



III Semester M.Sc. Examination, January 2018
(CBCS Scheme)
CHEMISTRY

C-301-OC : Organic Reaction Mechanisms

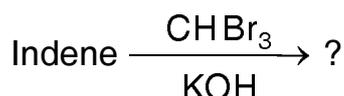
Time : 3 Hours

Max. Marks : 70

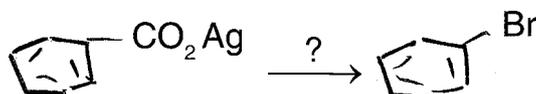
Instruction : Answer question No. 1 and **any five** of the **remaining**.

1. Answer **any ten** of the following : **(10×2=20)**

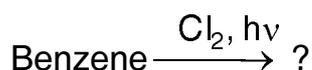
- Allylchloride undergoes nucleophilic substitution by S_N^1 mechanism whereas vinylchloride neither undergoes S_N^1 nor S_N^2 reaction. Give reason why ?
- N, N-Dimethylaniline couples with benzene diazonium chloride to give azo-derivative where as 2, 6-dimethyl – N, N-dimethylaniline does not couple with benzene diazonium chloride. Why ?
- Predict the product and explain the mechanism.



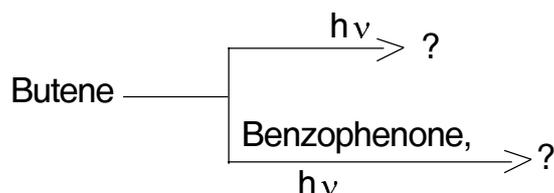
- How do you achieve the following conversion. Highlight the mechanism involved.



- Predict the product and propose a mechanism for the following :



- How do you explain the stability of tertiary radical over primary radical ?
- What is quantum efficiency ? Mention under what conditions quantum efficiency will be greater than 1 ?
- Predict the product(s) in the following and give reason.



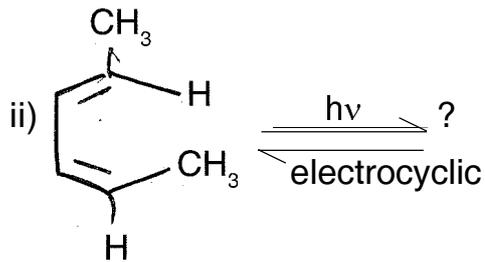
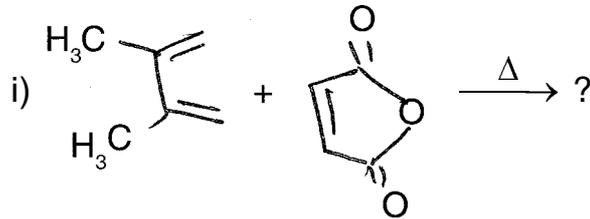
- What is optical pumping ? Explain by taking suitable examples.



- j) With an example give the mechanism of oxy-cope rearrangement.
- k) Write the structure of biotin. Give its biological importance.
- l) Highlight the role of nicotinamide in any one biological transformation.
2. a) How will you differentiate between SE2 and SE1 mechanisms ? Explain taking suitable examples.
- b) What are nitrenes ? How are they generated ? Explain any two reactions involving nitrenes. **(5+5=10)**
3. a) What are bridge head radicals ? Give examples. Explain the role of neighbouring group assistance in free radical reactions at bridgehead carbons.
- b) How do you achieve the following conversion ? Propose suitable mechanism.
- Aniline $\xrightarrow{?}$ chlorobenzene. Give the evidences to support the formation of the ensuing reactive intermediate. **(5+5=10)**
4. a) Predict the product(s) and propose mechanism
- $$(\text{CH}_3)_2\text{C}=\text{CH}-\text{CH}_3 + (\text{C}_6\text{H}_5)_2\text{C}=\text{O} \xrightarrow{h\nu} ?$$
- b) With the help of correlation diagram predict the con-rotatory interconversion of 1, 3-butadiene to cyclobutene. Is the reaction thermally or photochemically allowed ? **(5+5=10)**
5. a) How do you analyze an sigmatropic rearrangement ? Explain taking the example of 1, 3-pentadiene.
- b) Explain the role and its mechanism in the decarboxylation of α -ketoacids by thiamine pyrophosphate. **(5+5=10)**
6. Write briefly on the following :
- Substitution at allylic carbon
 - Formation of methionine from homoserine by vitamin B₁₂ coenzyme and SAM⁺.
 - Meerwein arylation. **(3+4+3=10)**



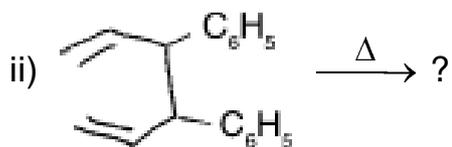
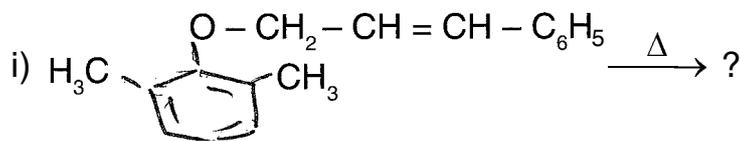
7. a) Predict the products in the following :



2E, 4Z-Hexadiene

b) Discuss the mechanism of transamination of amino acids by PLP. **(6+4=10)**

8. a) Compute the following reactions



b) Explain the role of Flavin coenzymes in oxidation reactions. **(3+3+4=10)**
