

M.Sc. DEGREE (CSS) EXAMINATION, MARCH 2013**First Semester**

Faculty of Science

Branch : Chemistry

**AN 1C 02 / AP 1C 02 / CH 1C 02 / PH 1C 02 / PO H1C 02—STRUCTURAL AND
MOLECULAR ORGANIC CHEMISTRY**

(Common to All Branches of Chemistry)

[2012 Admissions]

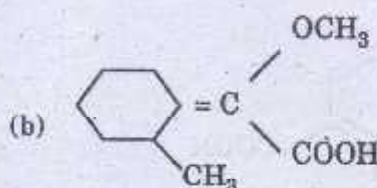
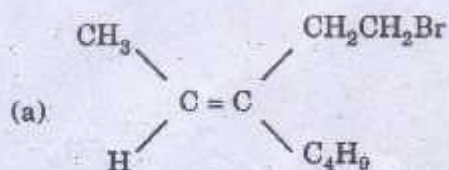
Time : Three Hours

Maximum Weight : 30

Section A

*Answer any ten questions.
Each questions carries a weight of 1.*

1. Draw the line diagram of hept-4, 6-dien-2-yne. Label each carbon and predict the hybridisation and geometry of each carbon centre.
2. Which is more acidic and why—Chloroacetic acid and acetic acid.
3. Explain aromatic character of cyclopentadienyl anion using Hückel rule.
4. How NMR is used as a tool for aromaticity?
5. What is primary kinetic isotopic effect?
6. Write two examples for Hard and Soft acids and bases.
7. Explain the mechanism of ester hydrolysis by $B_{AC}2$ mechanism.
8. Give two methods for the determination of geometrical isomers. Explain.
9. Assign E, Z nomenclature of following :—



10. What is atropisomerism?

Turn over

11. What is the significance of Curtin Hammett principle ?
12. Draw the conformers of *cis* 1, 4-di-*t*-butyl cyclohexane. Explain their stabilities.
13. Draw and explain the stereochemical relation for the formation of 2-butene from 2-bromo-butane through E_2 mechanism.

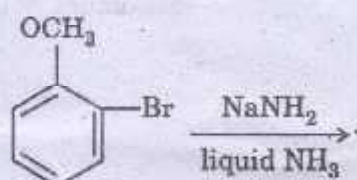
(10 × 1 = 10)

Section B

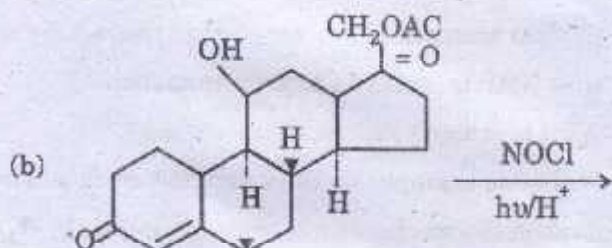
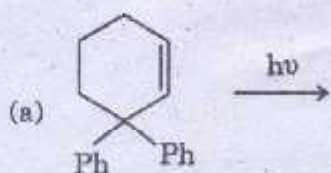
Answer five questions by attempting not more than three questions from each bunch.
Each questions carries a weight of 2.

BUNCH I (Problem Type)

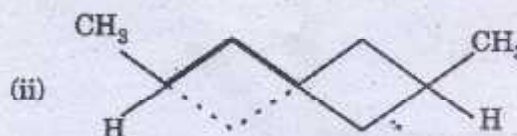
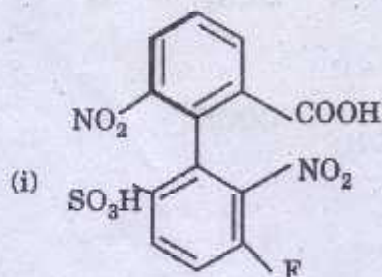
14. Predicts the products and explain the mechanism of following :—



15. Complete the following reaction.

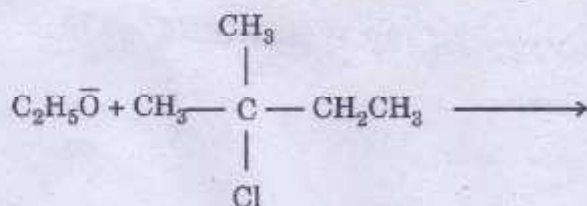


16. (a) Assign R or S configuration of following :—



- (b) Draw the R, S configuration of trans-Cyclo-octane.

17. Predicts the products and explain the mechanism of the following :—



BUNCH II (Short Essay Type)

18. Write a note on Wheland intermediate. Give the evidence for its formation.
19. What is Barton Reaction. Discuss its mechanism?
20. What is Enantiotopic and diastereotopic ligands? How NMR used to distinct it?
21. Discuss the stereochemistry and stability of *cis* and *trans* 1, 2-dimethyl cyclohexane.

(5 × 2 = 10)

Section C

Answer any two questions.
Each question carries a weight of 5.

22. (a) Explain aromaticity using HMO theory.
(b) Define the terms aromatic, anti-aromatic and non-aromatic using suitable examples.
(c) Briefly explain the $\text{S}_{\text{N}}1$ & $\text{S}_{\text{N}}2$ mechanism.
23. (a) Briefly comments on Hammett equation and linear free energy relationship.
(b) Give a detailed account of $\text{A}_{\text{AC}}2$ and $\text{B}_{\text{AL}}1$ mechanism of ester hydrolysis with experimental evidences.
24. Explain with suitable examples to the stereochemistry of C, N, S based chiral centres.
25. Illustrate with suitable examples to the conformational analysis of Fused and bridged bicyclic system.

(2 × 5 = 10)