

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI  
(END SEMESTER EXAMINATION)

CLASS: MSc/PRE-PHD  
BRANCH: CHEMISTRY

SEMESTER : I/NA  
SESSION : MO/18

SUBJECT: CH403 REACTIONS MECHANISM IN ORGANIC CHEMISTRY

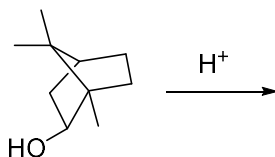
TIME: 3 HRS.

FULL MARKS: 50

**INSTRUCTIONS:**

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
  2. Attempt all questions.
  3. The missing data, if any, may be assumed suitably.
  4. Before attempting the question paper, be sure that you have got the correct question paper.
  5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.
- 

- Q.1(a) Explain the relative basic strength of  $\text{HO}^-$  and  $\text{NH}_3$  and Why? Explain the reasoning including Hückel Rule associated with aromatic or anti-aromatic nature of  $\text{C}_3\text{H}_3\text{SbCl}_6$  and 1-3-cyclobutadiene. [5]
- Q.1(b) What is Hyperconjugation, explain the stability of propene using molecular orbital diagram showing hyperconjugation. [5]
- Q.2(a) From the mechanism of  $\text{S}_{\text{N}}1$  reaction explain the reason that the expected racemization is not observed 100%. [5]
- Q.2(b) Describe  $\text{S}_{\text{E}2}$  (back) and  $\text{S}_{\text{E}2}$  (front) mechanism with example. How does the process distinguish from product stereochemistry. [5]
- Q.3(a) By nitration of aniline with  $\text{HNO}_3/\text{H}_2\text{SO}_4$  reagent good amount of meta-nitro aniline is obtained-Justify the statement with proper mechanism. Write short note on Vilsmeier reaction. [5]
- Q.3(b) Describe the benzyne mechanism for aromatic nucleophilic substitution with example. Give the evidence of  $\text{S}_{\text{N}}1$  mechanism for aromatic compound. [5]
- Q.4(a) Show the possible stereochemistry for different types of electrophilic addition to  $\text{C}=\text{C}$ . Explain the mechanism with stereochemistry for addition of  $\text{HBr}$  to cis and trans 2-bromo-2-butene under free-radical conditions at  $-80^\circ\text{C}$ . [5]
- Q.4(b) Write short note on Perkin reaction. Explain the  $\text{E1CB}$  and comment on the product stereochemistry with example. [5]
- Q.5(a) Discuss the nitrene based rearrangement with example and mechanism. [5]
- Q.5(b) Write a short note on Wagner-Meerwein Rearrangement. Draw the product with mechanism for the following rearrangement: [5]



:::::03/12/2018:::::M