D 41961 (Pages : 2) Name.....

Reg. No.....

FOURTH SEMESTER B.Sc. DEGREE EXAMINATION, APRIL 2018

(CUCBCSS–UG)

Chemistry

CHE 4B 04—ORGANIC CHEMISTRY—I

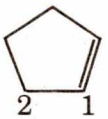
Time : Three Hours Maximum : 80 Marks

Section A

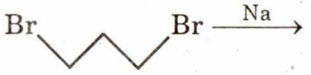
(Fill in the blanks and one word type questions.)

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Isomers formed by rotation about single bonds are called ————.
2. What are the hybridizations of carbons 1 and 2 respectively in the following structure ?



3. The temporary displacement of π electrons to one of the bonded atoms is called ————.
4. Heterolytic fission of C-C bond generates ————.
5. The catalyst used in Friedal-Craft's alkylation is ————.
6. Give an example of a carcinogenic polycyclic arene.
7. The electrophile in aromatic nitration reaction is ————.
8. Baeyer's reagent is an alkaline solution of ————.
9. Write the product formed in the reaction :



10. Write the structure of an anti-aromatic compound.

(10 × 1 = 10 marks)

Section B (Short Answer Quesions)

Answer any **ten** *questions.*
Each question carries 2 *marks.*

11. Define metamerism with an example.
12. What is meant by enantiomeric excess ? Calculate the enantiomeric excess of a chiral substance with 70 % of one enantiomer and 30 % of the other.
13. Write the R and S configurations of lactic acid.
14. Draw the most stable conformation of cyclohexane showing all the axial and equatorial hydrogens.

Turn over

15. Which is a stronger acid-formic acid or acetic acid ? Explain why ?
16. Why is 2-Butene more stable than I-Butene?
17. What is meant by steric effect in organic reactions ?
18. Write a note on Lindlar's Catalyst and its application in organic synthesis.
19. State Saytzeff's rule with an example.
20. Why are 1-alkynes acidic ? What is the product formed when acetylene is treated with lithium ?
21. What happens when toluene is treated with alkaline $KMnO_4$? Why is an alkaline condition preferred in this reaction ?
22. Explain Diels-Alder reaction using a suitable example.

(10 × 2 = 20 marks)

Section C (Short Essay or Paragraph Questions)

Answer any **five** *questions.*
Each question carries 6 *marks.*

23. Explain the isomerism exhibited by maleic and fumaric acids.
24. Write down the stereoisomers of tartaric acid. How many of them are optically active ? Give reasons for your answer.
25. Give an account on mesomeric effect and its applications.
26. Discuss the structure, hybridization and stability of carbanions.
27. Describe the mechanism ofMarkownikov addition in alkenes.
28. Write a note on cis hydroxylation of alkenes mentioning the reagents used.
29. Compare the electrophilc addition rates of alkenes and alkynes.
30. How does Huckel's rule explain the aromaticity of cyclopropenyl cation and annulenes ?

(5 × 6 = 30 marks)

Section D (Essay Type Questions)

Answer any **two** *questions.*
Each question carries 10 *marks.*

31. (a) Discuss the conformational analysis of ethane.
    (b) Explain the optical isomerism in biphenyls.
32. (a) Compare the electron densities in benzene, toluene and nitrobenzene.
    (b) Differentiate between singlet and triplet carbenes.
33. Using suitable examples discuss the following in detail:
    (a) Oxymercuration of alkynes.
    (b) Ozonolysis of alkenes.
    (c) Stereochemistry of the dehalogenation of dihalides.
34. (a) Explain the mechanism of bromination and sulphonation reactions of benzene.
    (b) Discuss the Haworth synthesis of napthalene.

(2 × 10 = 20 marks)