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**SARDAR PATEL UNIVERSITY**  
**M.Sc. Semester - IV (Organic Chemistry) Examination**  
**Thursday, 7<sup>th</sup> April 2016**  
**PS04C ORC02 - Natural Products**

**Time: 02:30 pm - 05:30 pm**

**Maximum Marks - 70**

- Q.1** Select the correct answer from the option given below for each of the following questions. [08]  
Write **ONLY ANSWERS** in the provided answer book. [e.g. Q.1 (1)-(b)]
- (1) Which of the following product is obtained upon condensation of biotin (Vitamin H) with phenanthraquinone?  
(a) Dihydroquinoxaline (b) Amino carboxylic acid  
(c) Quinoxaline (d) Pimelic acid
- (2) The structures of steroids are based on \_\_\_\_\_ skeleton.  
(a) 1,2-Cyclopentenophenanthrene (b) 1,2-Cyclobutyrophenanthrene  
(c) 1,2-Cyclohexenophenanthrene (d) 1,2-Cycloheptenophenanthrene
- (3) Which of the following sentence is correct for  $\beta$ -Eudesmol?  
(a) It gives naphthalene derivative on sulphur dehydrogenation  
(b) Molecular formula is  $C_{15}H_{25}O$   
(c) It has one double bond and one  $2^{\circ}$ -OH group  
(d) It has exocyclic double bond which shows absorption at  $610\text{ cm}^{-1}$  in IR spectroscopy
- (4) Herzig-Meyer method is used for the detection of \_\_\_\_\_ in alkaloids.  
(a) No. of methylenedioxy group (b) No. of methoxy group  
(c) No. of alkyl group (d) No. of alkyl group present on N-atom
- (5) Which of the following product obtained upon reaction of morphine with  $CH_3I/KOH$ ?  
(a) (-) - Thebaine (b) (-) - Codeine  
(c) Codeinone (d) Apomorphine
- (6) The nature of side chain is detected by \_\_\_\_\_ method in Steroids.  
(a) Zeisel's method (b) Emde's degradation  
(c) Barbier-Wieland degradation (d) Hofmann exhaustive methylation
- (7) Ozonolysis of  $\beta$ -Carotene give two moles of \_\_\_\_\_.  
(a) Acetic acid (b) 2,2-Dimethylglutaric acid  
(c) 2,2-Dimethylsuccinic acid (d) Geronic acid
- (8) Beri-beri is caused due to the deficiency of \_\_\_\_\_ in human.  
(a) Ascorbic acid (b) Aneurine  
(c) Adermin (d) Axerophthol

- Q.2** Answer **ANY SEVEN** of the following [14]
- (a) Describe the mechanism of acid catalyzed rearrangement of caryophyllene in to caryolanol and clovene.
  - (b) Give the synthesis of mahanimbine.
  - (c) What is bile acid? Write the name and structure of two naturally occurring bile acids.
  - (d) Give the evidences for the five member cyclic ring containing sulphur atom in biotin.
  - (e) Explain EMDE degradation with suitable example.
  - (f) Give the chemical evidences to confirm the position of angular methyl group in  $\beta$ -eudesmol.
  - (g) Discuss the biogenesis of sesquiterpenoid using mevalonic acid pathway.
  - (h) Give the synthesis of ascorbic acid starting from glucose.
  - (i) Explain the chemical evidence for the functionality of oxygen atom in morphine.

**Q.3**

- (a) Discuss the structure of Adermin and Give its synthesis. [06]
- (b) Give the synthesis of the following: [06]
  - (i) Biotin
  - (ii) Retinol

OR

- (b) Discuss the structure of Vitamin A<sub>1</sub> and give its synthesis. [06]

**Q.4**

- (a) Give the spectral evidences for the structure determination of the following alkaloids: [06]
  - (i) Mahanimbine
  - (ii) Sceletium alkaloid A<sub>4</sub>

(b)

- (i) Give the chemical evidences for the nitrogen end of nitrogen containing bridge [03]  
[-N(Me)-CH<sub>2</sub>-CH<sub>2</sub>-] is attached at C-9 or C-10 position of phenanthrene nucleolus in morphine.
- (ii) Describe the mechanism for the acid catalyzed conversion of thebaine to thebenine. [03]

OR

- (b) Give the synthesis of following: [06]
  - (i) Tylophorine
  - (ii) Sceletium alkaloid A<sub>4</sub>

**Q.5**

- (a) Give the evidences for the position of double bond and 3<sup>o</sup>-hydroxyl group in  $\beta$ -eudesmol. [06]
- (b) How will you confirm the symmetrical structure of  $\beta$ -carotene and give its synthesis. [06]

OR

- (b) Give the synthesis of the following compounds: [06]
  - (i) Caryophyllene
  - (ii) Cadinene dihydrochloride

**Q.6**

- (a) Answer the following: [06]
  - (i) Discuss biogenesis of steroids.
  - (ii) Give the synthesis of Testosterone and Cortisone.
- (b) Discuss the position of 2<sup>o</sup>-hydroxyl group and double bond in cholesterol. [06]

OR

- (b) Discuss the nature and position of side chain in cholesterol. [06]

