

**October 2025**  
**B.A./B.Sc.**  
**Third Semester**  
**MAJOR – 3**  
**CHEMISTRY**  
*Course Code: CHM 3.11*  
**(Basic & Hydrocarbon)**

Total Mark: 50  
Time: 2 hours

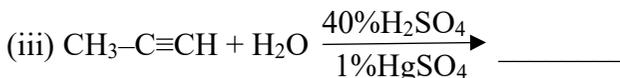
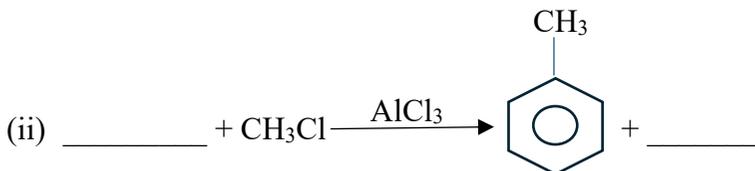
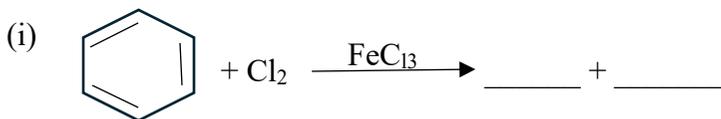
Pass Mark: 20

I. Answer the following questions.

1. (a) Write the IUPAC name. 1×2=2
- (i)  $\text{CH}_3\text{-CH}_2\text{-CH}_2\text{-CH(Br)-CH(C}_2\text{H}_5\text{)-CH}_3$
- (ii)   $\text{-CH}_2\text{CH=CH}_2$
- (b) Define hybridisation. Give the different types of hybridisations. 1+1=2
- (c) Allyl radical is more stable than an alkyl radical. Give reason. 2
- (d) Briefly discuss homolytic and heterolytic bond fission with suitable example. 4
- (e) Differentiate between singlet and triplet carbene. 2
2. (a) Complete the following reactions. 2+2=4
- (i)  $\text{CH}_3\text{-CH=CH}_2 + \text{Br}_2 \longrightarrow$
- (ii)  $\text{CH}_3\text{-CH=CH}_2 + \text{H}_2\text{O} \longrightarrow$
- (b) Give the laboratory method of allylic bromination. 2
- (c) Define elimination reaction. Differentiate between E1 and E2 elimination reaction. 1+3=4
- (d) What is Wurtz-Fittig reaction? Give the chemical reaction. 2
3. (a) Discuss the stabilities of cyclohexane conformations with a labelled energy profile diagram. 4

(b) Complete the following reactions and provide the mechanism:

2×4=8



II. Answer any two of the following questions.

4. (a) Define resonance. Draw the resonance hybrid structures of 1,3-butadiene. 1+2=3
- (b) Give reasons to the following: 2+2=4
- (i) Phenol is more acidic than methanol
- (ii) Benzyl cations are more stable than allyl cation.
5. (a) Explain Saytzeff's rule with suitable example. 3
- (b) Briefly explain the ozonolysis of alkene with detail mechanism. 4
6. (a) Explain the directing effects of electron-donating and electron-withdrawing groups in electrophilic aromatic substitution reactions. 3
- (b) Write the alkylation of terminal alkynes with suitable reaction mechanism. 2
- (c) Explain the stability of cyclobutane in terms of Baeyer's strain theory. 2