

(8 pages)

Reg. No. :

Code No. : 9395

Sub. Code : HCHM 21

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2015.

Second Semester

Chemistry

ORGANIC CHEMISTRY — II

(For those who joined in July 2012 onwards)

Time : Three hours

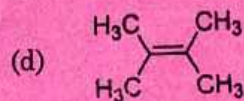
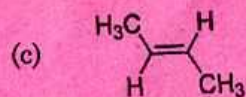
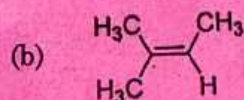
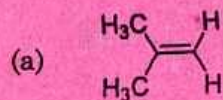
Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. Which of the following alkenes would have the largest $\lambda_{\max}$?



2. The region of an infra-red spectrum where many absorptions take place is known as the _____

- (a) Thumbprint region
- (b) Handprint region
- (c) Footprint region
- (d) Fingerprint region

3. Which of the following statements about tetramethylsilane is incorrect?

- (a) it produces a single peak at $\delta = 10$
- (b) it is inert
- (c) it is volatile and can be easily distilled off and used again
- (d) it is used to provide a reference against which other peaks are measured

4. Fourier transform is

- (a) a mathematical function
- (b) used to convert from the time domain to the frequency domain
- (c) used in many modern analytical techniques, such as IR and NMR
- (d) all of the above

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5. The base peak in a mass spectrum is
 - (a) the peak corresponding to the parent ion
 - (b) the peak set to 100% relative intensity
 - (c) the highest mass peak
 - (d) the lowest mass peak
6. Which one of the following methods would be best for finding the identify of an organic compound?
 - (a) finding the m/z value of the molecular ion in its mass spectrum
 - (b) its proton nmr spectrum
 - (c) comparing its infra red spectrum with known examples
 - (d) measuring its melting point
7. How to extract the alkaloids in mineral salt form from plant?
 - (a) Heating with organic solvent
 - (b) Boiling with ammonium-hydroxide and water
 - (c) Shaking with water containing mineral acid
 - (d) Boiling with water and lead acetone

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8. Which of the following penicillins is β - lactamase resistant?
- (a) Flucloxacillin
(b) Penicillin G
(c) Amoxicillin
(d) Procaine penicillin
9. Zingiberene is obtained from _____
- (a) Ginger (b) Garlic
(c) Guava (d) Apple
10. Which one of the following is produced by human skin cells?
- (a) Camphor (b) Squalene
(c) Zingiberene (d) α - Santonin

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b),
each answer should not exceed 250 words.

11. (a) Explain how the polarity of solvent and hydrogen bonding affect the $\lambda_{\max}$ value.

Or

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[P.T.O.]



- (b) Explain why the UV spectrum of benzene vapours contains many sharp bands whereas the same spectrum of benzene solution in alcohol lacks fine details and consists only of broad peaks.

12. (a) Discuss the basic principles of NMR spectroscopy.

Or

- (b) What do you mean by diamagnetic and paramagnetic effect in NMR spectroscopy? Explain with examples.

13. (a) Expand the following terms :

- (i) FAB-MS
- (ii) ESI-MS
- (iii) MALDI-MS
- (iv) HRMS
- (v) CI.

Or

- (b) Discuss the fragmentation pattern of 1°, 2°, 3° alcohols with examples.

14. (a) Explain briefly about the degradation of alkaloid by Emde method.

Or

- (b) Write the structure of following with appropriate stereochemistry

- (i) Morphine
- (ii) Strychnine

15. (a) Write the structures of (i) vitamin B1
(ii) α - tocopherol.

Or

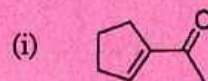
- (b) Complete the following conversions

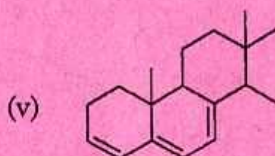
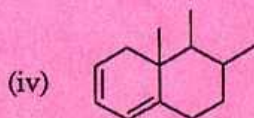
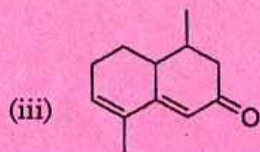
α - pinene $\rightleftharpoons$ cis-Norpinic acid.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b),
each answer should not exceed 600 words.

16. (a) Applying Woodward-Fieser rules, calculate the values of absorption maxima for the following compounds :





Or

- (b) Describe the effect of inter molecular and intra molecular hydrogen bonding on the position of absorption frequency of the compound. Give an example.
17. (a) How the electronic factors which influence the vibrational frequency? Explain with suitable example.
- Or
- (b) Discuss briefly about inductive and the mesomeric effects which influencing the carbonyl absorption frequency.

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18. (a) Calculate the empirical formula and degree of unsaturation of following
- (i) C, 71.11%; H, 6.67%; N, 10.37%
- (ii) C, 76.42%; H, 4.49%; N, 8.91%;

Or

- (b) Describe the important features of the mass spectra of the amines and phenols with suitable examples.
19. (a) Elucidate the structure of chloramphenicol.

Or

- (b) Describe the general methods of structure determination of alkaloids.
20. (a) Describe the structure determination of α - pinene.

Or

- (b) Give brief account about the general method of determining structure of terpenoids.

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