(Pages : 4) **P – 6081**

Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, January 2023

Chemistry / Polymer Chemistry / Analytical Chemistry

CH/CL/PC 232 – ORGANIC CHEMISTRY – III

(2020 Admission Onwards)

Time : 3 Hours Max. Marks : 75

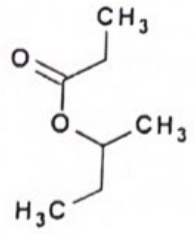
SECTION – A

Answer any **two** sub-questions among (a), (b) or (c) from each question. Each sub-question carries **2** marks.

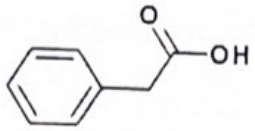
1. (a) What is the effect of solvent's polarity in solution UV spectroscopy?

   (b) How hydrogen bonding affect the IR frequency shifts?

   (c) Pick out the mass spectral fragmentation pattern of the following compounds:



(i)



(ii)

2. (a) What is the theory of NMR spectroscopy?

   (b) What is DEPT? What is its advantage?

   (c) Draw the ^{1}H-NMR spectrum of 4-amino benzaldehyde.

P.T.O.

3. (a) What is lithium exchange reaction? What is its importance?

(b) Write a method for the preparation of Gilman reagent.

(c) What is Tebbe's reagent? What are its uses?

4. (a) What is the mechanism of olefin metathesis?

(b) What is Stepns-Castro coupling?

(c) What are the characteristics of protecting groups?

5. (a) Discuss the mechanism of Clemmensen reduction.

(b) What are the applications of HIO_4?

(c) What are the advantages of ozone oxidation?

(10 × 2 = 20 Marks)

SECTION – B

Answer either (a) or (b) of each question. Each question carries **5** marks.

6. (a) Distinguish between soft and hard ionization techniques in mass spectrometry.

(b) Draw the IR spectrum of 2-amino methyl benzoate (methyl anthranilate) and pick out the IR bands.

7. (a) Explain the HSQC and HMQC - NMR techniques.

(b) An organic compound with molecular weight 72 exhibit the following peaks in 1H-NMR : 4.5 (1, s), 2.8 (4, t), 1.1 (3, s). Determine the structure of the compound.

8. (a) How organolithium compounds are prepared? What are their uses?

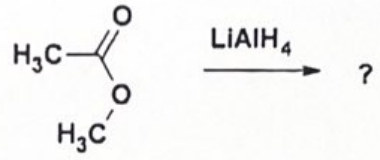
(b) Discuss the preparation and uses of (Benzene) chromium tricarbonyl.

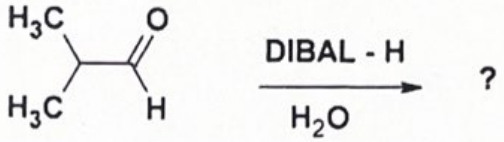
9. (a) Discuss the retrosynthetic analysis of acetanilide.

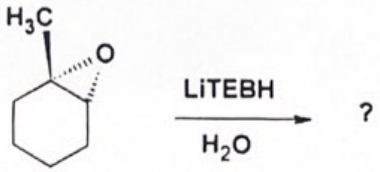
(b) What are the various types of Grubbs catalysts? What are its applications?

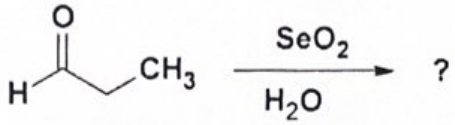
10. (a) Explain the mechanism of McFadyen–Stevens reaction.

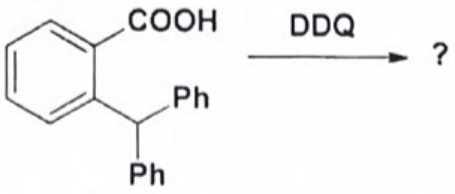
(b) Sketch the products of the following reaction:

(i) 

(ii) 

(iii) 

(iv) 

(v) 

(5 × 5 = 25 Marks)

SECTION – C

Answer any **three** questions. Each question carries **10** marks.

11. Monitor the Hoffmann degradation reaction of CH_3-O-CH_2CO-NH_2 to CH_3-O-CH_2-NH_2 by infrared and mass spectrometry studies.

12. Follow the Diels – Alder reaction of cis-1,3-butadiene and ethane to form cyclohexene by ^{1}H-NMR spectroscopy.

13. What are Grignard reagents? How are they prepared? Explain its various applications.

14. (a) What is Negishi coupling? Explain its mechanism. What are its advantages?

    (b) Discuss the Umpolung concept. (7 + 3)

15. (a) What is Swar oxidation? Discuss its mechanism.

    (b) What is Wolff-Kishner reduction? Discuss its mechanism.

(3 × 10 = 30 Marks)
