

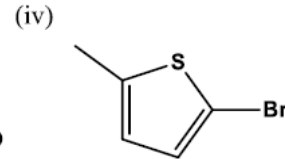
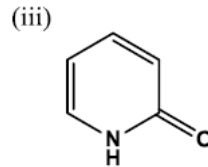
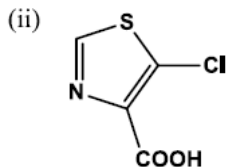
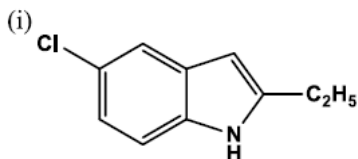
Time: 3 Hours

Marks: 80

Q.1.A.

(i) Give IUPAC nomenclature of the following: (Any 3)

(03)



(ii) Draw the structures for the following: (Any 2)

(02)

- 3-Ethyl-5-methylquinoline
- 2-Methyl-5-bromofuran
- 4,5-dihydro-imidazole-4-carboxylic acid

B. Answer the following in brief: (2M each)

(10)

(i) Size exclusion chromatography of monodisperse fractions of a linear polymer A and B, yield molecular weights 4,00,000 and 8,00,000 respectively. Mixture is prepared from 3 parts by weight of A and 5 parts by weight of B. Determine weight average molecular weight.

(ii) During DNA synthesis, A, G and C requires protecting group while thymine does not. Justify.

(iii) Calculate the isoelectric point for Aspartic acid given that $pK_{a1} = 1.88$, $pK_{a2} = 3.65$, and $pK_{a3} = 9.60$. Write the structure of the zwitterions.

(iv) Give the structure/s of oxidation product of Pyridine.

(v) At which position does electrophilic aromatic substitution occur in pyrrole? Why?

C. (i) Draw all resonating structures for thiophene.

(02)

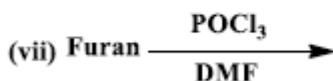
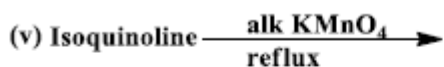
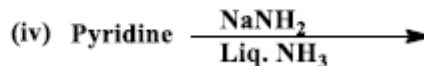
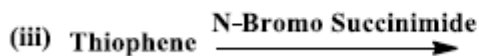
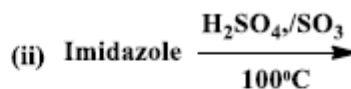
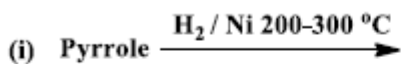
(ii) Can imidazole be considered as amphoteric? Justify.

(02)

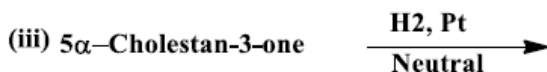
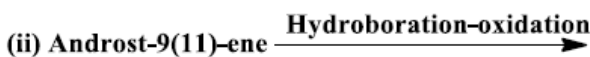
(iii) Draw the structure of 5α -androstan- 3β -ol (in chair conformation)

(01)

Q.2. A. Give the products of the following reactions (Any 6) (06)



B. Complete the following reactions: (03)



C. Illustrate the Edman degradation analysis for the peptide Gly-Phe-Glu-Lys (03)

Q.3. A. Write the following synthesis with mechanisms: (Any 3) (06)

- (i) Doebner-Miller Synthesis
- (ii) Robinson-Gabriel Synthesis for oxazole
- (iii) Hantzsch Pyridine Synthesis
- (iv) Knorr Pyrrole Synthesis

B. Write all steps required for synthesis of Leu-Ala dipeptide. (03)

C. Discuss polymerization reaction of propene using ZieglerNatta catalysis. (03)

Q.4. A. Give reasons for the following: (06)

- (i) 5 α -cholestane-3 α -ol is oxidized 3 times faster than 5 α -cholestane-3 β -ol.
- (ii) Nucleophilic substitution in pyridine takes place at 2 and 4 position.
- (iii) Cholesterol gives cis product upon oxidation with KMnO₄ while with H₂O₂ it gives trans product

B. Draw the general structures for androstane, pregnane and estrane backbone of steroids (03)

C. Briefly discuss the Merrifield solid phase synthesis of DNA (03)

Q.5.A. (i) Compare the basicity of pyridine and pyrimidine. (05)

(ii) Write in detail method of Synthesis of piperazine from oxirane (05)

(iii) Draw resonating structures for Indole (01)

B. Attempt the following conversions: (05)

(i) Furan to Furfural (Gattermann reaction)

(ii) Pyridine to 4-nitro pyridine

(iii) Indole to 3-Formyl-Indole

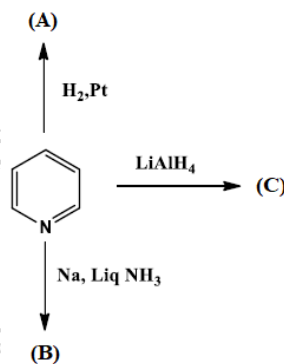
(iv) Thiazole to thiazole-5-sulphonic acid

(v) Acrolein to quinoline (Skraup Synthesis)

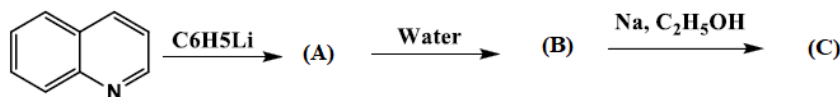
C. Classify polymers on the basis of their physical properties giving one example from each class. Discuss any one in detail (04)

Q.6. A. Identify and write the structures of A, B and C in the following reactions: (06)

(i)



(ii)



B. 5-Cholestene (A) when treated with peracetic acid gives product B, which on treatment with water to give product C. Give the structures of A, B and C with proper stereochemistry. (03)

C. What are co-polymers? Explain different types of co-polymers. (03)
