F 5539 (Pages : 4) Reg. No.....

Name.....

M.Sc. DEGREE EXAMINATION, FEBRUARY 2016

First Semester

Faculty of Science

Branch : Chemistry

AN IC 02 / AP IC 02 / CH IC 02 / PH IC 02 / POH IC 02—STRUCTURAL AND MOLECULAR ORGANIC CHEMISTRY

(Common to all branches of Chemistry)

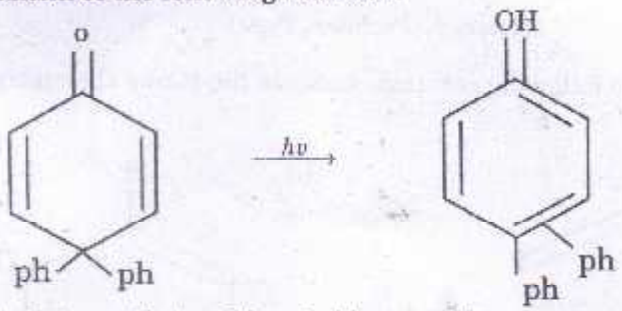
[2012 Admission onwards]

Time : Three Hours Maximum Weight : 30

Section A

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

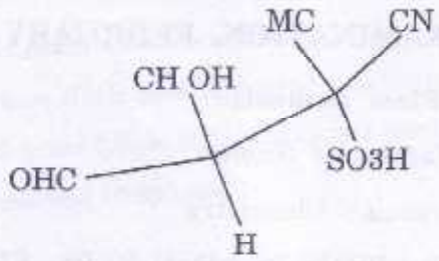
1. Cyclo-octatetraene is non-aromatic. But when it is reduced by alkali metals it becomes aromatic. How ?
2. Explain inductive effect with suitable examples.
3. Explain why a nitrogroup in the para position is more effective in increasing the acidity of phenol that of benzoic acid.
4. Explain the mechanism of photo-trees rearrangement.
5. Give the mechanism of the following reaction :



6. Explain Kinetic isotope effects with suitable example.
7. What is meant by (a) Chirality ; (b) diastereomers.
8. Draw the confirmation of cyclohexane derivatives.

Turn over

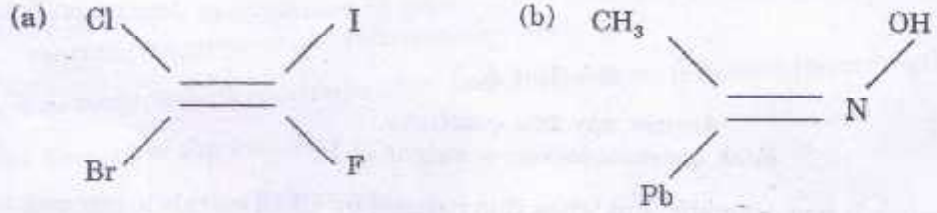
9. Assign R/S configuration for the following :—



10. What is meant by Top city ? Explain with example.

11. Explain Curtin Hammelt principle.

12. Name the following compounds as E, Z or Syn or anti.



13. A solution of optically active 1-phenyl ethanol, C_6H_5 CH(OH) – CH_3 in an aqueous solvent containing H^+ slowly recemizes. Account.

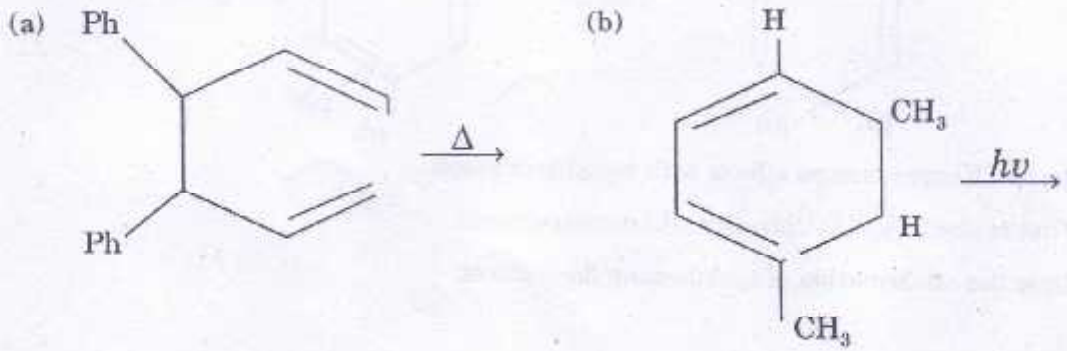
(10 × 1 = 10)

Section B

Answer any **five** *questions by attempting not more than 3 questions from each bunch. Each question carries a weight of* 2.

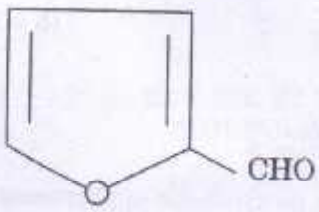
Bunch 1 (Problem Type)

14. Predict the products in the following reaction. Indicate the stereo chemistry if any :



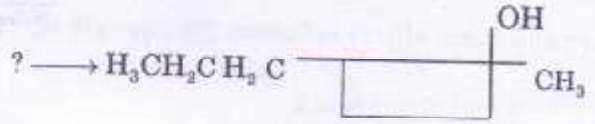
15. Predict the product and outline the mechanism :

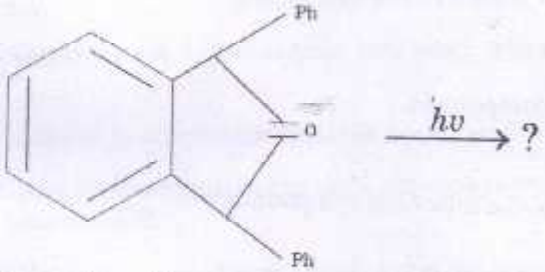
(a) $C_6H_5CHO + CH_2(COOEt)_2 \xrightarrow{NaH} ?$

(b) 

$+ (CH_3 - CO)O \xrightarrow{NaoMe} ?$

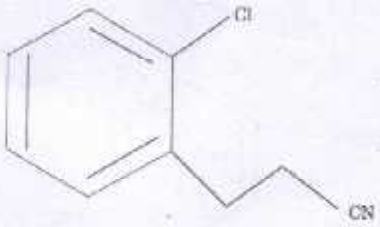
16. Complete the following reaction and explain the mechanisms :—

(a) 

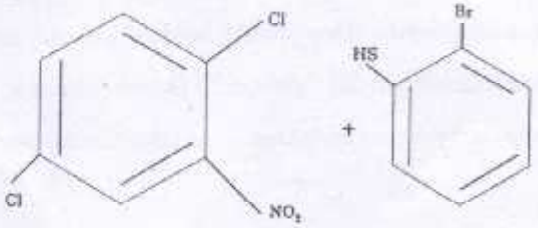
(b) 

$\xrightarrow{h\nu} ?$

17. Predict the product(s) and explain the mechanism :

(a) 

$\xrightarrow[NH_3(Cl)]{NaNH_2} ?$

(b) 

$\xrightarrow{base} ?$

Bunch 2 (Short Essay Type)

18. Explain Hofmann elimination with examples.

19. Explain with example how NMR used to distinguish enantiotopic / diascore otopic ligands.

20. What are hard and soft acids ? How HSAB principle used to distinguish them ?

21. Write note on Fullerenes and Graphene.

(5 × 2 = 10 marks)

Section C

Answer any **two** *questions.*
Each question carries a weightage 5.

22. (a) Explain the mechanism of Boston reaction. What are its synthetic applications ?

    (b) Outline the mechanism of photo-fries rearrangement. How will you show that the rearrangement proceeds as intramolecularly ?

23. How do mesomeric, hyperconjugative and steric effects influence the strength of organic bases.

24. Give account of the following :—

    (a) Chirality due to helicity.

    (b) Prosterio-isomerism.

    (c) Configuration of Cyclophanic compounds.

    (d) Axial chirality.

25. Illustrate the conformational studies of the following compounds :—

    (a) Congressane.

    (b) Sucrose.

    (c) Adamantane.

(2 × 5 = 10 marks)