



# UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig. ....

Roll No. in Words. ....

PAPER: Organic Chemistry (Sp. Theory-I)  
Course Code: CHEM-409 Part-I (Compulsory)

MAX. TIME: 15 Min.  
MAX. MARKS: 10

Signature of Supdt.:

**Attempt this Paper on this Question Sheet only.**

**Please encircle the correct option. Division of marks is given in front of each question.**

**This Paper will be collected back after expiry of time limit mentioned above.**

**Q.1. Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)**

- I. Molecular Rearrangement can occur in
  - a) E1
  - b) E2
  - c) S<sub>N</sub>1
  - d) Both E1 and S<sub>N</sub>1
- II. Which of the product is predominant in Saytsev's Rule
  - a) Less substituted alkenes
  - b) More substituted alkenes
  - c) Unsubstituted alkenes
  - d) None of these
- III. In S<sub>N</sub>2 substitution, the correct order of reactivity as nucleophile is
  - a) <sup>-</sup>OR > <sup>-</sup>OH > H<sub>2</sub>O
  - b) H<sub>2</sub>O > <sup>-</sup>OR > <sup>-</sup>OH
  - c) <sup>-</sup>OH > <sup>-</sup>OR > H<sub>2</sub>O
  - d) H<sub>2</sub>O > <sup>-</sup>OH > <sup>-</sup>OR
- IV. Among the followings which one is the best leaving group
  - a) Fluoride
  - b) Chloride
  - c) Bromide
  - d) Iodide
- V. The weak base (often the solvent) takes part in
  - a) Slow step of E1 reaction
  - b) Fast step of E1 reaction
  - c) Slow step of S<sub>N</sub>1 reaction
  - d) None of these
- VI. The β- elimination reactions occur in
  - a) E1
  - b) E2
  - c) E1CB
  - d) All the three
- VII. In S<sub>N</sub>1 reaction if the concentration of nucleophile is doubled, the reaction rate will
  - a) Remain the same.
  - b) Increase
  - c) Decrease
  - d) First increase then decrease
- VIII. In which solvent the rate of S<sub>N</sub>1 reaction will be highest?
  - a) 100 % water
  - b) 50 % water + 50 % methanol
  - c) 20 % water + 80 % methanol
  - d) 100 % methanol
- IX. E2 reaction is a
  - a) Zero order reaction
  - b) First order reaction
  - c) Second order reaction
  - d) Third order reaction
- X. Among the following which will be the major product for the reaction of 2-bromobutane with sodium ethoxide.
  - a) 2- Butene
  - b) 1-Butene
  - c) Ethene
  - d) Propene



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PAPER: Organic Chemistry (Sp. Theory-I)

Course Code: CHEM-409 Part – II

MAX. TIME: 2 Hrs. 45 Min.

MAX. MARKS: 50

**ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED**

Q. NO. 2. Give the short answer of the following questions. [4 x 5 = 20]

- I. Describe the mechanism of  $S_N1$  reaction. Give one example?
- II. Describe the stereochemical evidences for  $S_N1$  reaction.
- III. Why 2-iodobutane is more reactive than 2-bromobutane in  $S_N1$  reaction?
- IV. What is Hofmann rule? Give one example.
- V. What is neighboring group participation? Give one example.

Q. NO. 3.

- i. How the deuterium isotope effects can be used for determination of reaction mechanism? [5]
- II. How the solvent play important role in determining the mechanism and rate of nucleophilic substitution reactions? [5]
- III. Describe the nucleophilic substitution reactions of allylic substrate. Give examples. [5]

Q. NO. 4.

Complete the following reactions and draw the mechanisms for all steps involved.

In case if there is possibility of more than one product, indicate which product is major?

[3 x 5 = 15]

