY AND NATURAL PRODUCTS
SUBJECT CODE : 19CH/PC/SO44
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

Answer all the questions.

(20 x 1= 20)

I Choose the correct answer:

1. Which of the following statements best describes a synthon?
 - a. synthetic reagent used in a reaction
 - b. A key intermediate in a reaction sequence
 - c. A transition state involved in a reaction mechanism
 - d. A hypothetical structure that would result in a given reaction if it existed

2. Which of the following conditions results in the formation of a C-C bond?
 - a. Alkyl halide + EtONa
 - b. Alcohol + CH_3SOCl_2
 - c. Organometallics + alcohol
 - d. Organometallics + carbonyls

3. Which of the following is macro cyclic compound?
 - a. Crown ethers
 - b. Diethyl ether
 - c. Ethyl methyl ether
 - d. Methyl phenyl ether

4. Terpenoids are composed of repeating units of
 - a. Amino acids
 - b. Isoprene units
 - c. Glucose molecules
 - d. Fatty acids

5. Which of the following compounds does not give a tertiary alcohol upon reaction with methyl magnesium bromide?
 - a. 3-methylpentanal
 - b. Ethyl benzoate
 - c. 4,4-dimethylcyclohexanone
 - d. 4-heptanone

6. Among the following which contains a steroid and α, β unsaturated ketone is
 - a. Estrone
 - b. Prostaglandin
 - c. Cortisone
 - d. morphine

7. Which one of the following is a alkaloid ?
 - a. Bile acid
 - b. Quinine
 - c. Citral
 - d. Luteolin

8. In the crown ether 12-crown-4, how many atoms are there in the ring and how many are oxygen?
 - a. 12 and 4
 - b. 4 and 12
 - c. 16 and 2
 - d. 12 and 12

9. Which of the following statement is correct in case of Cascade reaction?
 - a. It is a chemical process that comprises at least two consecutive reactions
 - b. It is the chemical process that involve single step
 - c. Isolation of intermediate is required
 - d. Reaction condition is change among the consecutive steps.

10. Which of the following statements best describes retrosynthesis?
- The reaction conditions required to convert the product of a reaction back to the original starting materials
 - A strategy used to design a synthesis of a target molecule by working back from the target to simple starting materials
 - The design of a synthetic scheme using cheap, traditional reagents, rather than expensive modern reagents
 - The design of reaction conditions such that an equilibrium reaction is pushed towards the products rather than the starting materials.
11. Which one of the following is not a steroid ?
- Bile acid
 - Cholesterol
 - Progesterone
 - Diadine
12. Umpolung means -----
- Reversal of polarity
 - Retention of polarity
 - Retention of chirality
 - Inversion of chirality

II Fill in the blanks:

13. ----- Reagent is used for the synthesis of amide from R-COOH and RNH₂
14. Terpenoids are composed of repeating units of.....
15. IBX stands for.....

III Match the following:

- Pigment -- codeine
- Alkaloid -- Apigenin
- Terpene -- androgens
- Flavone -- lemonene
- Steroid --anthocyanin

SECTION – B

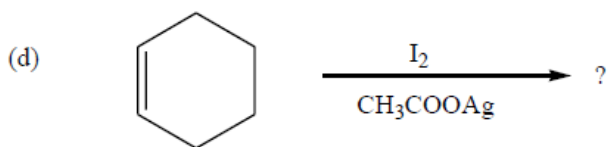
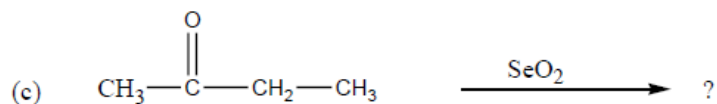
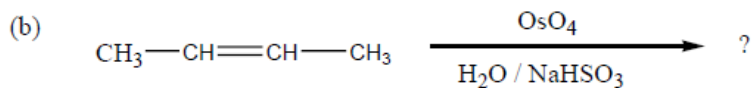
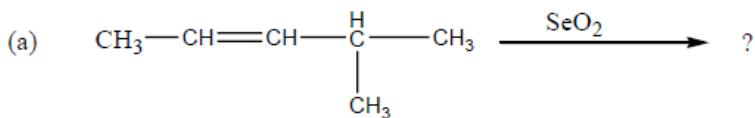
ANSWER ANY FIVE QUESTIONS:

(5x8=40)

21. Explain the following terms with suitable examples.
- Synthons
 - Synthetic equivalent
 - Retrosynthesis
 - FGI
22. a. Write briefly about Suzuki coupling, Heck reaction (6)
 b. Write the importance of Lomordo reagent (2)
23. a. Discuss the classification of pigments. (3)
 b. List Structural differences between isoflavanoids and anthocyanins (4)
24. How do the following reagents find an application in organic synthesis?
 Give an example. (i) OsO₄ (ii) DCC, (iii) 9-BBN
25. a. What are flavones? (2)
 b. Discuss the structural elucidation of Zingiberene. (6)

26. Write the preparation and properties of thiazole (8)

27. Complete the following (8)

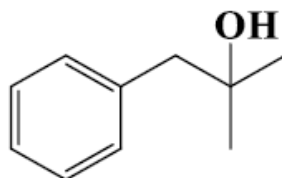


SECTION – B

ANSWER ANY TWO QUESTIONS:

(2x20=40)

28. i) Show the Disconnection approach for the following molecules, represent synthons and respective synthetic equivalents and forward direction reaction. (5)



ii) Predict suitable synthon and synthetic equivalents for $\text{C}_6\text{H}_5\text{CH}_2\text{C}\equiv\text{CH}$. (4)

iii) Cholestanone on oxidation gives two isomeric products which on heating gives a ketone. With the help of reaction explain how this statement helps in understanding the position of hydroxyl group in Cholesterol (5)

iv) Discuss Lithium diisopropylamide reagent, Alkyl and Vinyl silanes reagent (6)

29. i) Give a general method to synthesise the following heterocyclic compounds, Imidazole, Oxazole (6)

ii) Explain the application of UV-Visible spectroscopy in the structural elucidation and determination of Flavonoids (4+6)

iii) How are the position of two angular methyl groups in cholesterol determined? (4)

30. i) Write an application for the following reagent in organic synthesis.

N-Bromosuccinamide, Dicyclohexylcarbodiimide (4)

ii) Discuss structured elucidation of papaverine. (6)

iii) Explain the importance of organolithium compounds in organic synthesis. (6)

iv) Give the synthesis of Daidzein. (4)

