

M.Sc. Examination 2019

Semester-IV

Chemistry

Optional Course: CH-1021

(Organic Chemistry)

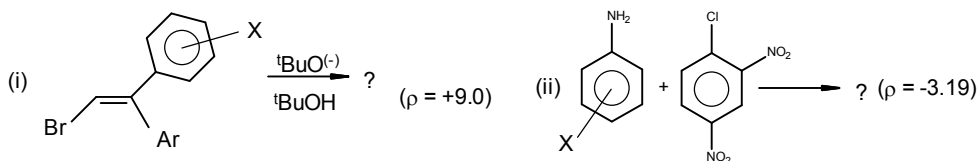
Time: Three Hours

Full Marks: 40

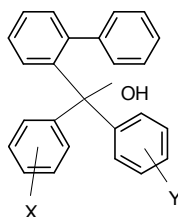
Questions are of equal value or as indicated in the margin.

Answer *any four* questions.

1. a) Explain the significance of the sign of ρ value. 3
- b) "The magnitude of the absolute value of ρ measures the susceptibility of the reaction rate on the effect of substituent". Discuss it with proper example. 3
- c) Predict the products of the following reactions and explain the sign of the ρ value with proper mechanism. 2+2



2. a) Cyclodehydration of the following 2-phenyl-triaryl methanol shows downward deviation in Hammett plot. Explain. 5



- b) How could you establish the mechanism of the hydrolysis of the following ester in 99% H_2SO_4 by observing the Hammett plot?
 CH_3-COOR where $R=Me$ or Et . 5
3. a) Solve the secular equation of butadiene for obtaining the energy levels of the π -system using Hückel approximation. 8
- b) Offer a pictorial representation of the π -molecular orbitals associated to each energy level in butadiene. 2
4. Construct the canonical form of the bonding molecular orbitals of methane using its tetrahedral symmetry. 10
5. a) Prove that citral contains one aldehyde group and hence determine its chemical structure (m.f. of citral $C_{10}H_{16}O$). 6
- b) How do you distinguish the two isomers, citral-a and citral-b, chemically and spectroscopically both? 4
6. a) How do you distinguish linalool from geraniol though both of them have the same molecular formula ($C_{10}H_{18}O$)? 8
- b) How do you convert caryophyllene to isocaryophyllene? 2