

(6 pages)

9232/ECHJC31

NOVEMBER 2020

**ORGANIC SPECTROSCOPY AND NATURAL
PRODUCTS**

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

- The base peak of 2-butanol appears at this M/e
(a) 31 (b) 43
(c) 45 (d) 59
- The number of vibrational degrees of freedom for benzene molecule is
(a) 36 (b) 12
(c) 30 (d) 12
- The splitting pattern of hydroxy position of impure ethanol is
(a) triplet (b) Singlet
(c) doublet (d) multiplet

4. ^{13}C spectrum of diethylphthalate gives _____ signals.
- (a) 3 (b) 4
(c) 5 (d) 6
5. If E_L is the velocity of left circularly Polarized light and E_R is the velocity of right circularly polarized light, then for 2-chloropropane
- (a) $E_L > E_R$
(b) $E_R > E_L$
(c) $E_R = E_L$
(d) $E_R = E_L = 0$
6. The stationary phase and mobile phase in gas-liquid chromatography respectively are
- (a) Gas and liquid
(b) liquid and gas
(c) gas and solid
(d) liquid and solid
7. The numbers of $\text{C} = \text{C}$ and $\text{C} = \text{O}$ groups present in cortisone respectively are
- (a) 3 and 1 (b) 1 and 3
(c) 2 and 3 (d) 3 and 2

8. Total number of π electrons present in Diels hydrocarbon steroids are
- (a) 4 (b) 7
(c) 8 (d) 14
9. When atropic acid is oxidized with permanganate, this is formed
- (a) Benzene
(b) benzoic acid
(c) phenylgloxal
(d) phenol
10. The chemical name of penicillin V is
- (a) benzyl penicillin
(b) phenoxypropyl penicillin
(c) phenoxymethyl penicillin
(d) alpha-aminobenzyl penicillin.

SECTION B — (5 × 7 = 35 marks)

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

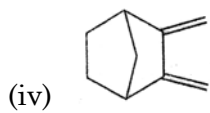
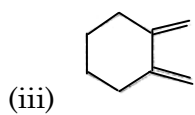
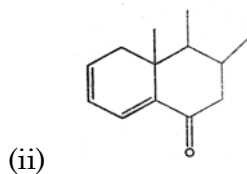
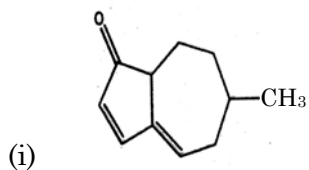
11. (a) Explain the factors influencing the vibrational frequencies in IR spectroscopy.

Or

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(b) Calculate the λ_{\max} for the following



12. (a) Describe the NMR spectra of
(i) crotonaldehyde (ii) p-anisidine (iii) allyl acetate.

Or

(b) Calculate the ^{13}C chemical shift values of
(i) 2-methylpentane (ii) 2-butene.

13. (a) Discuss the applications of α -halo ketone rule.
Or
(b) Describe the technique and applications of ion-exchange chromatography.
14. (a) Explain the structures and chemistry of PGE1 and PGF1 α .
Or
(b) Elucidate the structure of equilenin.
15. (a) How are Emde and Von Braun degradations used to elucidate the structure of alkaloids?
Or
(b) Write the synthesis of morphine.

SECTION C — (3 \times 10 = 30 marks)

Answer any THREE questions.

16. (a) Discuss the fragmentation pattern of
(i) pentanal (ii) benzyl alcohol.
(b) Bring out the characteristics and significance of meta stable peaks and isotopic peaks.
17. (a) How are double resonance and shift reagents used to simplify a complex NMR spectrum?
(b) Explain the principles of ROESY and NOESY.

(6+4)

18. Discuss the principle, types, technique and applications of paper chromatography.
 19. Explain the structure and stereochemistry and cholesterol.
 20. Elucidate the structure of chloramphenicol. Confirm the structure by a suitable synthesis.
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