

(8 pages)

Reg. No. :

Code No. : 8542

Sub. Code : HCHM 21

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2013.

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. In which region of the electromagnetic spectrum does an absorption at 600 nm come?
(a) Near – UV (b) Vacuum – UV
(c) Visible (d) Infrared
2. FT-IR is used mostly for
(a) quantification of organic molecules
(b) functional group analysis of organic molecules
(c) heavy metal analysis
(d) molecular weight determination

3. The sharp intense peak at 1246 cm^{-1} is usually indicative of _____ stretch
(a) C-C single bond
(b) C-N single bond
(c) C-H single bond
(d) C-O single bond
4. The isomer of C_4H_8 which procedures an NMR spectrum with four different signals is
(a) $\text{CH}_2 = \text{CHCH}_2\text{CH}_3$
(b) $\text{CH}_3\text{CH} = \text{CHCH}_3$
(c) $(\text{CH}_3)_2\text{C} = \text{CH}_2$
(d) Cyclobutane
5. Bromine possesses two isotope (^{79}Br and ^{81}Br) in an approximate 1 : 1 ratio. In the mass spectrum of Br_2 , how many peaks will the parent ion contain?
(a) 4 (b) 3
(c) 2 (d) 1
6. Which of the following compounds is most likely to have its base peak at $m/z = M-18$?
(a) Alkene (b) Cycloalkane
(c) Alcohol (d) Ester

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7. Cocaine is used as _____ in the official medicine

- (a) narcotic (b) emetic
(c) cough suppressant (d) local anaesthetic

8. Mechanism of chloramphenicol

- (a) Bond to D-Ala-D-Ala terminus of glycopeptides
(b) Same as for macrolides
(c) Block metabolite synthesis.
(d) Inhibits transpeptidation

9. This is important in the regulation of calcium levels, especially for normal bone development

- (a) Vitamin A (b) Vitamin B
(c) Vitamin C (d) Vitamin D

10. Vitamin B₆ is also known as _____

- (a) Pyridoxine (b) Thiamine
(c) Riboflavin (d) Lactoflavin.

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PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Why do UV-V spectra of organic compounds tend to exhibit very broad absorption peaks? You can draw an energy diagram to help explain?

Or

- (b) Write short note on Fermi resonance.

12. (a) Why TMS is used as an internal standard in NMR spectrometry?

Or

- (b) Expand the following terms :

- (i) ¹H-¹H COSY
(ii) NOESY
(iii) DEPT
(iv) FT NMR.

13. (a) Expand the following terms :

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

Or

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[P.T.O.]



- (b) Find the structure of the organic compound whose mass spectrum shows m/e values as 100, 43(100%), 57, 85, 71, 41 and 29.

14. (a) Write the structure of following with appropriate stereochemistry

- (i) Penicillin
(ii) Chloramphenicol.

Or

(b) Write the structure of following with appropriate stereochemistry

- (i) Morphine
(ii) Strychnine.

15. (a) Give the total synthesis of santonin.

Or

(b) Write the structures of following :

- (i) squalene
(ii) abietic acid.

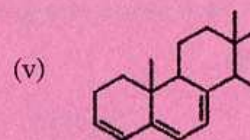
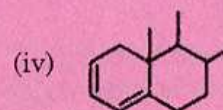
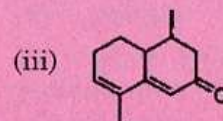
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PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

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



Or

(b) Define alpha-halo ketone rule and give their applications.

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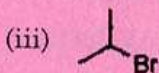
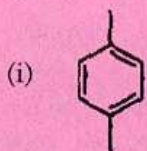
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17. (a) Describe briefly ^{13}C NMR spectroscopy. What are the extra advantages of it over ^1H -NMR spectroscopy?

Or

- (b) Draw the ^1H -NMR spectrum for each of the following compounds. Assume a first order spectrum in all cases.



18. (a) Write short notes on :
- Mc-Lafferty rearrangement
 - Nitrogen rule.

Or

- (b) Discuss briefly the fragmentation pattern of aldehydes and ketones with suitable examples.

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19. (a) Discuss the biosynthesis of Morphine.

Or

- (b) Describe the general methods of structure determination of alkaloids.

20. (a) Elucidate the structure of thiamine.

Or

- (b) Show the biosynthesis of mono and diterpenoids.

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