

2017

CHEMISTRY

Paper : 401 (O)

NATURAL PRODUCTS AND HETEROCYCLIC CHEMISTRY

Full Marks: 80

Time: 3 hours

The Figures in the margin indicate full marks for the questions

1. Answer the following (any five) 2x5=10
 - a. Write the significance of D & L notation in sugar chemistry. How they are different from d and l?
 - b. Why sucrose is called invert sugar? Explain with reaction.
 - c. Write the functions of glycogen.
 - d. What are glycosamines? Explain with suitable examples.
 - e. How can you convert an aldose to its immediate higher homologue? Write the reactions.
 - f. Why maltose is called C₁-C₄ reducing sugar? Explain.

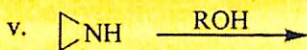
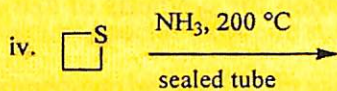
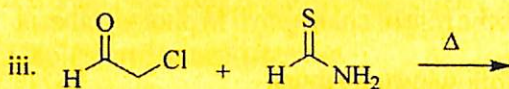
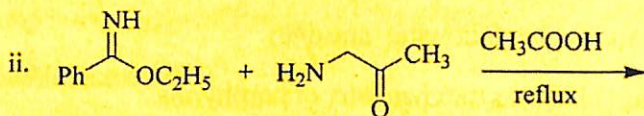
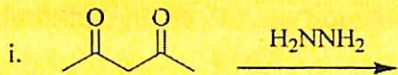
2. Answer the following (any two) 5x2=10
 - a. Discuss the structure of maltose or lactose.
 - b. How can you establish the ring structure of glucose? Give evidences in support of your answer.
 - c. Establish the structure of amylose.

3. Answer the following (any five) 5x5=25
- What are steroids? Discuss the relationship between sterols and bile acids. How the positions of a double bond and hydroxyl group in a steroid are determined? Illustrate your answer giving suitable examples.
 - Sketch the following transformations (any one)
 - Cholesterol to testosterone
 - Ergosterol to progesterone
 - Discuss special isoprene rule with example. How many isomers can be possible for caryophyllene? Write the structure of isocaryophyllene. Prove that santonin has a naphthalene skeleton.
 - Discuss the use of UV-VIS and IR spectroscopy in the structural characterisation of terpenoids.
 - Establish the position of angular methyl group and two double bond in abietic acid.
 - What is pro-vitamin D₂? Write any one synthesis of it. Why vitamin D is known as antiricketic?
 - Establish the nature of side chain and position of the double bond of cholesterol.
4. Answer the following (any two) 5x2=10
- Discuss the structure of rezerpine (Without synthesis of rezerpine)

- Discuss any one synthesis of morphine.
 - Establish the position of side chain and double bond in morphine.
5. Answer the following (any one) 5x1=5
- Discuss the chemistry of porphyrins.
 - Discuss the role of chlorophyll in photosynthesis.
6. Answer the following (any four) 5x4=20
- Discuss any two method for synthesis of aziridines with mechanism. 5
 - Discuss the ring opening reaction of oxirane with organometallics. 5
 - Explain the following - 1+2+2
 - Oxirane has a higher dipole moment than thiirane.
 - Ring opening of oxetane by nucleophile is slower than that of oxirane.
 - A three membered ring is easier to form than a four membered one, although the former has a larger ring strain.
 - Write down the syntheses of imidazole starting from an aldehyde and a 1,2-diamino benzene. Mention any two reactions of imidazole. 5

e. Complete the following reaction?

1x5



f. What is click chemistry? Discuss its application in various fields of chemistry.
