

This question paper contains 6 printed pages]

BR—121—2016

FACULTY OF SCIENCE

M.Sc. (First Year) (First Semester) EXAMINATION

NOVEMBER/DECEMBER, 2016

(CBCS Course)

CHEMISTRY

Paper CH-412

(Organic Chemistry—I)

(Friday, 18-11-2016)

Time : 10.00 a.m. to 1.00 p.m.

Time—Three Hours

Maximum Marks—75

N.B. :— (i) Attempt All questions.

(ii) Figures to the right indicate full marks.

(iii) Use of logarithmic table and calculator is allowed.

(iv) Multiple Choice Questions (MCQ) should be attempted only once on page No. 3 of answer-book with complete answers.

1. Attempt any *three* of the following : 15

(a) Explain orientation and reactivity of phenol and phenyl cyanide towards aromatic electrophilic substitution reaction.

(b) Explain the terms homoaromaticity and antiaromaticity with suitable example.

(c) Explain with examples neighbouring group participation.

(d) What is Jablonski diagram ? Explain in detail with suitable examples.

(e) Discuss photochemistry of cis-trans isomerism in olefins.

P.T.O.

2. Attempt any *three* of the following : 15

- (a) Explain Hammond's postulate for transition state structure in detail.
- (b) Compare the stability of carbocation and carbonion with suitable examples.
- (c) Explain the effect of substrate, attacking nucleophile and leaving group in aliphatic nucleophilic substitution reactions.
- (d) Explain the Norrish type I and II with suitable examples.
- (e) Explain the Barton reaction with suitable examples.

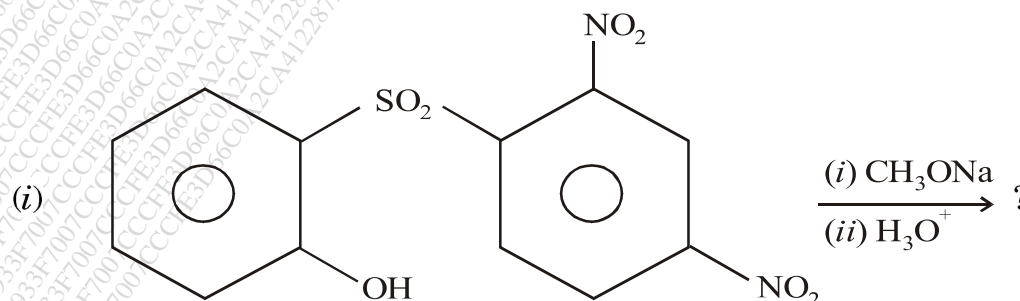
3. (a) Comment on the following : 7

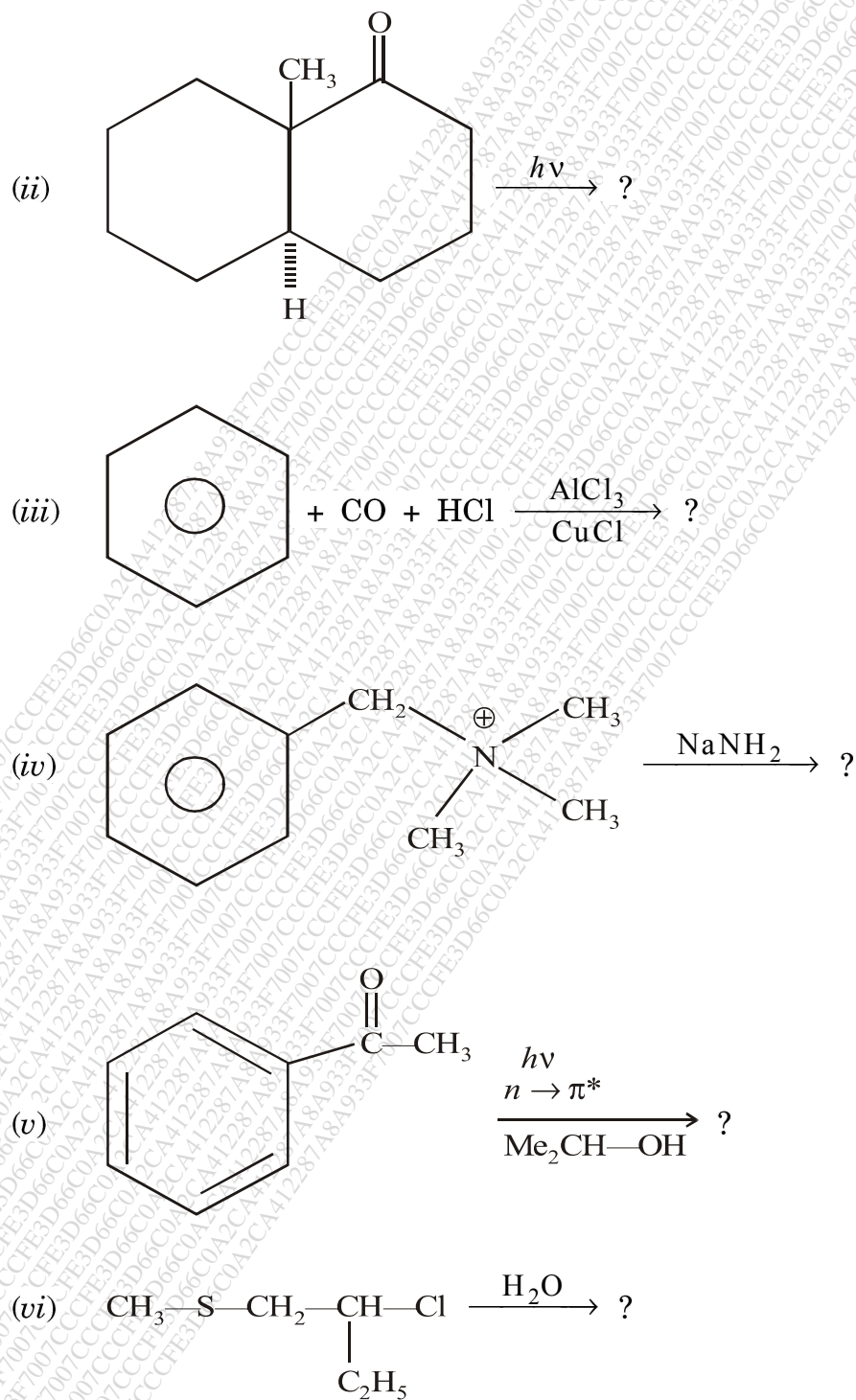
- (i) Isotopic labeling effect
- (ii) Hammett equation.

Or

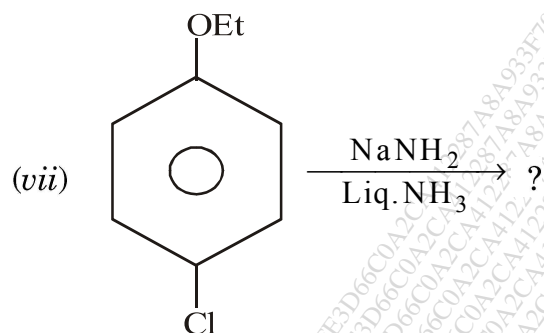
Explain the Paterno-Buchi reaction with suitable example and its stereochemistry.

(b) Predict the product(s) with mechanism of the following (any *four*) : 8





P.T.O.



4. (a) Comment on the following : 7

- (i) Photoreduction of carbonyl compound.
- (ii) Photochemistry of α , β -unsaturated ketones.

Or

Discuss the following :

- (i) $\text{S}_{\text{N}}\text{Ar}$ reactions
- (ii) Sommelet-Hauser reaction.

(b) Explain with mechanism : 8

- (i) IPSO substitution reaction
- (ii) Vilsmeier reaction.

Or

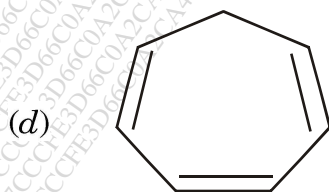
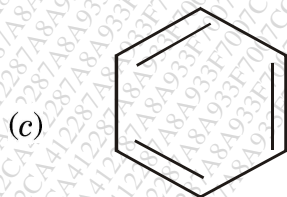
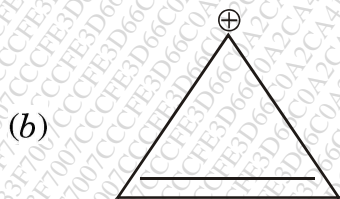
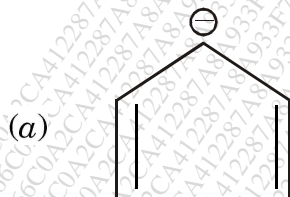
- (i) Explain the stability of carbanions and free radicals.
- (ii) What are annulenes ? Explain aromaticity of [10] annulenes.

5. (A) Select the *correct* answer from the given options for each of the following : 5

- (i) An alcohol may be converted into an alkyl chloride in the presence of thionylchloride is a reaction :

- | | |
|-----------------------------------|----------------------------|
| (a) $\text{S}_{\text{N}}1$ | (b) $\text{S}_{\text{N}}2$ |
| (c) $\text{S}_{\text{N}}\text{i}$ | (d) Both (a) and (b) |

- (ii) Vilsmeier reaction of phenols, aromatic amines or phenolic esters causes :
- (a) Oxidation (b) Reduction
(c) Epoxidation (d) Formylation
- (iii) The conversion of singlet to triplet state takes place via :
- (a) Internal conversion (b) Intersystem crossing
(c) Fluorescence (d) Phosphorescence
- (iv) Which of the following compounds will be non-aromatic in nature ?



P.T.O.

(v) Conversion of benzophenone to benzpinacol photochemistry is an example of :

- (a) Norrish Type I
- (b) Photoreduction
- (c) Paterno-Buchi reaction
- (d) Norrish Type II

(B) Write short notes on any *two* :

10

- (a) Photochemical formulation of smog
- (b) Anchimeric Assistance
- (c) Types of reagents.