

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2016

(CUCBCSS-UG)

Core Course—Chemistry

CHE 4B 04—ORGANIC CHEMISTRY—I

Time : Three Hours

Maximum : 80 Marks

Section A (One Word)

Answer all questions.

Each question carries 1 mark.

1. Propanoic acid and Methylmethanoate are _____ isomers.
2. Two adjacent members in a homologues series differ by a _____ group.
3. Diethyl ether and Methylpropyl ether are _____.
4. Out of Cis-2-butene and Trans-2-butene, the isomer having zero dipole moment is _____.
5. Most stable conformation of Ethylene glycol is _____.
6. Free radicals are generated by _____ of carbon- carbon sigma bond.
7. When 2-Bromo-3-methyl butane is warmed with alcoholic KOH, the major product formed is _____.
8. The final product formed when an alkene undergoes oxymercuration followed by hydrolysis is _____.
9. The product obtained when benzene is first sulphonated and then chlorinated is _____.
10. The structure of 9-Bromoanthracene is _____.

(10 × 1 = 10 marks)

Section B (Short Answers)

Answer any ten questions.

Each question carries 2 marks.

11. Draw the Sawhorse projection formulae for staggered and eclipsed forms of ethane.
12. Draw the structure of stereo isomers of the dicarboxylic acid having the molecular formula $C_4H_4O_4$.
13. Illustrate Keto-enol tautomerism using one example.
14. Draw any two stable conformations of Methylcyclohexane.
15. Draw the structures of enantiomers of Lactic acid.
16. Out of 1-Butyne and 2-Butyne, which is acidic. Give one reaction to show their acidity.
17. Which is more acidic 2-Chlorobutanoic acid or 3-Chlorobutanoic acid. Justify your answer.
18. Which is having a large heat of hydrogenation, Cis-2-butene or Trans-2-butene ? Justify.

Turn over

19. Discuss the Haworth synthesis of Naphthalene.
20. How does 2-Butyne react- with (a) H_2 /Lindlar catalyst and (b) Na/Liquid ammonia
21. Give two examples each for ortho/para and meta directing groups.
22. What are the products of sulphonation of naphthalene at different temperatures ?

(10 × 2 = 20 marks)

Section C (Paragraphs)*Answer any five questions.**Each question carries 6 marks.*

23. Discuss with suitable example the E and Z system of nomenclature of geometrical isomers.
24. What are Carbocations ? Discuss the stability of carbocations.
25. Describe how resonance energy of benzene can be calculated from heat of hydrogenation.
26. Discuss the stereochemistry of addition of halogens to carbon-carbon double bond.
27. Write a short note on ozonolysis. Find the structures of alkenes that yield on ozonolysis (i) only acetone (ii) only acetaldehyde.
28. Discuss the mechanism of addition of hydrogen halides to an alkene.
29. Give the mechanism of nitration of benzene.
30. State Huckel's ($4n + 2$) rule. How will you explain aromatic character of Furan, Indole and Annulene by Huckel's rule ?

(5 × 6 = 30 marks)

Section D (Essays)*Answer any two questions.**Each question carries 10 marks.*

31. (a) Discuss the optical isomerism in tartaric acid.
(b) Give any *two* methods for the resolution of a racemic mixture.
32. (a) Write a note on Baeyer's Strain Theory. What are its limitations ?
(b) Describe the different conformations of n-butane with energy diagram.
33. (a) What is hyperconjugative effect ? How it can be used to compare stability of Toluene and Ethyl benzene ?
(b) What is Mesomeric effect ? Give two examples each for - M and + M groups. How it can be used to compare the basicity of aniline and paranitroaniline ?
34. (a) Discuss the mechanism of dehydration of alcohols.
(b) Write a short note on 1, 4 addition of 1, 3-butadiene and Diels Alder reaction.

(5 + 5 = 10 marks)

(5 + 5 = 10 marks)

(5 + 5 = 10 marks)

(5 + 5 = 10 marks)

(2 × 10 = 20 marks)