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**WT—86—2024**

**FACULTY OF SCIENCE**

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

**NOVEMBER/DECEMBER, 2024**

**(CBCS/New Pattern)**

**CHEMISTRY**

**Paper—CH-412**

**(Organic Chemistry—I)**

**(Thursday, 12-12-2024)**

**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.*

1. Attempt any *three* of the following : 15
- (a) Explain the stereoselective and stereospecific reactions with mechanism.
  - (b) Explain Hammond's postulate for transition state structure in detail.
  - (c) Draw the configuration and specify the R and S enantiomers of 2-bromopentane.
  - (d) Discuss the stereochemistry of Allene and Biphenyl.

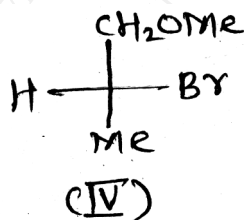
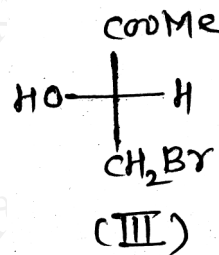
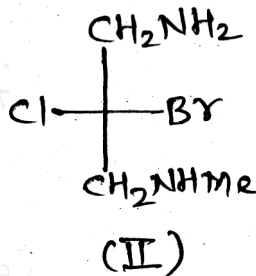
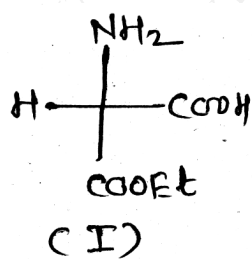
P.T.O.

- (e) Explain the role of crossover experiment and kinetic isotope effect in determination of mechanism of organic reaction.

2. Attempt any *three* of the following :

15

- (a) Explain with examples neighbouring group participation.
- (b) Write a note on types of reagents.
- (c) Explain the terms homoaromaticity and antiaromaticity with suitable examples.
- (d) Nucleophilic substitution at chiral carbon by  $S_N^2$  mechanism is not accompanied by racemisation but by inversion.
- (e) Designate structures I to IV as R or S :



3. (a) Write brief notes on :

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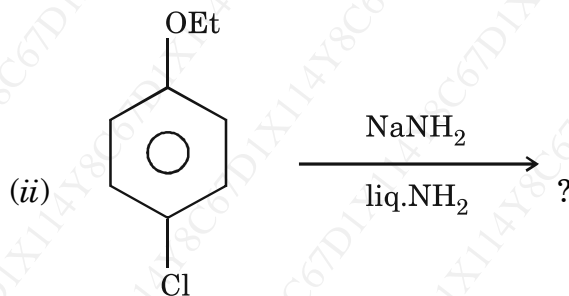
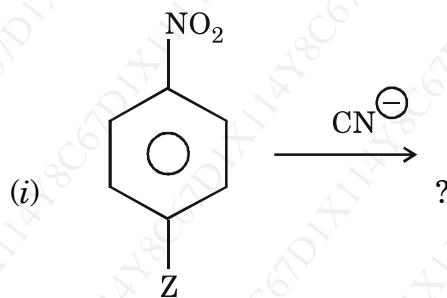
(i) Kinetically and thermodynamically controlled products.

(ii) Benzenoid and non-benzenoid compounds.

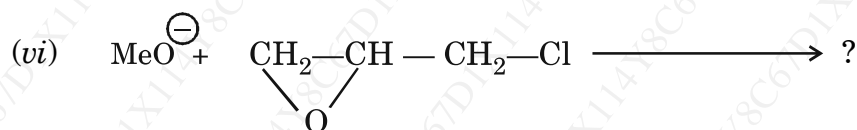
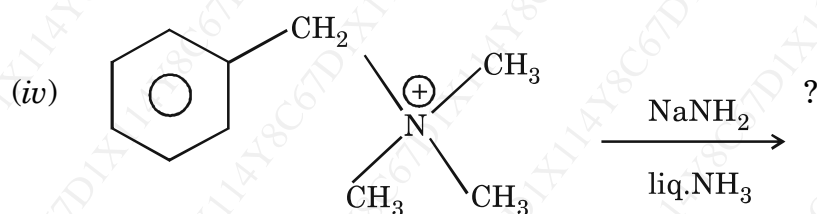
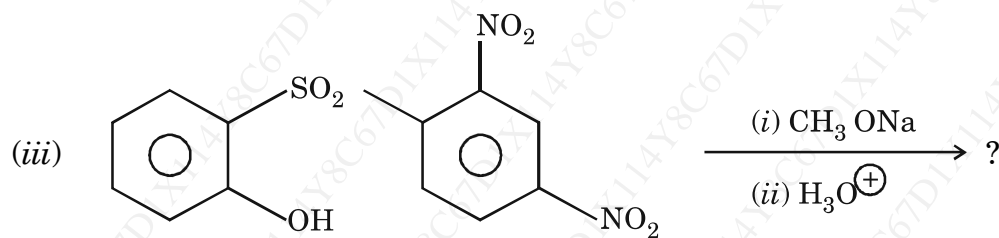
Or

Give the order of stability of different conformational isomers in chair form of 1, 3 dimethyl cyclohexane by drawing their chair conformation and Newmann projection formula of each and illustrating 1, 3 diaxial interaction.

(b) Predict the products with mechanism of the following (any four) : 8



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4. (a) (i) What are annulenes ? Explain aromaticity of [10] annulenes.

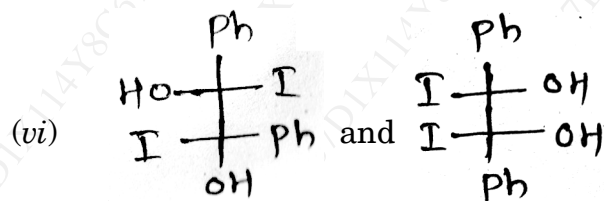
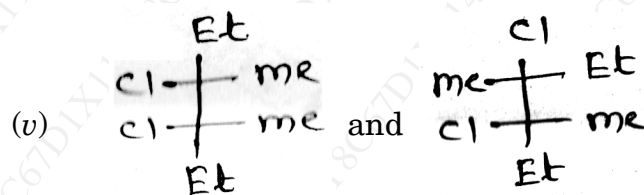
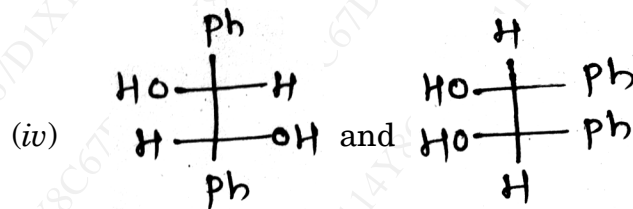
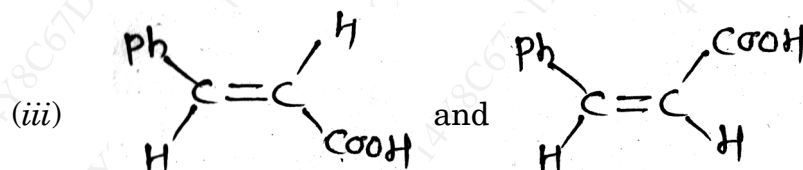
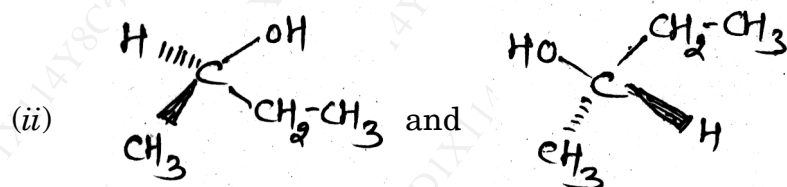
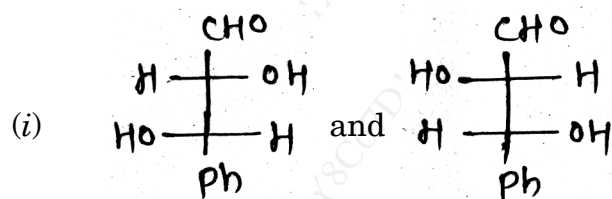
(ii) Explain the stability of carbanions and free radicals. 7

Or

(i) Alternate and non-alternate hydrocarbons.

(ii) Isotopic labelling effect.

(b) Indicate whether the relationship in each pair of compounds below is identical, enantiomeric or diastereomeric by assigning R and S configuration and E and Z configuration (any four) : 8



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5. Write notes on (any *three*) :

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- (i) Inclusion compounds
- (ii) Anchimeric Assistance
- (iii) E<sup>+</sup>CB mechanism
- (iv) Benzyne mechanism
- (v) S<sub>N</sub><sup>1</sup> mechanism.

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