24. Examine the neighbouring group mechanism of participation by σ, π, and n electrons. (K4)

25. Explain the effect of substrate structure, leaving group and attacking nucleophile in aromatic nucleophilic substitution. (K5)

SARASWATHI NARAYANAN COLLEGE
(Autonomous Institution Affiliated to Madurai Kamaraj University)
(Reaccredited with Grade 'B' by NAAC)
Madurai – 625 022.
M.Sc., Chemistry –Summative Examinations

Code: **LPCHCT11** **Semester: I**

ORGANIC CHEMISTRY-I

Duration: 3 Hrs. **Max: 75 Marks**

SECTION – A **5 x 1 = 5**

I. Answer ALL questions. Choose the correct answer. (K2 Level)

1. The order of decreasing stability of the following cations is

(I) $CH_3C^+HCH_3$ (II) $CH_3C^+HOCH_3$ (III) $CH_3C^+HCOCH_3$

a) III > II > I b) I > II > III

c) II > I > III d) I > III > II

2. Which of the following is a characteristic of an aromatic compound?

a) Cyclic b) Planar

c) (4n+2) π electrons d) All of the above

3. Hammond postulate deals with

a) geometry b) shape

c) electron pairs d) all of the these

4. How will you arrange the following in the decreasing order of leaving the group in the nucleophilic substitution reaction?

a) $Cl^- > Br^- > CH_3COO^- > HO^- > H^-$

b) $Cl^- > Br^- > HO^- > H^- > CH_3COO^-$

c) H– >Cl– > HO– > Br– > CH3COO_

d). $H^- > Cl^- > HO^- > Br^- > CH_3COO^-$

5. The number of π electrons present in benzyne intermediate is

a) 6 b) 8

c) 10 d) 12

II. Fill in the blanks (K1 Level) 5 x 1 = 5

6. Number of electrons in Carbene intermediate is ----------
7. Write any one aromatic annulene----------
8. Thermodynamically controlled products have -------- amount energy than kinetic products.
9. The step in S_N1 reaction that is a slow rate-determining step is formation ----------
10. Nitration of benzene is called ---------- substitution reaction.

SECTION-B 5 x 2 = 10

Answer ALL the questions.

11. Define ambident nucleophiles with an example.(K2)
12. What is meant by Craig's rule? (K2)
13. How to find out rate of the reaction by isotopic labelling? (K3)
14. Compare the inductive effect with field effect. (K4)
15. The electrophilic substitution occurs in antharancene at 9 and10th position justify your answer? **(K5)**

SECTION-C 5 x 5 = 25

Answer all questions choosing either (a) or (b)in about 2 pages each.

16. a) Write the synthesis, geometry, stability of carbene. (K1)

(Or)

b) Describe the synthesis, geometry, stability of carbocation.

17. a) Explain the rules followed inhomoaromaticity and antiaromaticity. (K2)

(Or)

b) Illustrate the aromaticity characters of Fulvene – Azulene – Tropolones.

18. a) Summarize the Primary and Secondary Kinetic Isotope effect with examples. (K3)

(Or)

b) Draw and Explain Reaction Profile diagram with Kinetic vs Thermodynamic control of product.

19. a) List the nucleophilic substitution reaction at allylic, trigonal and vinylic carbon. (K4)

(Or)

b) Discuss the effect of leaving group and solvents in S_E2 reaction.

20. a) Classify the selectivity relationship – orientation in di-substituted benzene. (K5)

(Or)

b) Illustrate the Benzyne mechanism with suitable reaction.

SECTION-D 3 x 10 = 30

Answer any THREE questions in about 4 pages each.

21. Discuss the quantitative treatment of the effect of structure on reactivity using LFER. (K1)
22. List out two compounds or ions for each ring size with aromatic character in five, six, seven and eight member rings. (K2)
23. List out the various Methods of determining Reaction Mechanism. (K3)