

MSC DEGREE END SEMESTER EXAMINATIONS – NOVEMBER 2015

SEMESTER- 1, SUBJECT: CHEMISTRY / PHARMACEUTICAL CHEMISTRY

COURSE: P1CHET02 / P1CPHT02 - STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY

(Regular, Supplementary / Improvement)

Time: Three Hours

Max. Marks: 75

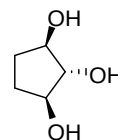
Section A

(Answer any 10 questions. Each question carries 2 Marks)

1. Explain Hammett equation for the quantitative relationships between structure and activity.
2. Describe the kinetic versus thermodynamic control of product formation in enolate chemistry with examples.
3. Write a note on the secondary kinetic isotope effect with examples
4. Give an example with mechanism for photo Fries rearrangement.
5. How many planes of symmetry does each of the following molecules possess?

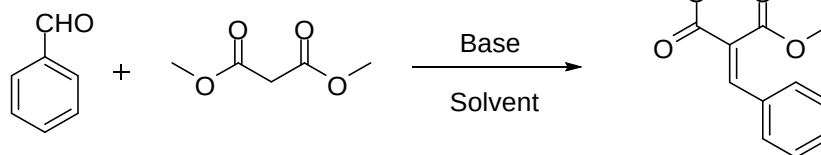


b)

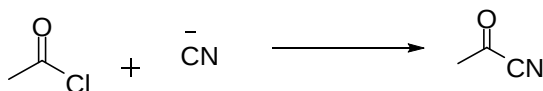


6. Use curved arrows to explain the mechanism

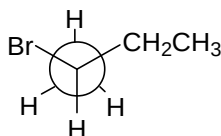
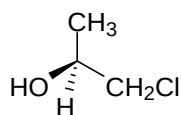
a)



b)

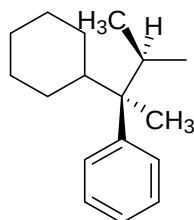


7. Why is it relatively easy to deprotonate cyclopentadiene? Explain.
8. Assign R or S designations for each of the following compounds.



9. Write a short note on carbon nanotubes and fullerenes.
10. Explain B_{AC}2 mechanism of ester hydrolysis.

11. What does a diastereomer mean? Does the following molecule have a diastereomer? If yes, draw the structure.



12. Draw the stable conformations of *cis* and *trans-tert*-butyl cyclohexanols. Which one is esterified easily? Why?

13. State Saytzeff rule with suitable example.

(2 x 10 = 20)

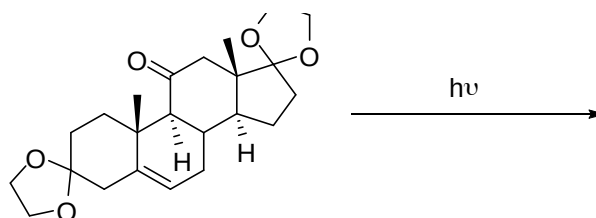
Section B

(Answer 5 questions by attempting not more than 3 questions from each bunch.

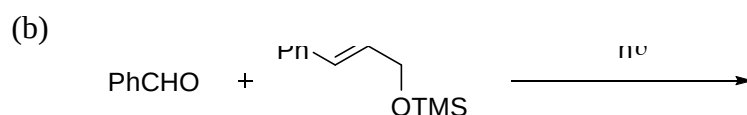
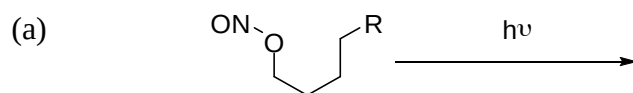
Each question carries 5 marks each)

Bunch – 1 (Problem type)

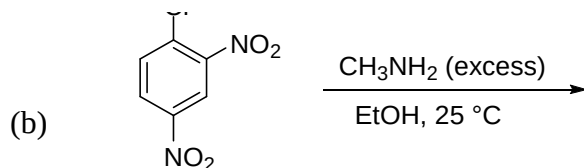
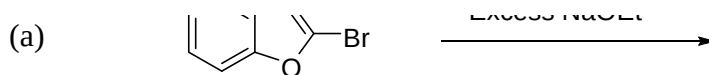
14. Explain Norrish Type II reaction with mechanism. Predict the product in following case based on Norrish Type II mechanism:



15. Predict the product(s) and explain the mechanism of the following reactions:



16. Complete the following reactions and explain the mechanisms:



17. Explain with the help of an example, a rearrangement proceeding through a 1, 4 diradical?

Bunch – 2 (Short essay type)

18. Explain axial, planar and helical chirality with examples.

19. Use suitable examples to explain anti -and homo-aromatic systems. How can NMR be used as a tool for aromaticity?

20. Define stereoisomerism based on symmetry and energy with suitable examples.

21. Explain the conformation and reactivity in semipinacolic deamination and pyrolytic elimination with examples. (5 × 5 = 25)

Section C

(Answer any 2 questions. Each question carries 15 marks)

22. Explain Cram's Hammett Principle and the chemical consequence of conformational equilibrium. Explain the application in stereoselective and regioselective reactions.

23. Explain Hard and soft acids and bases with examples. Write a note on HSAB principle and its applications.

24. Explain the terms topicity and prostereoisomerism. Differentiate the methylene protons (CH₂) in propane, ethanol, butan-2-ol based on topicity. How can one distinguish enantiotopic and diastereotopic ligands using NMR techniques?

25. Give a detailed account of the conformational analysis and stereochemistry of decalins and adamantane. (15 × 2 = 30)
