



UNIVERSITY OF NORTH BENGAL
B.Sc. Honours Part-II Examination, 2020

CHEMISTRY

PAPER-III

Time Allotted: 2 Hours

Full Marks: 30

*The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
All symbols are of usual significance.*

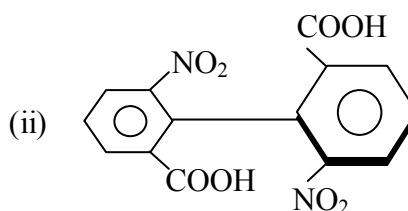
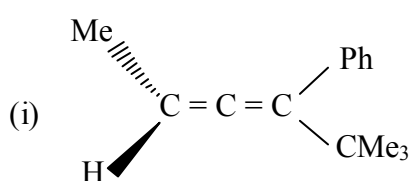
Answer Question No. 1 and any two from the rest

1. Answer the following questions (any *five*): 2×5 = 10
- (a) Write two uses of Grignard reagent.
 - (b) Alcohols are weaker acids than phenol but stronger nucleophiles. — Explain.
 - (c) Allyl chloride is more reactive than vinyl chloride. — Explain why.
 - (d) Draw two conformations of *meso*-2,3-dibromobutane in sawhorse. One with σ plane and the another with inversion point.
 - (e) Why should a Grignard reagent be prepared in an anhydrous conditions?
 - (f) Why HI is used as better reagent to cleave an ether rather than HBr?
2. (a) How will you prepare 3-ethylpentane-3-ol using Grignard reagent? 3
- (b) Explain the mechanism involved in Meerwein-Ponndorf-Verley reduction of a typical ketone. Mention one synthetic advantage of carrying out MPV reduction. 2+1 = 3
- (c) 2,4,6-trimethyl benzoic acid is very difficult to esterify. — Explain. 2
- (d) Mention three conditions which control S_N1 and S_N2 reaction and how? 2
3. (a) Which of the following would be most and least readily hydrolysed with NaOH and why? 1 $\frac{1}{2}$
- MeCO_2Me ; $\text{Me}_3\text{CCO}_2\text{Me}$; MeCOOBu^t
- (b) Between $\ominus\text{NH}_2$ and $\text{NH}_2 - \text{NH}_2$ which serve as better nucleophile and why? 1 $\frac{1}{2}$
 - (c) Can you synthesis $\text{Me}_3\text{C}-\text{O}-\text{CMe}_3$ by using Williamson's method? Give reason. 2
 - (d) What do you mean by ylide? How does an ylide acquire stabilization? 1+2 = 3
 - (e) How can you convert benzaldehyde to acetophenone by means of Umpolung reaction? 2

4. (a) Explain how compounds with two chiral centres are classified as “erythro” and “threo” forms. 2
- (b) Compound containing no chiral centre but show specific rotation. 2
- (c) Compound containing more than one chiral centre but does not show specific rotation. 2
- (d) Distinguish between the following:
- (i) Acetonitrile and Methyl isocyanide 2
- (ii) *o*-phenylenediamine and *m*-phenylenediamine. 2

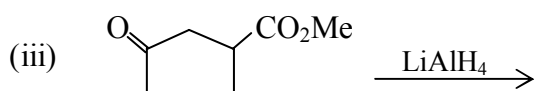
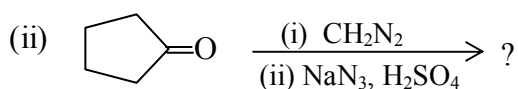
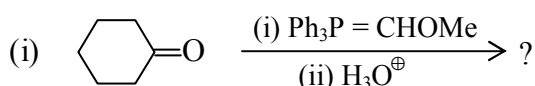
5. Write short notes (any **five**): 2×5 = 10
- (i) NBS (ii) B₂H₆
- (iii) HIO₄ (iv) Gabriel-Phthalimide Synthesis
- (v) Arndt-Eistert Synthesis (vi) Lossen reaction
- (vii) Zeisel's method.

6. (a) Give R/S designation for the following molecules. 2

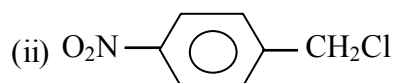
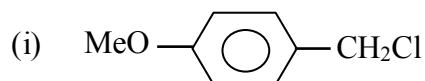


- (b) Explain the following terms giving suitable example (any **two**): 2×2 = 4
- (i) Pseudo asymmetric centre
- (ii) Centre of symmetry
- (iii) Resolution.
- (c) Write short notes (any **two**): 2×2 = 4
- (i) Knoevenagel condensation
- (ii) Reimer-Tiemann reaction
- (iii) Wittig reaction.

7. (a) Predict the product(s) with mechanism (any **three**): 2×3 = 6



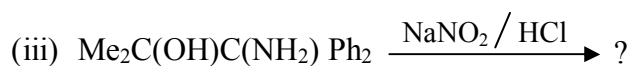
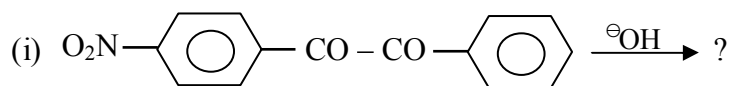
(c) Which mechanism, S_N1 or S_N2 is favourable for reaction of each of the following substrate (any *two*): $1 \frac{1}{2} \times 2 = 3$



(d) Give an example of alternative axis of symmetry. 1

10.(a) What is Beckmann rearrangement? Discuss its mechanism. 1+2 = 3

(b) Give the products with mechanism (any *two*): 2×2 = 4



(c) How a mixture of 1° , 2° and 3° amines are separated by Hinsberg's method? 3

—×—