



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – CHEMISTRY

SECOND SEMESTER – APRIL 2017

CH 2819- ORGANIC REACTION MECHANISMS & HETEROCYCLICS

Date: 06-05-2017
Time: 09:00-12:00

Dept. No.

Max. : 100 Marks

Part-A

Answer ALL questions.

(10 x 2= 20)

- Which of the following species will exhibit aromatic character?
a) cycloheptatrienyl anion b) cyclooctatetraene c) [14]Annulene
- Write Grunwald-Winstein relationship and mention the terms involved in it.
- Define isoracemisation process with an example.
- Between diphenylmethyl bromide and t-butyl bromide which will undergo solvolysis very readily and why?
- Give the mechanism of Sommelet-Hauser rearrangement.
- How is carbene generated? Mention its stability with the substituents.
- Compare E1 and E2 reactions.
- What type of addition reaction takes place when HBr reacts with 2-pentene in presence of benzoperoxide?
- Draw the structure of phthalocyanine.
- How is uracil synthesized?

Part-B

Answer any EIGHT questions.

(8 x 5= 40)

- Methylation of toluene at 0 °C gives a mixture of *o*- & *p*-xylene while at 80 °C it gives mainly *m*-xylene. Justify.
- Explain benzyne mechanism with an example.
- 'The effect of attacking nucleophile in S_N1 reaction kinetics is negligible.' Why?
- Explain the reaction mechanism of nitration of benzene with evidences.
- Discuss the effect of solvent in substitution reactions.
- Explain Bucherer reaction with example.
- Explain E1-E2-E1cB spectrum
- Describe any one method each of direct and indirect method of addition of water molecule to C-C double bond.
- Explain free radical addition reaction with suitable example. How is it different from free radical polymerization?

20. Explain Fischer indole synthesis.
21. Discuss the nucleophilic substitution reactions of pyridine.
22. Compare the structure of chroman and chromone for synthesis and biological properties.

Part-C

Answer any FOUR questions.

(4 x 10= 40)

- 23 a. Explain bimolecular aliphatic electrophilic substitution(S_E2) reaction with suitable example.
 - b. Acetanilide undergoes nitration by Ac_2O-HNO_3 predominantly at the sterically hindered ortho position. Explain. (5+5)
- 24 a. Explain the mechanism of von Richter rearrangement with evidences.
 - b. Give the mechanism for Wohl-Ziegler bromination reaction. (5+5)
25. Explain the following with evidences:
 - a) single electron transfer (SET) mechanism
 - b) ion-pair mechanism (5+5)
- 26 a. How does $E1$ reaction compete with S_N1 reaction? Explain with suitable examples.
 - b. Discuss the 1,2- and 1,4-nucleophilic addition reactions in conjugated alkenes? Give suitable examples. (5)
- 27 a. Describe catalytic hydrogenation reactions of alkenes with suitable examples. (4)
 - b. Why are Heterocyclic compounds less aromatic than benzene derivatives? Mention the heterocyclic compounds that undergo addition reactions. (4+2)
- 28 a. Explain a synthetic route for the following compounds. (4+2)
 - (a) carbazole (b) Luciferin.
 - b. What are the biological importances of pyrimidine and chromone derivatives? (4)

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