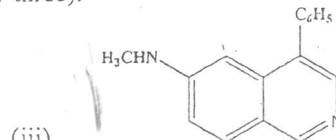
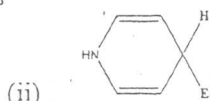
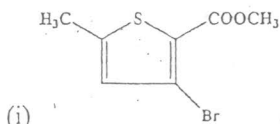


N.B.: 1. All Questions are compulsory  
2. Figures to right indicate full marks

Total Marks: 70

Q1. (a) Give IUPAC nomenclature of the following (any three): (03)



- (b) Compare and comment on basicity of imidazole and pyridine. (02)  
 (c) Explain disrotatory motion with example. (01)  
 (d) Explain the term Functional Group Addition with suitable example. (01)  
 (e) What is the strategy used for disconnection in pyrrole. (01)  
 (f) Give structures of the following in chair form: (03)  
 (i) 5 $\alpha$ -progesterane (ii) Cortisone (iii) 3 $\beta$ -hydroxy-6 $\beta$ -acetoxy-5 $\alpha$ -androstane  
 (g) Give product formed for reaction of Cholesterol with H<sub>2</sub>O<sub>2</sub> and justify (01)  
 (h) Draw reaction to depict classical and non-classical route for Friedel Craft alkylation. (01)  
 (i) Define term Atom efficiency. If atom efficiency of a reaction corresponds to 40% then what will be its theoretical E-factor? (02)

Q2. (a) Write the following reactions with mechanism (any two): (04)

- (i) Doebner Miller synthesis  
 (ii) Pomeranz - Fritsch synthesis  
 (iii) Fischer indole synthesis

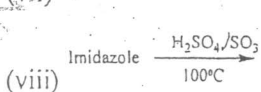
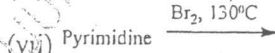
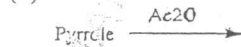
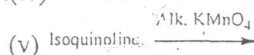
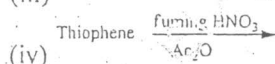
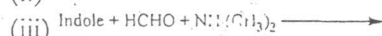
- (b) Using orbital diagram, explain whether (4 $\pi$  + 2 $\pi$ ) cycloaddition photochemical reaction would be suprafacial or antarafacial by giving suitable example. (04)  
 (c) Compare biocatalytic route of penicillin G with chemical synthesis. (03)

Q3. (a) Attempt the following conversions (Any Four) (04)

- (i) Pyrimidine to 5-bromopyrimidine  
 (ii) Pyridine to 2-phenylpyridine  
 (iii) 2,3-butanedione to 2,4,5-trimethylimidazole  
 (iv) Pyridine to 1,4-dihydropyridine  
 (v) 2,4,6-trichloropyrimidine to pyrimidine

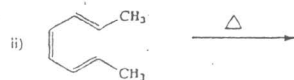
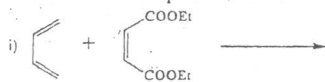
- (b) Using synthon approach devise scheme for synthesis of atenolol. (04)  
 (c) Discuss classical and non-classical route for synthesis of Hydroquinone. (03)

Q4. (a) Write structures of products formed for the following reactions (any eight): (08)



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(b) Write structures of products formed in the following reactions: (03)



Q5. (a) Write the following reactions with mechanism (any two): (04)

- (i) Knorr pyrrole
- (ii) Hinsberg synthesis
- (iii) Paal Knorr synthesis for furan.

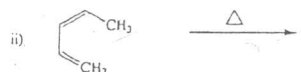
(b) Give reasonable explanation for the following (Any seven) (07)

- (i) Protonation of Nitrogen atom present in pyridine ring is easier than pyrrole.
- (ii) Which is the preferred position for Electrophilic aromatic substitution reaction in imidazole and why?
- (iii) Why pyrimidine (pKa: 1.30) is much less basic than pyridine (pKa: 5.2).
- (iv) 5 $\beta$ -cholestane-3-one forms 4-bromo derivative.
- (v) Acetates of 5 $\alpha$ -cholestane-3 $\beta$ -ol get more rapidly hydrolysed than 5 $\alpha$ -cholestane-3 $\alpha$ -ol.
- (vi) Cholesterol gives trans product upon oxidation with H<sub>2</sub>O<sub>2</sub>.
- (vii) Electrophilic substitution in quinoline takes place at 5 and 8-position.
- (viii) Furan undergoes Diels Alder reaction whereas thiophene does not.

Q6. (a) Draw resonating structures for the following (04)

- (i) Pyridine
- (ii) Indole
- (iii) Imidazole
- (iv) Quinoline

(b) Explain following reactions with mechanism: (04)



(c). Give simplest retrosynthetic pathway for the following (any 3) (03)

- (i) p-methoxyacetophenone
- (ii) Ethyl p-aminobenzoate
- (iii) 1-butene
- (iv) 2,4-dimethyl-2-pentanol

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