



‘সমানো মন্ত্র: সমিতি: সমানী’

UNIVERSITY OF NORTH BENGAL

B.Sc. Honours 4th Semester Examination, 2022

CC9-CHEMISTRY

ORGANIC CHEMISTRY

Time Allotted: 2 Hours

Full Marks: 40

The figures in the margin indicate full marks.
All symbols are of usual significance.

1. Answer any **five** questions of the following: 1×5 = 5

- (a) Draw the structures of nicotine and reserpine.
- (b) What is isoprene rule?
- (c) Why only secondary amines are preferred for Mannich Reaction?
- (d) Furan and pyrrole have opposite direction of dipole moment — Why?
- (e) Cyclohexylamine is more basic than aniline — Why?
- (f) *Trans* decalin is more stable than *cis*-decalin. — Why?
- (g) Chalk out a synthetic plan for indene.

2. Answer any **three** questions from the following: 5×3 = 15

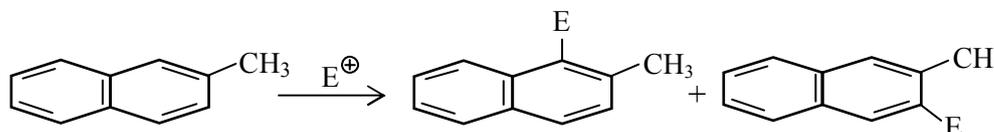
- (a) (i) Arrange the following in decreasing order of their reactivity toward electrophilic substitution reaction. Give a suitable explanation in favor of your choice. 3+2 = 5

Benzene; thiophene and pyrrole.

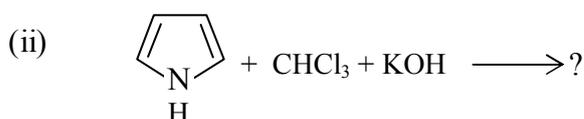
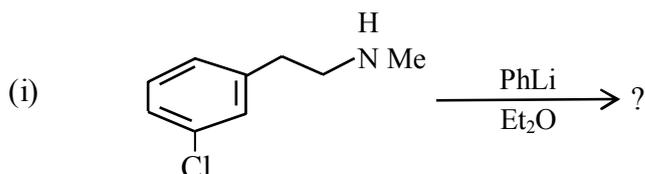
- (ii) Why the Gabriel phthalimide synthesis of amine is not suitable for the preparation of tertiary amine?

(b) (i) Write the structures of different stereoisomers of menthol. 2+3 = 5

- (ii) In the following reaction, which one will be major product and why?



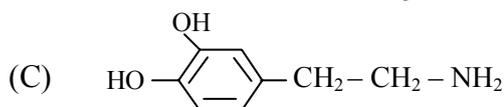
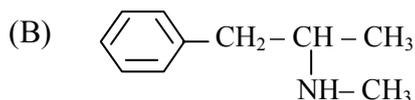
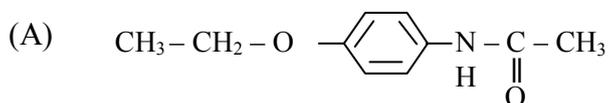
(c) What would be the major product in the given reactions? Draw the plausible reaction mechanism in each case. 2½×2 = 5



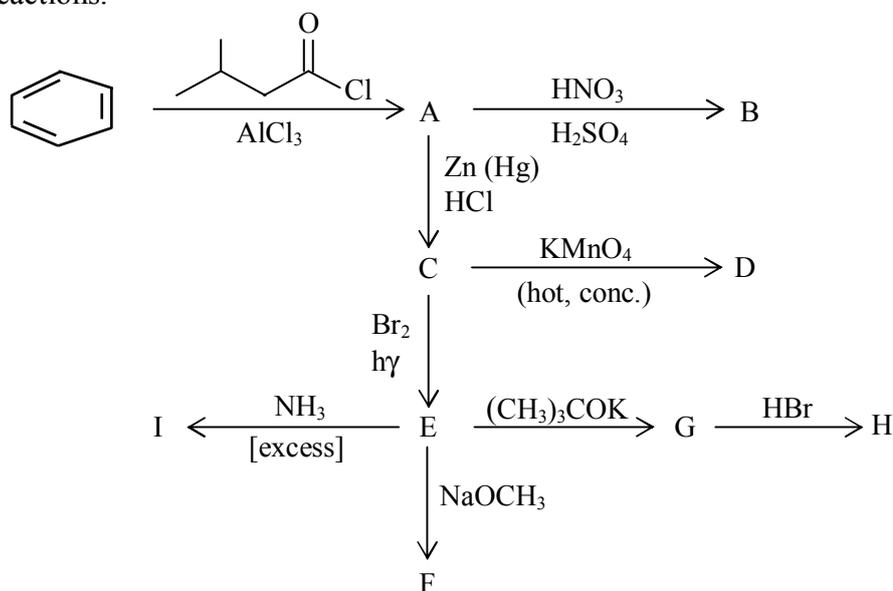
- (d) (i) How do you prove that nicotine has N – CH₃ group? 2+3 = 5
- (ii) How do you establish the positions of unsaturation in citral?
- (e) (i) *N*-methyl-2-pyrrole carboxaldehyde does not undergo Cannizzaro reaction. 2+3 = 5
— Why?
- (ii) Unlike benzene, pyridine undergoes both electrophilic and nucleophilic substitution reaction. — Why? Identify the position(s) of pyridine ring where substitution will occur in each case.

3. Answer any **two** questions from the following: 10×2 = 20

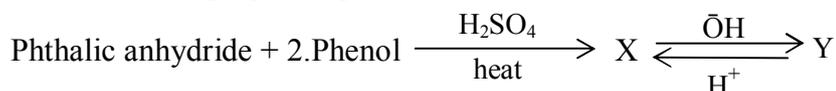
- (a) (i) An organic compound, with molecular formula C₈H₁₇N, which upon treatment with excess MeI followed by silver oxide and heating, gives pure (*S*)-enantiomer of *N,N*-dimethyl oct-7-ene-4-amine. Propose a complete structure of the unknown compound, and show how this reaction gives the observed product. 5+5 = 10
- (ii) Devise a synthesis for each of the following, starting with any compounds containing no more than six carbon atoms.



- (b) (i) Give the structures of compounds A to I in the following series of reactions. 5+5 = 10

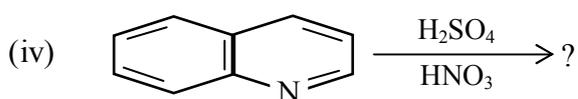
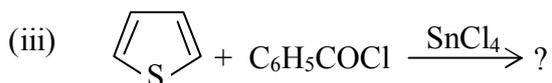
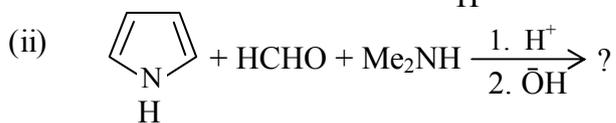
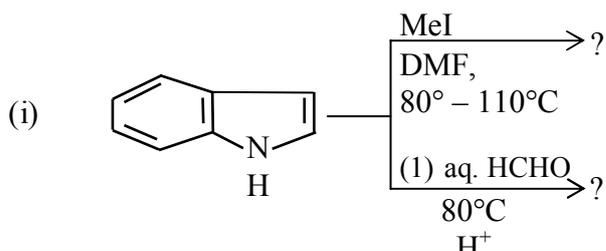


- (ii) In the following reaction, identify both X and Y. Propose a mechanism for the synthesis of X. What kind of structural change occurs under basic medium? Also propose a plausible mechanism.



(c) Predict the product with suitable mechanism.

2×5 = 10



—x—