

Seat No. : _____

11C-127

May-2015

M.Sc. Sem.-II

**408 : Chemistry
(Organic Chemistry)**

Time : 3 Hours]

[Max. Marks : 70

- Instructions :** (1) All the questions are compulsory.
(2) Figures to the right indicates full marks.

1. (A) Answer the following questions.
- (1) Discuss chemical ionization technique used in mass spectroscopy. **4**
 - (2) Give a brief idea on ^{13}C chemical shifts of alkyne, ketonic and heteroaromatic carbon by giving appropriate examples. **3**
- OR**
- (1) Write a note on the factors (electronegativity and hybridization of carbon) affecting the ^{13}C chemical shift. **4**
 - (2) Explain by appropriate example "meta stable peak" and "Molecular ion peak". **3**
- (B) Answer the following questions :
- (1) Discuss the Mass fragmentation of Benzyl bromide in detail. **4**
 - (2) Write a note on High-Resolution-Mass Spectrometry (HRMS). **3**
- OR**
- An organic compound with a MW 151 exhibits the following spectral data : **7**
- UV : 225 NM
- IR (KBr) : 3050, 1720, 650 cm^{-1}
- ^1H NMR : (δ) δ 2.2 (3H, singlet), 3.5 (2H, triplet), 4.5 (2H, triplet)
- ^{13}C NMR : (δ) 25.7, 28.4, 47.2, 207.7
- HRMS : 149.9685
- Deduce the structure of the compound with suitable explanation.
2. (A) Answer the following questions :
- (1) Explain the modified Jablonski diagram and discuss the terms involved in it. **4**
 - (2) Write a note on di- π methane rearrangement with suitable example. **3**
- OR**
- (1) Write a short note on oxetane formation in detail.
 - (2) Explain Norrish type I reaction mechanism with suitable example.

- (B) Give any two synthesis and four important reactions for Imidazole or benzothiazole. 7

OR

Give any two synthesis and four important reactions for Cinnoline or Quinoxaline.

3. Answer the following questions :

- (A) Discuss the principle, mechanism and three synthetic applications of the following reactions : 7

- (1) Buchwald Hartwig reaction
- (2) Birch Reduction

OR

Discuss the principle, mechanism and three synthetic applications of the following reactions :

- (1) Suzuki reaction
- (2) Wittig reaction

- (B) Discuss the principle, mechanism and three synthetic applications of the following reactions : 7

- (1) Knoevenagel reaction
- (2) Dickmann reaction

OR

Discuss the principle, mechanism and three synthetic applications of the following reactions :

- (1) Mannich reaction
- (2) Stobbe condensation

4. Answer the following questions :

- (A) Discuss selectivity, mechanism and three utilities of the following reagents : 7

- (1) Dicyclohexylcarbodiimide (DCC)
- (2) 2, 3-Dichloro-5, 6-Dicyanobenzoquinone DDQ

OR

Discuss selectivity, mechanism and three utilities of the following reagents :

- (1) DIBAL-H
- (2) n-Butyl lithium

- (B) Discuss selectivity, mechanism and three utilities of the following reagents : 7

- (1) Phase transfer catalysis
- (2) Dess-Martin periodinane

OR

Discuss selectivity, mechanism and three utility of the following reagents :

- (1) Sodium cyanoborohydride
- (2) Grignard reagent

5. Answer the following questions :

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- (1) Give two applications of Baker's yeast in organic synthesis.
- (2) What is Steglich esterification ?
- (3) What is Umpolung reagent ? Give one application of this reagent.
- (4) What is photolysis ?
- (5) What is photo sensitizer ?
- (6) Give law of photochemical equivalence ?
- (7) What do you understand by Nitrogen rule ?
- (8) What is McLafferty rearrangement ?
- (9) Give one synthesis of Pyrimidine.
- (10) Predict only the number of signals expected in the proton spin decoupled ^{13}C spectrum of m-xylene.
- (11) Deduce the identity of the following compound from the ^1H NMR data given.
 $\text{C}_7\text{H}_7\text{NO}_3$: δ 3.9 (3H, singlet), 6.9 (2H, doublet), 8.1 (2H, doublet) (ppm).
- (12) Vilsmeier-Haack reagent is also known by which other name ?
- (13) Which ingredients are used in Jones Oxidation reaction ?
- (14) Give one example of Michael reaction.
