

**RAN-1903080203010003****M.Sc. (Organic Chemistry) (Sem. - III) Examination October - 2025****Paper-I [Natural Products and Bio-molecules]****Time: 3 Hours]****[Total Marks: 70**

સૂચના : / Instructions (1) ઉપરોક્ત દર્શાવેલ વિગતો ઉત્તરવહી પર અવશ્ય લખવી. Fill up strictly the above details on your answer book (2) Figures to the right indicate full marks of the questions	Seat No.: <table border="1"> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> Student's Signature						

Q. 1. Answer any three of the following: 18

- Discuss the nature of rings B and C in colchicine.
- Prove the presence of the $>N-CH_3$ group and the ether linkage in morphine.
- Describe the geometry and aromatic character of porphyrin.
- Differentiate heme and hemin. Discuss the degradation product of hemin under different conditions.

Q. 2. Answer any three of the following: 18

- What are adrenocortical hormones? Give the names and structures of adrenocortical hormones.
- Give the evidences to prove the presence and position of the hydroxyl group and double bond in Cholesterol.
- Prove that bile acids are hydroxyl derivatives of 5β -cholanic acid. Give the synthesis of Diel's hydrocarbon.
- Classify sex hormones. Discuss and prove the structure of Oestrone giving suitable explanation.

Q. 3. Answer any three of the following: 18

- Give the sodium sulphite cleavage of vitamin B₁. Discuss the structure of base B, giving analytical and synthetic evidences.
- Discuss the degradation product of Gibberellic acid and derive the conclusion in determining its structure.
- Write down the names of water-soluble vitamins. Giving suitable reactions to prove that vitamin H has a bicyclic molecule and the presence of a sulphur unit.
- What are Sesquiterpenoids? Describe the ozonolysis reaction and the synthesis of Farnesol.

Q. 4. Answer any three of the following:

16

- (a) Give names and structures of nitrogenous bases present in nucleic acids. Discuss hydrogen bonding between the following pairs of bases:
 - (i) Thymine and Adenine (ii) Cytosine and Guanine
 - (b) What are enzymes? Discuss the various factors affecting on enzyme activity.
 - (c) Differentiate competitive and non-competitive inhibition of an enzyme. Explain the hydrolysis process of nucleoprotein with an example.
 - (d) Enlist different types of RNAs. Discuss the role of RNAs in the synthesis of proteins.
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