

This question paper contains 7 printed pages]

L—113—2019

FACULTY OF SCIENCE

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

MARCH/APRIL, 2019

(CBCS Pattern)

CHEMISTRY

Paper II (CH-422)

(Organic Chemistry)

(Thursday, 25-4-2019)

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

Time—3 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 (MCQs) should be attempted only once on Page No. 3 of answer-book with complete answer.

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

(a) Describe the mechanism and synthetic uses of Reformatsky reaction.

(b) Interconversion of 1, 3, 5-hexatriene \rightleftharpoons 1, 3-cyclohexadiene under thermal and photochemical condition can be explained by FMO method.

(c) Discuss the stereochemistry of spiranes and allenes.

(d) Discuss the mechanism of E^2 reaction.

(e) Cycloaddition of 1, 3-butadiene and ethylene by FMO and PMO method.

Explain.

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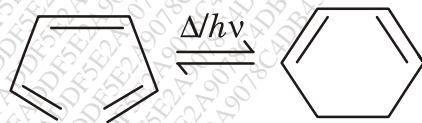
2. Answer any *three* of the following :

15

- (a) Why on thermal reaction cis 3, 4-dimethyl cyclobutene gives (2E, 4Z), 2, 4-hexadiene while the trans isomer gives the (2E, 4E) 2, 4-hexadiene.
- (b) Explain witting reaction. Give its mechanism. How would you synthesis $C_6H_5-CH=CH-CH_3$?
- (c) Trans (*ee*) 1, 3-dimethyl cyclohexane is more stable than trans (*ee*) 1, 2-dimethyl cyclohexane.
- (d) The relative rates of reaction of 1-bromo-2, 2-dimethyl propane and bromo ethane is 4.2×10^{-6} and 1.0 respectively with EtO^\ominus in EtOH at $55^\circ C$.
- (e) What are sigmatropic rearrangement ? Explain 1, 3-sigmatropic rearrangement by FMO and PMO method.

3. (a) Construct correlation diagram and FMO method for the following transformations. Predict whether these transformations are thermally or photochemically allowed :

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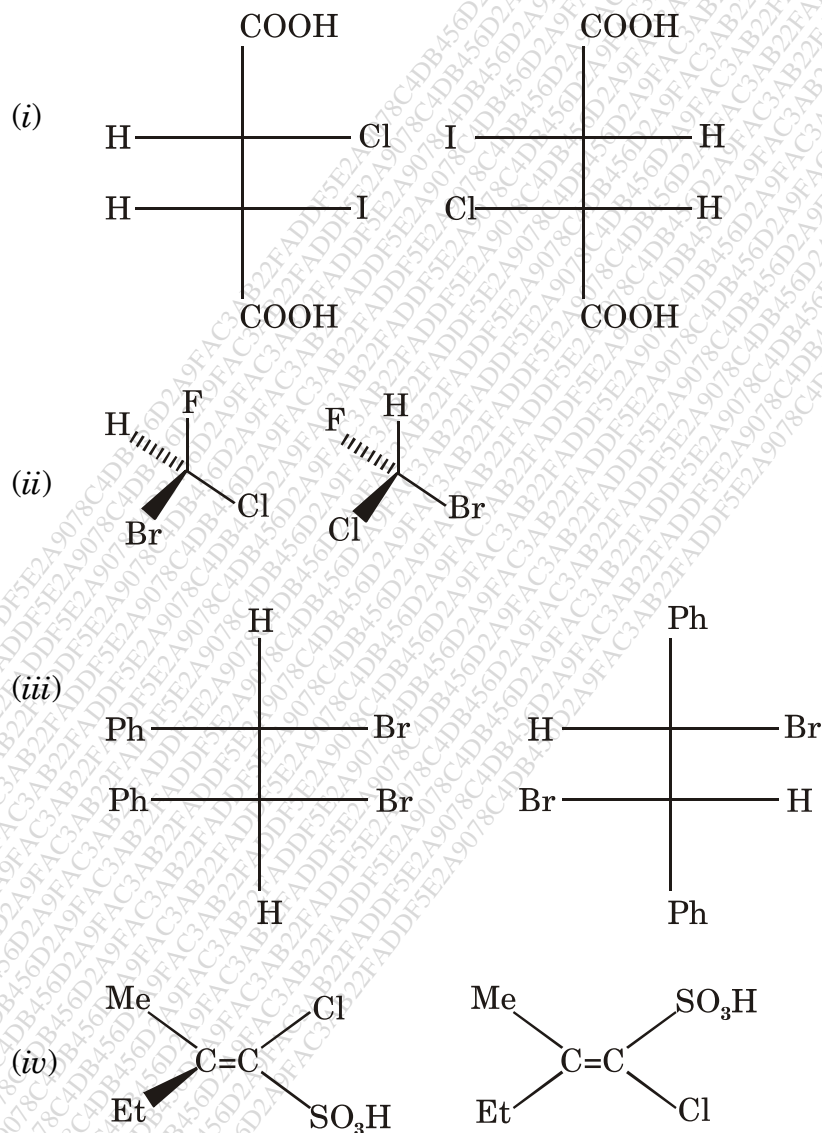
Or

Illustrate the mechanism for the following reactions with suitable examples :

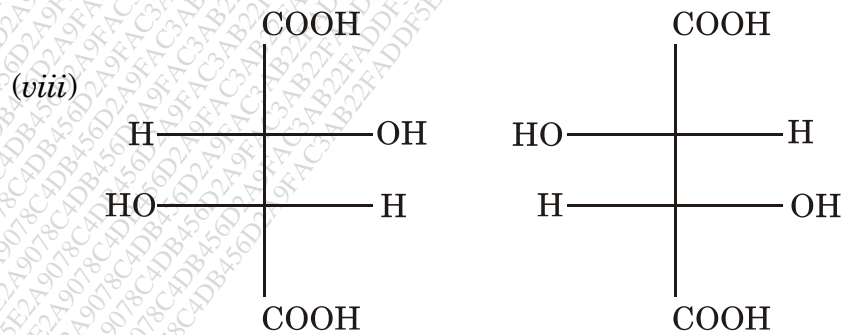
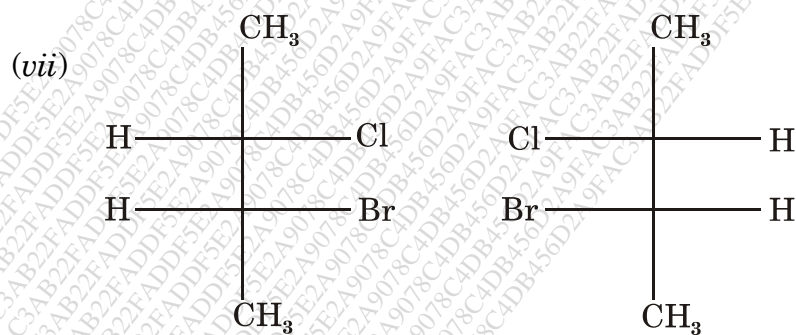
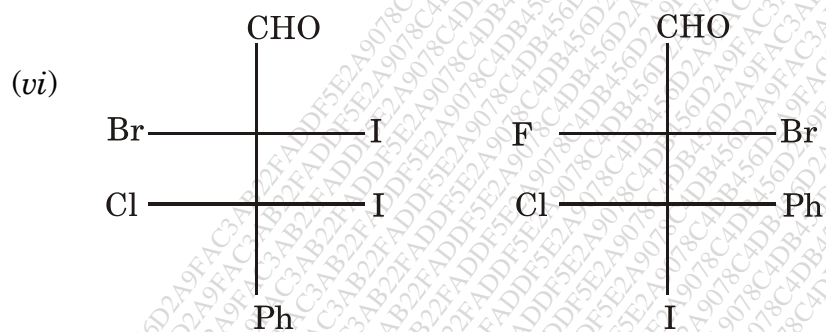
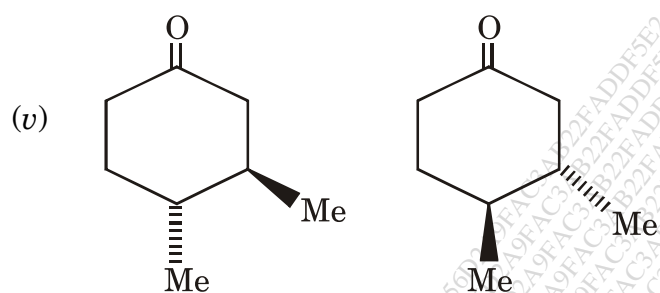
- (i) Michael addition
- (ii) Benzoin condensation.

- (b) Indicate whether the relationship in each pair of compounds below is identical, enantiomeric or distereomeric by assigning R & S and E & Z configurations :

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P.T.O.



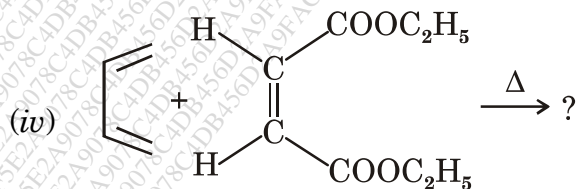
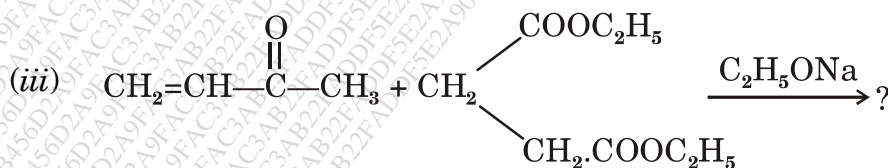
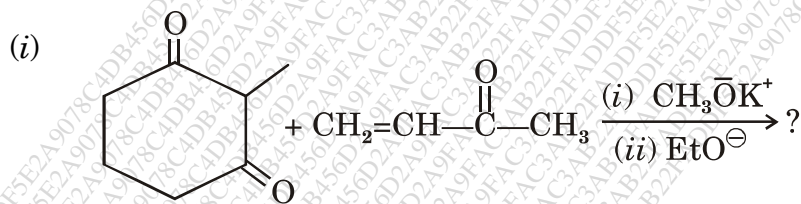
4. (a) Give the order of stability of different conformational isomers in chair form of 1, 4 dimethyl cyclohexane by drawing their chair conformations and Newmann's projection formula of each and illustrating 1, 3 diaxial interaction.

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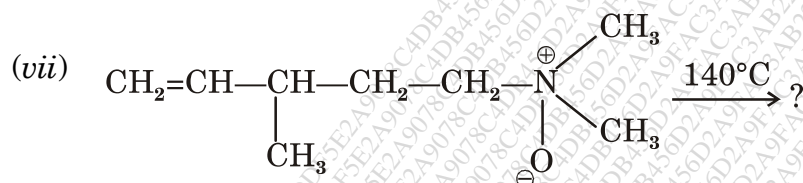
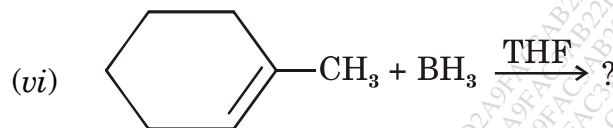
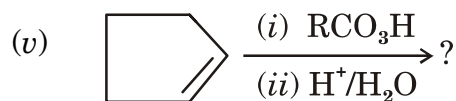
Or

- (i) Addition of HX on alkenes is regioselective. Why ?
 (ii) Write a note on stereochemistry of addition reactions.
- (b) Predict the product(s) with appropriate mechanism of the following (any four) :

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P.T.O.



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

(i) Stobbe reaction involves base catalysed condensation between :

- (a) Benzaldehyde and KCN
 (b) Benzaldehyde and diethyl malonate
 (c) Aldehyde or ketone and diethyl succinate
 (d) None of the above

(ii) Cycloaddition reaction between 1, 3-butadiene and ethylene under thermal condition is :

- (a) supra-supra (b) antra-antra
 (c) supra-antra (d) both (a) and (b)

(iii) Pyrolytic elimination of acetates, xanthates and amine oxides exhibits :

- (a) Anti stereoselectivity
 (b) Syn stereoselectivity
 (c) Enantio selectivity
 (d) Diastereo selectivity

- (iv) The optically active allene among the following :
- (a) 3-methyl but-1, 2-diene
 - (b) 1, 2-butadiene
 - (c) 1, 2-pentadiene
 - (d) 2, 3-pentadiene
- (v) [1, 3] sigmatropic rearrangement is symmetry allowed under :
- (a) thermal
 - (b) photochemical
 - (c) presence of non-polar solvent
 - (d) presence of catalyst
- (B) Write notes on (any two) :
- (a) Pyrolytic elimination
 - (b) 1, 3-dipolar cycloaddition reaction
 - (c) Stereochemistry of Biphenyls.

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