UNIVERSITY OF THE PUNJAB

B.S. 4 Years Program :Seventh Semester – 2020

Paper: Organic Chemistry (Sp. Theory-I)

Course Code: CHEM-409 Part – I (Compulsory) Time: 15Min. Marks: 10

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Signature of Supdt.:

Attempt this Paper on this Question Sheet only.
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. (10x1=10)

I) Among the following which is aprotic polar solvent?

a) Ethanol

b) Dimethyl sulfoxide

c) Water

d) n-Hexane

II) Among the following which is the \most reactive in S_N1 reaction?

a) *t*-Butyl fluoride

b) *t*-Butyl chloride

c) *t*-Butyl bromide

d) *t*-Butyl iodide

III) Among the following which is the best nucleophile?

a) CH_3OH

b) HO^-

c) CH_3COO^-

d) CH_3S^-

IV) In which solvent rate of S_N1 reaction will be highest?

a) Water

b) Diethyl ether

c) n-Hexane

d) Chloroform

V) The major product of elimination reaction of 2-chloropentane with hydroxide is

a) 1-Pentene

b) 2-Pentene

c) 2-Methyl-2-butene

d) 1-Methyl-2-butene

VI) Among the following which condition is best for S_N2 reaction?

a) High concentration of a good nucleophile

b) Low concentration of a good nucleophile

c) High concentration of a poor nucleophile

d) Low concentration of a poor nucleophile

VII) Among the following which is most reactive in E1 elimination reaction?

a) Alkyl fluoride

b) Alkyl chloride

c) Alkyl bromide

d) Alkyl iodide

VIII) E2 reaction is a

a) First order reaction

b) Second order reaction

c) Third order reaction

d) Fourth order reaction

IX) Aryl halides and Vinylic halides

a) Do not undergo S_N1 reactions but undergo S_N2 reactions

b) Do not undergo S_N2 reactions but undergo S_N1 reactions

c) Do not undergo either S_N1 or S_N2 reactions

d) Undergo both S_N1 and S_N2 reactions

X) When tertiary amine oxide containing a β-hydrogen is heated at about 200°C, elimination occurs, resulting in the formation of

a) An alkane

b) An alkene

c) An alkyne

d) A cycloalkane

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B.S. 4 Years Program :Seventh Semester – 2020

Roll No. .....

Paper: Organic Chemistry (Sp. Theory-I) **Time: 2 Hrs. 45 Min. Marks: 50**

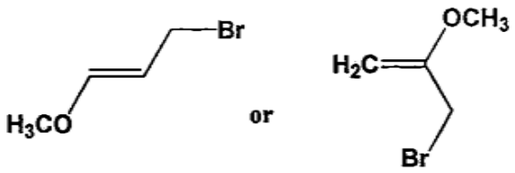
Course Code: CHEM-409 **Part – II**

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2. Give short answers of the following: (5x4=20)

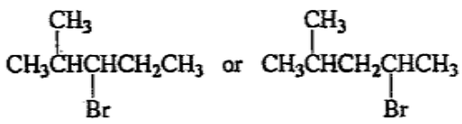
I) Which is a better nucleophile in an aqueous solution, $\overline{RO}$ or $\overline{RS}$? Justify your answer.

II) Which alkyl halide would you expect to be more reactive in an S_N1 solvolysis reaction? Justify your answer.



III) In which solvent, methanol or dimethyl sulfoxide, acetate ion is more reactive as a nucleophile?

IV) Which alkyl halide would you expect to be more reactive in an E2 reaction? Give reason.



V) Which isomer reacts more rapidly in an E2 reaction, *cis*-1-bromo-4-tert-butylcyclohexane or *trans*-1-bromo-4-tert-butylcyclohexane? Justify your choice.

Q.3. Answers the following questions.

I) What product would be formed from the S_N2 reaction of the following? Draw complete mechanism for both reactions. [10]

a. (*R*)-2-bromobutane and hydroxide ion

b. Methyl iodide (excess) and ethylamine

II) What is deuterium kinetic isotope effect? How it can be used for determining reaction mechanism? [6]

III) Describe the synthetic applications of pyrolytic elimination reactions. [8]

IV) Explain the chemical kinetics of E1cB elimination mechanisms. [6]