

**CHE-553****Natural Products, Heterocyclic and  
Spectroscopy****M. Sc. CHEMISTRY (MSCCH-12/13/16)****Second Year, Examination, 2017****Time : 3 Hours****Max. Marks : 80**

**Note :** This paper is of **eighty (80)** marks containing **three (03)** Sections A, B and C. Attempt the questions contained in these Sections according to the detailed instructions given therein.

**Section-A****(Long Answer Type Questions)**

**Note :** Section 'A' contains four (04) long answer type questions of nineteen (19) marks each. Learners are required to answer *two* (02) questions only.

1. Discuss in detail Shikimic acid biosynthetic pathways.
2. Describe in brief the following :
  - (i) Synthesis of pyrimidine
  - (ii) Vitamin A<sub>1</sub> and A<sub>2</sub>
  - (iii) Optical rotatory dispersion
  - (iv) Chemical shift scale in <sup>19</sup>F NMR
3. Write short notes on the following terms used in NMR :
  - (i) Off resonance

- (ii) HSQC
  - (iii) Scalar coupling
  - (iv) First and second order spectra
4. What are prostaglandins ? Discuss the biological role of prostaglandins along with the synthesis of  $\text{PGE}_2$  and  $\text{PGE}_{2\alpha}$ .

### Section-B

#### (Short Answer Type Questions)

**Note :** Section 'B' contains eight (08) short answer type questions of eight (08) marks each. Learners are required to answer *four* (04) questions only.

1. Discuss classification of alkaloids with structure of each category.
2. Discuss synthesis of heme.
3. Discuss medicinal importance and chemistry of benzofurans and quinoline.
4. What is DEPT experiment in  $\text{C}^{13}$  NMR ? What information is obtained from this experiment ? Discuss by taking a suitable example.
5. Discuss the ORD curves with cotton effects.
6. What are enzymes ? How do they differ from catalyst ? Discuss the mode of action of enzymes.
7. Write short notes on the following :
  - (i)  $\text{P}^{31}$  NMR
  - (ii) Rotenoids
8. Discuss synthesis and uses of the following :
  - (i) Pyrazine
  - (ii) Oxirane

**Section-C****(Objective Type Questions)**

**Note :** Section 'C' contains ten (10) objective type questions of one (01) mark each. All the questions of this Section are compulsory.

Choose the correct answer :

1. Which of the following is the example of alkaloid ?
  - (i) Menthol
  - (ii) Nicotine
  - (iii) Camphor
  - (iv) Citral
2. Pantothenic acid is the name of :
  - (i) Vitamin B<sub>1</sub>
  - (ii) Vitamin B<sub>2</sub>
  - (iii) Vitamin B<sub>5</sub>
  - (iv) Vitamin B<sub>6</sub>
3. Rotenoids are related to :
  - (i) Flavones
  - (ii) Isoflavones
  - (iii) Xanthones
  - (iv) Isoflavonols
4. Who gave the term enzyme ?
  - (i) Emile Fischer
  - (ii) Koshland
  - (iii) Frederick W. Kuhn
  - (iv) E. L. Tatum and G. W. Beadle
5. Which of the following is not the pathway of fatty acid catabolism ?
  - (i)  $\alpha$ -oxidation
  - (ii)  $\beta$ -oxidation
  - (iii)  $\gamma$ -oxidation
  - (iv)  $\omega$ -oxidation

6. Which of the following terpenoids occur in peppermint oil ?
- (i) Citral (ii) Zingiberene  
(iii) Menthol (iv) Camphor
7. Melamine contains N in its ring :
- (i) One  
(ii) Three  
(iii) Two  
(iv) None of the above
8. Which of the following statements is true for furazone ?
- (i) Two oxygen, one nitrogen  
(ii) One oxygen, two nitrogen  
(iii) Two oxygen, one sulphur  
(iv) Two sulphur, one oxygen
9. Which of the following is not a quadrupolar magnetic molecule ?
- (i)  $^{14}\text{N}$  (ii)  $^{11}\text{B}$   
(iii)  $^2\text{D}$  (iv)  $^{19}\text{F}$
10. ORD curve is plotted in between :
- (i) Specific rotation and frequency  
(ii) Specific rotation and wavelength  
(iii) Wavelength and polarity  
(iv) Frequency and polarity