24U321 (Pages: 2) Name : .....

Reg. No : .....

THIRD SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(FYUGP)

CC24UCHE3CJ202 - ORGANIC CHEMISTRY - I

(B.Sc. Chemistry - Major Course)

(2024 Admission - Regular)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. What is tropylium ion? Explain its aromaticity on the basis of Hückel's rule. [Level:2] [CO2]

2. Give the expression for the Kb of a 1° amine R-NH_2. Mention the relationships for an organic base i) between its strength and its Kb value and ii) between its strength and its pKa value. [Level:2] [CO2]

3. Write the IUPAC names of : i) Neopentane ii) sec-Butyl alcohol iii) Ethylene dichloride. [Level:1] [CO1]

4. What is meant by steric effect? [Level:3] [CO2]

5. Explain the term field effect as applied operative in organic molecular species. [Level:1] [CO2]

6. Which has a higher pKa value — ethanoic acid or propanoic acid? Why? [Level:3] [CO2]

7. Draw the structure of (E)-1-bromo-2-methylbut-2-ene. [Level:3] [CO3]

8. Which among the cycloalkane rings has the maximum calculated value of angle strain? [Level:2] [CO3]

9. Comment on the mechanism by which differential migration of sample components is effected in adsorption column chromatography. [Level:2] [CO4]

10. Comment on the stationary and mobile phases in paper chromatography. [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. Explain the formation of the double bond in ethylene (ethene) on the basis of the molecular orbital theory principles. [Level:2] [CO1]

12. Explain the shape of the CH_4 molecule on the basis of the concept of hybridization. [Level:3] [CO1]

13. What is Cope rearrangement? Give two examples with equations. Comment on the mechanism of such a reaction. [Level:2] [CO2]

14. Explain how cyclisation reactions can be of use in distinguishing the geometrical isomers of a compound. [Level:2] [CO3]

15. Describe geometrical isomerism taking but-2-ene. [Level:3] [CO3]

16. Explain the term ring flipping in respect of the conformational isomerism in cyclohexane. [Level:3] [CO3]

17. Distinguish between the terms conformation and configuration. [Level:2] [CO3]

18. The conformers of ethane cannot be isolated. Why? [Level:3] [CO3]

(Ceiling: 36 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

19. Discuss the factors that affect the stability of different carbanions. [Level:3] [CO2]

20. What is meant by solvent extraction? Discuss the principle of the method. Explain briefly two methods of solvent extraction commonly used in the purification of organic compounds. [Level:2] [CO4]

(1 × 10 = 10 Marks)

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