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ICH 402

I Semester M.Sc. Degree Examination, November/December 2019

INDUSTRIAL CHEMISTRY

Organic Chemistry - I

Time : 3 Hours]

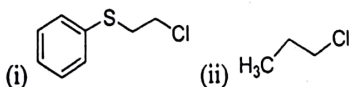
[Max. Marks : 70

PART - A

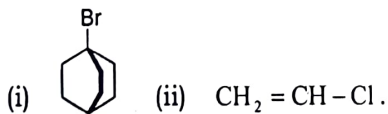
Answer **any five** questions :

(5 × 2 = 10)

1. (a) Write any two methods of generation of nitrenes.
- (b) Comment on stability and reactivity of phosphorus ylide by giving a suitable example.
- (c) Why following compound (i) react with water 600 times faster than compound (ii)?



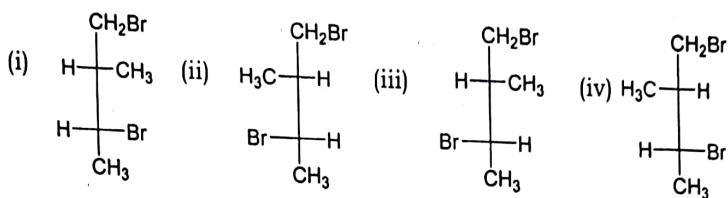
- (d) Explain why following compounds is unreactive under both S_N1 and S_N2 reactions.



- (e) What is reed reaction? Give one example.
- (f) How aromatic nucleophilic substitution reaction taking place by using Benzyne intermediate? Give an example.



- (g) Give the R/S designation for each of the stereoisomers of 1,3-dibromo-2-methylbutane.



- (h) Write the structure of following compounds.

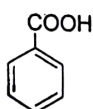
- (i) (S, S) - Chiraphos
- (ii) Swainsonine
- (iii) IPC_2BH
- (iv) (R, R) DIPAMP.

PART - B

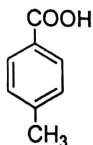
Answer **any five** full questions :

(5 × 12 = 60)

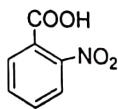
2. (a) What are carbenes? How they are generated? Give two reactions involving carbenes as intermediate.
- (b) Compare acidity and basicity of the following compounds and justify your answer.



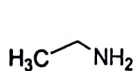
(i)



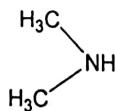
(ii)



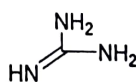
(iii)



(iv)



(v)



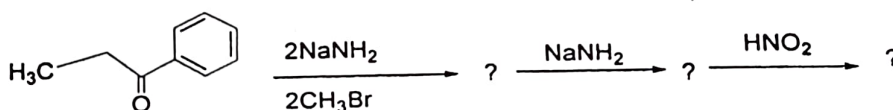
(vi)

- (c) Write a short note on Hammett equations and its applications.

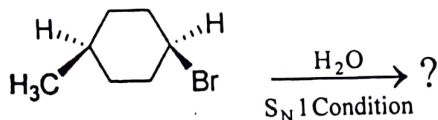
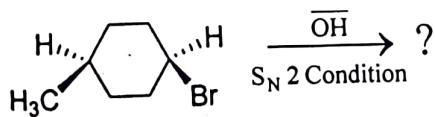
(4 + 4 + 4)



3. (a) Describe the primary and secondary kinetic isotopic effect with examples.
- (b) With suitable example explain, how the structure of organic compounds effect the strength of organic acid.
- (c) How do you differentiate ylides and enamines? Give one reaction involving ylides and enamine as intermediate. (4 + 4 + 4)
4. (a) Discuss the effect of leaving group and solvent polarity on reactivity in aliphatic electrophilic substitution reaction.
- (b) How the following tools are useful for the determination of mechanism of reaction?
- (i) Isotopic labeling
- (ii) Cross-over experiment.
- (c) Predict the product and propose suitable mechanism for the following reaction :



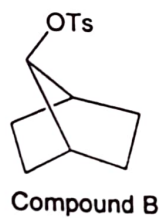
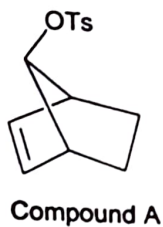
5. (a) Predict the products obtained from $\text{S}_{\text{N}}1$ and $\text{S}_{\text{N}}2$ reaction condition in the following cyclic reaction. Justify your answer.



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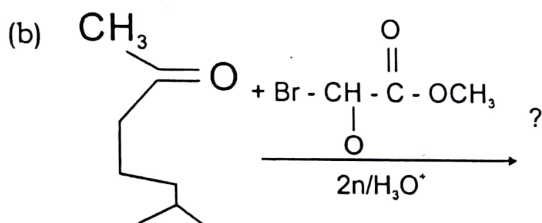
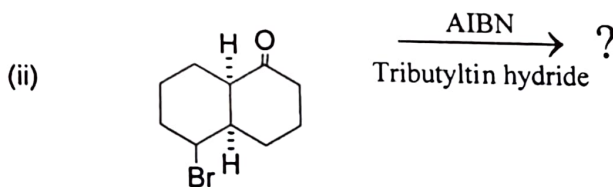
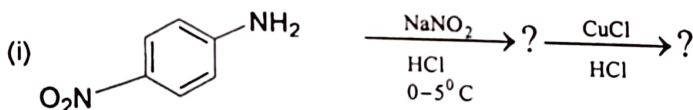


- (b) How do you differentiate S_E2 and S_Ei aliphatic electrophilic substitution reaction explain with examples.
- (c) Anti-tosylate compound
- (i) on acetolysis react 10^{11} times faster than its saturated compound.
- (ii) Justify your answer.



(4 + 4 + 4)

6. (a) Predict the product and discuss the mechanism in the following reactions :



(8 + 4)