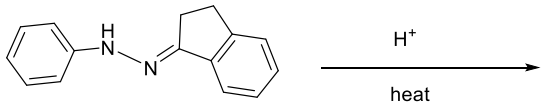
Birla Institute of Technology & Science, Pilani, Rajasthan 333 031
Second Semester 2022-2023
MID-SEMESTER EXAMINATION
CHEM F342 ORGANIC CHEMISTRY IV

Time: 90 Minutes **Max. Marks: 60** **Date: 18/03/23**

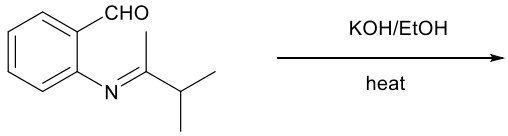
All questions are compulsory. Answer sub-parts of questions together.

Q. No. 1. Identify the major final product for the following chemical transformations and propose a detailed mechanism for their formation. [4x5=20]

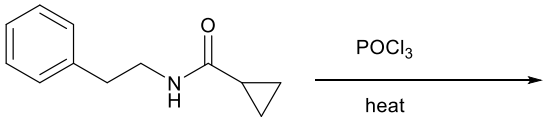
(i).



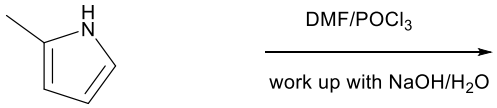
(ii).



(iii).



(iv).



Q. No. 2. (i). At what position(s) does electrophilic substitution reactions occurs in Pyrrole and Indole? Explain with proper justification. [5]

(ii). Using appropriate reactants/reagents/solvents, carry out the following conversions showing only important intermediates. *(No mechanism)* [3x5=15]

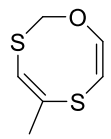
(a). Butan-1,4-dial to 3-Chloropyridine

(b). Acetone to 2,2-Dimethyloxetane

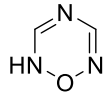
(c). Glycerol to Niacin

Q. No. 3. (i). Write the IUPAC name of the following compounds. *(No Partial Marking)* [4x1=4]

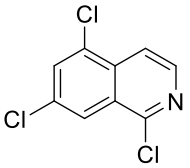
(a).



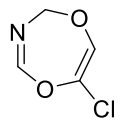
(b).



(c).



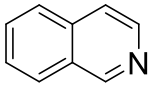
(d).

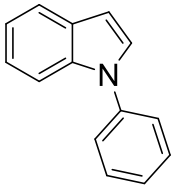


*[HINT: 6-membered-N-present unsaturated heterocyclic suffix: **ine**; 7-membered-N-present unsaturated heterocyclic suffix: **epine**; 8-membered-N-present unsaturated heterocyclic suffix: **Ocine**; 8-membered-N-absent unsaturated heterocyclic suffix: **Ocin**]*

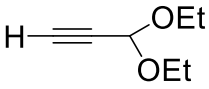
(ii). Arrange the following heterocycles [Pyrrole, Quinoline, Triethylamine, Furan] in increasing order their basic strength *(less to more: left to right)* *(No Partial Marking)* [2]

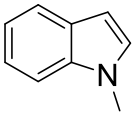
(iii). Identify the correct structures of **A-G** *(with correct stereochemistry, wherever applicable).* [7x2=14]

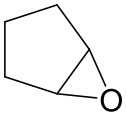
(a).  $\xrightarrow[\text{heat}]{Br_2/HCl}$ **A**

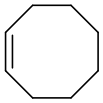
(b).  $\xrightarrow[\text{THF, -78 }^{o}C]{\text{nBuLi}}$ $\xrightarrow{\text{PhCHO}}$ $\xrightarrow{\text{Work up with } H^+}$ **B**

(c).  $\xrightarrow[\text{heat}]{N_2\text{=CH-COOEt}}$ **C**

(d).  $\xrightarrow[Et_2O]{\text{MeMgBr}}$ $\xrightarrow{CH_3CHO}$ $\xrightarrow[\text{heat}]{H^+}$ **D**

(e).  $\xrightarrow{CH_3I \text{ (excess), heat}}$ **E**

(f).  $\xrightarrow[\text{heat}]{\text{Thiourea}}$ **F**

(g).  +  $\xrightarrow[(ii)\ CH_3NH_2]{\text{(i) Sunlight}}$ **G**