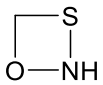
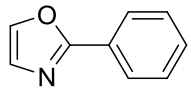
Birla Institute of Technology & Science, Pilani, Rajasthan 333 031
Second Semester 2021-2022
MID-SEMESTER EXAMINATION
CHEM F342 ORGANIC CHEMISTRY IV

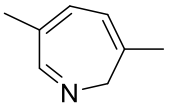
Time: 90 Minutes **Max. Marks: 60** **Date: 09/03/22**

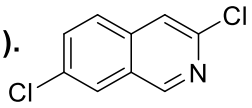
All questions are compulsory. Answer the sub-parts of a question together.

Q. No. 1. (i). Write the IUPAC nomenclature names for the following heterocycles. [4x1=4]

(a). 

(b). 

(c). 

(d). 

(ii). Indole possess a higher resonance energy as compared to pyrrole. Why? [3]

(iii). With a suitable example, show that furan prefers to undergo addition reaction over substitution reaction. [3]

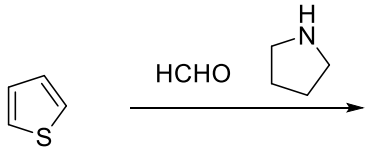
(iv). Electrophilic substitution reaction in quinoline occurs at C-5/C-8 positions as compared to C-6/C-7 positions. Why? [3]

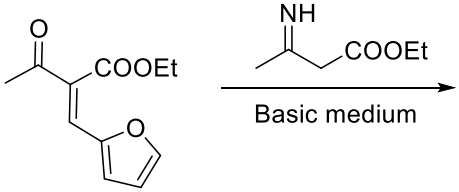
(v). Illustrate one example of cycloaddition reaction given by substituted aziridine. [2]

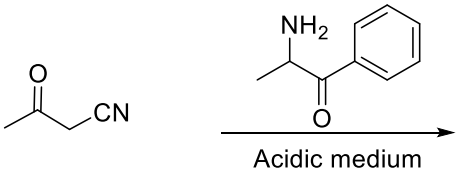
Q. No. 2. Using appropriate reactants/reagents/solvents, carry out the following conversions in not more than 3-4 step. (*No Mechanism is required for any sub-step, however do show important intermediates involved in the reaction)* [5x3=15]

(i). Phenylhydrazine to 2-methyl-3-formylindole
(ii). Pentan-2,4-dione to 2-amino-3-cyano-4,6-dimethylpyridine
(iii). *cis*-2,3-Dimethyloxirane to *cis*-2,3-dimethylaziridine
(iv). Succinic Acid to Diethyl furan-3,4-dicarboxylate
(v). 3,5-Dimethylisooxazole to *N*-tosylazetidine

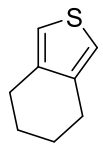
Q. No. 3. Complete the reactions and propose a detailed mechanism for the formation of major product. [3x5=15]

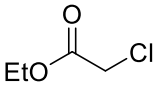
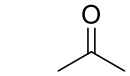
(i). 

(ii). 

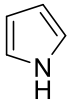
(iii). 

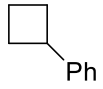
Q. No. 4. Identify the structures of **A-J** (*with correct stererochemistry, wherever applicable*) for the following chemical transformations. (*No mechanism required*) [10x1.5=15]

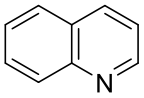
(i).  NC≡CN, Toluene, warm → **A** → (heat) → **B**

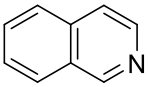
(ii).  NaOEt, THF →  heat → **C**

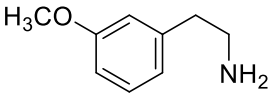
(iii). Ph–N=C=O +  → **D**

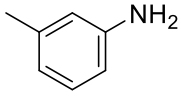
(iv).  $CHCl_3$, KOH → **E**

(v).  Benzene, $AlCl_3$ → **F**

(vi).  RCOCl, KCN → H^+ → **G**

(vii).  Alkaline $KMnO_4$, heat → **H**

(viii).  HCHO, heat → H^+ → **I**

(ix).  Acrolein, H^+ → [O] → **J**