LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIFTH SEMESTER – **NOVEMBER 2014**

CH 5510 - ORGANO-NITROGEN COMPOUNDS & STEREOCHEMISTRY

Date : 30/10/2014 Dept. No. Max. : 100 Marks

Time : 09:00-12:00

PART – A

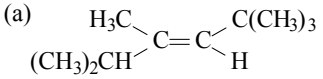
Answer ALL the questions. Each question carries two marks: (10 x 2 = 20 marks)

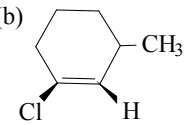
1. Arrange the following in the increasing order of base strength in aqueous medium and give reason for the same. secondary amine, ammonia, tertiary amine and primary amine
2. How is *m*-dinitrobenzene synthesized from benzene?
3. What are alkaloids? Give suitable example.
4. State isoprene rule?
5. Which of the following isomers of 1,3-dimethylcyclohexane is most stable isomer? Give reason.
6. Fumaric acid is more stable than maleic acid. Give reason.
7. Give the conditions for optical activity.
8. Define the term atropisomerism?
9. What is Fries rearrangement?
10. Give the mechanism of Benzilic acid rearrangement.

PART-B

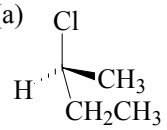
Answer EIGHT questions. Each question carries five marks. (8 x 5 = 40 marks)

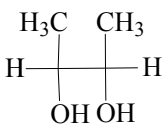
11. How is *p*-dinitrobenzene prepared from benzene?
12. Discuss the basicities of different order of amines in gas phase and in aqueous medium.
13. Explain the general method of elucidation of alkaloids.
14. Account the reactivity of pyrrole and pyridine toward nucleophilic substitution reaction.
15. Elaborate on the structure and functions of nicotine.
16. Draw the different conformations of cyclohexane explain their stabilities using a potential energy diagram.
17. Assign E/Z notation and predict the IUPAC name for the following:

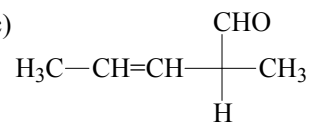
(a) 

(b) 

18. What is meant by resolution? How is a racemic mixture resolved by chemical method?
19. Explain optical activity in allenes.
20. Using Cahn-Ingold-Prelog rules assign R/S notation for the following:

(a) 

(b) 

(c) 

21. How are molecular rearrangements classified? Give an example for each.
22. Give the mechanism and stereochemical aspects of Beckmann rearrangement.

PART-C

Answer any FOUR questions. Each question carries ten marks: (4 x 10 = 40 marks)

23. (a) Effect the following conversions
    (i) nitrobenzene to phenol (ii) aniline to 1,3,5-tribromobenzene.
    (b) Why nitromethane shows acidic character? (4 + 4 + 2)
24. (a) Predict the product and the give the reaction of $C_6H_5N_2^+Cl^-$ with phenol and 2-naphthol.
    (b) Give the synthesis of isoquinoline by ring closure reaction. (6 + 4)
25. (a) Elucidate the structure of camphor.
    (b) Explain the general method of elucidation of terpenoids. (5 + 5)
26. (a) Discuss the conformational analysis of n-butane.
    (b) Give any two reactions two distinguish *cis-trans* isomers. (6 + 4)
27. (a) Explain asymmetric synthesis and Walden inversion with suitable examples.
    (b) Explain the D and L notation of optical isomers. (6 + 4)
28. Explain the following with mechanism.
    (a) Synthesis of aniline by Hofmman degradation.
    (b) Pinacole to pinacolone rearrangement. (5 + 5)

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