

- (e) What is epimerisation? Suggest a method for the conversion of D-glucose to D-mannose.
- (f) What are essential amino acids? Write the names and structures of two essential amino acids. (3,3,3,3,3)

2. (a) Treatment of a protein with trypsin gave a peptide 'A', which on complete hydrolysis produced: ser, ala, gly, phe, val, lys and asp residues.

Partial enzymatic hydrolysis of peptide 'A' with chymotrypsin gave a dipeptide and a pentapeptide. On treatment with Sanger's reagent followed by hydrolysis, the dipeptide gave DNP-asp. The pentapeptide was cycled through Edman's degradation procedure three times. The composition of the peptide remaining after each cycle was as follows:

After cycle 1: ala, lys, ser, gly

After cycle 2: ala, lys, gly

After cycle 3: ala, lys

What is the sequence of amino acids in the heptapeptide? Explain.

- (b) Write the structure of the tripeptide abbreviated as follows:

tyr – phe – leu

- (c) Write two advantages of Dansyl method of N-terminal analysis over Sanger's method. (8,2,2)

3. (a) A, B and C are D-aldohexoses. A and B on catalytic reduction give the same optically active alditol. However, A and B yield different osazones. B and C give the same osazone but different alditols. Show reactions to arrive at the structures of A, B and C.

- (b) Suggest a method to distinguish between:

(i) D-lactose and D-sucrose

(ii) α -D-maltose and α -D-lactose

- (c) How are the aldaric acids produced by the oxidation of D-glucose and D-gulose related? Write their Fischer structures. (7,2,3)
4. (a) How do you synthesize the following :
- (i) uracil from urea and ethyl acrylate
 - (ii) cytosine from uric acid
- (b) Write the structure of the following trinucleotide segment of RNA :
GMP-UMP-AMP (6,6)
5. (a) What are antibiotics? Give a detailed synthesis of chloramphenicol. Write its chemical name.
- (b) Write the structure of Vitamin C and write its chemical name.
- (c) What are analgesics? Write a method for the preparation of paracetamol. (6,3,3)
6. (a) Compound 'A' a ketone can be obtained by Diel's Alder reaction of methyl vinyl ketone and isoprene. 'A' on reaction with methyl magnesium bromide followed by acid hydrolysis gives B ($C_{10}H_{18}O$). B when heated with sulphuric acid gives p-cymene. Explain the above reactions.
- (b) Write names and structures of different stereoisomers of citral. How the difference in their configurations has been proved experimentally?
- (c) Define special isoprene rule. (6,4,2)
7. (a) Write the structure of a ω -3 fatty acid.
- (b) A mixed triglyceride contains two units of oleic acid and one unit of linolenic acid, write its all possible structures and calculate its iodine number. Classify it as drying oil or semi-drying oil or non-drying oil.

- (c) What happens when tripalmitin is
- (i) heated under pressure, with hydrogen in the presence of copper chromite catalyst.
 - (ii) heated with excess of aqueous NaOH. (2,6,4)
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8. (a) Write steps for the preparation of alanine by Gabriel's method.
- (b) Write the products, when an :
- (i) α -amino acid is heated
 - (ii) α -amino acid is reacted with ninhydrin.
- (c) Write a short note on rancidity. (3,6,3)