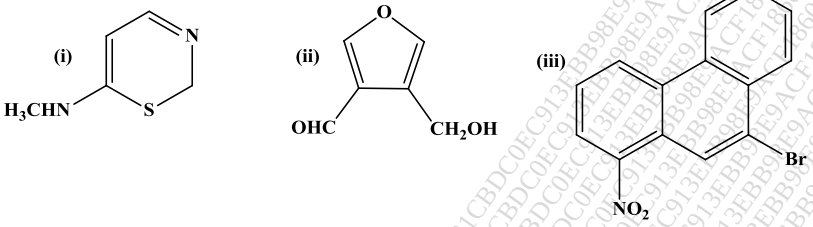
Q. P. Code: 20760

N.B.: 1. All Questions are compulsory **Time: 3 Hours** **Total Marks: 70**

2. Figures to right indicate full marks

Q. 1. A. Give the IUPAC nomenclature of the following compounds **(03)**

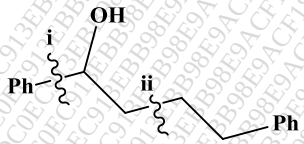


B. Define following terms: (i) Disrotatory motion (ii) E-factor (iii) Steroids **(03)**

C. Draw structures of the following: (i). Testosterone (ii) 5β-cholestan-3β, 6β-diol (in chair form) (iii) 5α-estrane chair form. **(03)**

D. Give suitable explanation for the statement 'Pyridine is a weaker base than aliphatic tertiary amines'. **(02)**

E. Depict the two disconnection strategies **(02)**



F. Depict hydrotalcite catalyzed condensation reactions. **(02)**

Q. 2. A. Write mechanism for (**Any Two**): **(**i). Friedlander synthesis (ii). Bischler-Napieralski (iii). Paal Knorr synthesis for furan **(04)**

B. 'Thermal (4+2) cycloaddition of 1,3-butadiene with propenal is symmetry allowed', justify the statement using molecular orbitals **(04)**

C. Discuss the green strategies for MPV reduction. **(03)**

Q. 3. A. Depict mechanism for the following conversions (**Any Two**) **(04)**

(i). 2 moles of Ethylacetoacetate to 2,4,6-trimethylpyridine (ii). Benzil to 2,4,5-triphenylimidazole (iii). Diethylmalonate to 2,4,6-trihydroxypyrimidine

B. Design retrosynthetic scheme and synthesis for Ibuprofen **OR** Benzocaine **(04)**

C. Compare merits and demerits of classical and zeolite catalyzed Friedel-craft acylation with an example. **(03)**

Q. 4. A. Write structures of products formed for the following reactions (**Any Eight**): **(08)**

i. Thiophene $\xrightarrow{conc.HNO_3}$

ii. Furan + Maleic anhydride $\xrightarrow{\triangle}$

iii. Pyrrole $\xrightarrow{EtOK,\ CHCl_3}$

iv. Pyridine $\xrightarrow{peracetic\ acid}$

v. 6-Hydroxymethylquinoline $\xrightarrow{Vapour\ phase\ bromination}$

vi. 8-bromoisoquinoline $\xrightarrow{NaNH_2,\triangle}$

vii. Indole $\xrightarrow{HCN,\ HCl}$

viii. Imidazole $\xrightarrow{oleum,\ 100^oC}$

ix. Pyrimidine $\xrightarrow{PhMgBr,\ Ether}$

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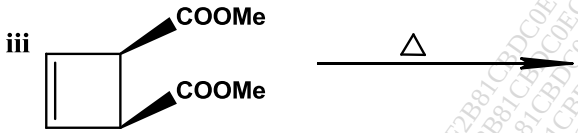
B. Write structures of products formed for the following reactions: **(03)**

i. trans,trans-2,4-hexadiene $\xrightarrow{h\nu}$

ii 2-methoxycyclopentadiene + 2-propenenitrile $\xrightarrow{\triangle}$

iii



Q. 5. A. Give suitable justification for the following statements: **(08)**

(i). Hoffmann degradation of 3α-trimethylammonium-5α-cholestanes gives 5α-cholestan-2-ene while 3β-trimethylammonium-5β-cholestanes do not form any product.

(ii). Cholestan-3β,5α,6β-triol on reaction with ethylchloroformate in presence of pyridine gives 3β-monocathylate while Cholestan-3β,5α,6α-triol forms 3β,6α-dicathylated product.

(iii). Indole undergoes Electrophillic Aromatic Substitution reaction preferably at which position and why?

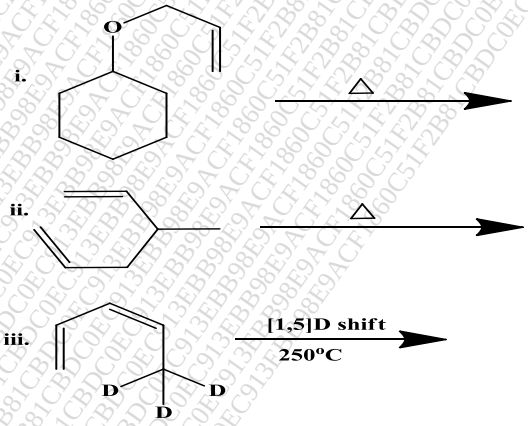
(iv). Furan, thiophene and pyrrole are all heteroaromatic compounds.

B. Write reagents and reaction conditions for the following conversions: **(03)**

(i). Furan to 2-nitrofuran (ii). Isoquinoline to phthalimide

(iii). 4-bromopyridine to 3,4-pyridyne

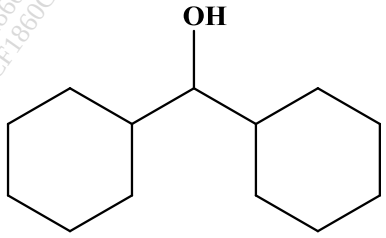
Q. 6. A. Complete the following reactions with mechanisms **(Any Two):** **(04)**



B. Draw resonating structures of the following: **(04)**

i. Thiophene ii. Quinoline iii. Imidazole iv. Pyridine

C. Give retrosynthetic and synthetic pathway for the following target molecule: **(03)**



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