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**University Examinations 2015/2016**

FOURTH YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE CHEMISTRY

**SCH 2402: STEREOCHEMISTRY REACTION MECHANISMS**

**DATE: NOVEMBER, 2015 TIME:** $2$**HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions.*

**QUESTION ONE – (30 MARKS)**

1. Using dashed-wedge line structure, draw two ways representation of 2-butanol.

(4 Marks)

1. How can one know if the molecules drawn in 1 (a) are homomeric different?

 (4 Marks)

1. (i) What is a conformation? (4 Marks)

(ii) Show conformation described in c (i) using ethane molecule. (4 Marks)

1. (i) Explain the main difference between achiral and chiral. (4 Marks)

(ii) Describe how one can test chirality of a compound. Show your description with 1, 2 dichlolocyclohexane. (6 Marks)

(e) Explain what happen on the exchange of a pair of substitutes twice around a chiral compound Bromocyclohexene. (4 Marks)

**QUESTION TWO (20 MARKS)**

1. Explain with reason precautions needed in manipulation of fisher projections. (5 Marks)
2. (i) If you are presented with a compound working n number of chiral carbon atoms, explain how you can predict the maximum number of possible stereoisomers.(4 Marks)

(ii) Using your suggested way of prediction in b(i) above show the number of stereoisomers in 2-chloro-but-2-ene. (4 Marks)

1. (i) What are diastereomers? (2 Marks)

(ii) Tartaric acid is a naturally occurring dicarboxylic acid. State the number of possible stereocenters and discuss their chirality. (5 Marks)

**QUESTION THREE (20 MARKS)**

1. (i) Give the meaning of optical activity. (2 Marks)

(ii) Using the (R) – lactic acid, (s)-lactic acid and (s) -1-phenylethylemine, explain how separations of enantiomers of (R, S) – lactic acid mixture can be done. (8 Marks)

1. Given that (S) (-) limoneve ($∝$) = 940 and (R) – (+) limoneve $∝$ = +115.00. Calculate its enantiomenic excess (optical purity) (10 Marks)

**QUESTION FOUR (20 MARKS)**

1. Explain the main differences between ionic or free radical reaction and pecyclic reactions. (4 Marks)
2. Using 1,3,5-hexabutene and 2-cyclobutene to explain electrocyclic ring closure and ring opening. (5 Marks)
3. Use molecular orbital of 1,3-butadiene .
4. Draw a diagram to show the orbital arrangements at;
5. ground state (3 Marks)
6. Excited state (2 Marks)
7. Explain the meaning of NOMO and ZUMO-orbitals (2 Marks)
8. Using cyclization of 2E, 4E-2, 4 hexadiene under heat and photochemical light, explain ;
9. Corotatory (2 Marks)
10. Disrotatory (2 Marks)