



WEST BENGAL STATE UNIVERSITY
B.Sc. Honours 3rd Semester Examination, 2019

CEMACOR07T-CHEMISTRY (CC7)

ORGANIC CHEMISTRY-III

Time Allotted: 2 Hours

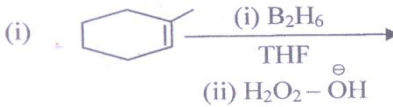
Full Marks: 40

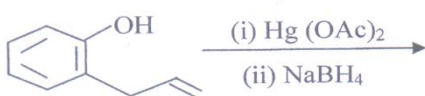
*The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.*

Answer any four questions taking one from each unit

UNIT-1

1. (a) How can you achieve the following transformations? 2

$$\text{CH}_3\text{CD}=\text{CH}_2 \longleftrightarrow \text{CH}_3-\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3\text{CH}=\text{CHD}$$
- (b) Identify the product(s) in each of the following reactions and suggest mechanism for their formation 2×2
 - (i)  2
 - (ii) $\text{CF}_3-\text{CH}=\text{CH}_2 \xrightarrow{\text{HBr}}$ 2
- (c) Ozonisation of 2,3-dimethylbut-2-ene in presence of formaldehyde gives the ozonide of isobutene as one of the products. Explain. 2
- (d) In conversion of but-2-yne to *trans*-but-2-ene by Na/liquid NH_3 and EtOH, *cis*-alkene is formed in negligible or no amount— Explain mechanistically. 2
2. (a) Write the products obtained in the reaction of E-but-2-ene with carbene generated from diazomethane in absence and presence of nitrogen. Account for the observed difference. 3
- (b) How can you carry out the following conversion? 2

$$\text{CH}_3-\text{CH}_2-\text{C}\equiv\text{CH} \longrightarrow \text{CH}_3-\text{CH}_2-\text{CH}_2\text{CHO}$$
- (c) Identify the product of the following reaction and suggest mechanism of the reaction: 2

- (d) Addition of one mole HBr to buta-1,3-diene at -78°C produces 81.5% of 3-bromobut-1-ene and 18.5% of 1-bromo-but-2-ene whereas at 25°C , the yields are 44% and 56% respectively. Explain these observations. 3

UNIT-2

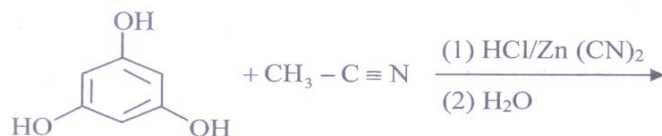
3. (a) Rationalise the fates of the following reactions in terms of mechanistic interpretation. 2+2



- (b) Predict the major and minor products of the following reaction with brief explanation. 2



4. (a) Predict the product with mechanism 2



- (b) Explain 'Ipso Substitution' with proper example. 2
(c) 2, 4, 6-trinitrochlorobenzene undergoes ready alkaline hydrolysis— Explain. 2

UNIT-3

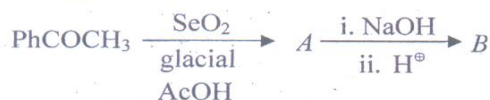
5. (a) How can you carry out the following conversions? 2×2



- (b) Explain the following observations. 4+3

- (i) Both *p*-nitrobenzaldehyde and *p*-dimethylamino benzaldehyde fail to undergo benzoin condensation but a mixture of these two compounds easily responds to benzoin condensation.
(ii) Alkaline hydrolysis of S-1-phenylethyl acetate gives S-1-phenyl ethanol but acid hydrolysis of the same ester furnishes racemic 1-phenylethanol.

- (c) Identify compounds *A* and *B* in the following sequence of reactions and suggest mechanism for their formation. Why compound *B* is formed as a pair of enantiomers? 2+2+1



- (d) Write the product of the following reaction with plausible mechanism.



6. (a) Compare the reactivity of acetaldehyde and acetone in aldol reaction.

- (b) Write the products of the following reaction with plausible mechanism:

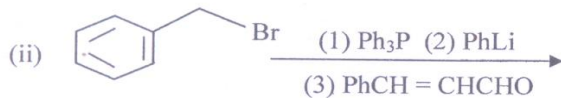


- (c) What happens when benzaldehyde is heated with acetic anhydride in the presence of sodium acetate? Write the mechanism of the reaction.

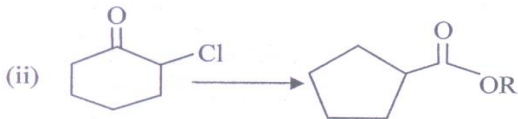
- (d) Can alcohol be used as a solvent in LiAlH_4 reduction of carbonyl compounds? Explain.

Explain the role of Li^+ in LiAlH_4 reduction of carbonyl compounds.

- (e) Predict the products of the following reaction with plausible mechanism.

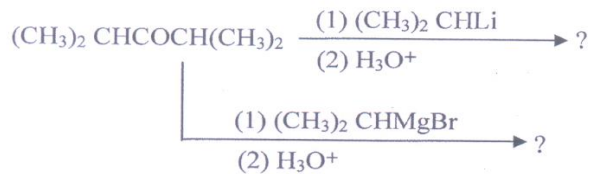


- (f) How can you carry out following transformations?



UNIT-4

7. (a) Predict the products of the following reaction with plausible mechanism.



(b) How can you carry out the following conversion?

2



8. (a) How can you carry out the following conversion using an organo-lithium as the initial reagent?

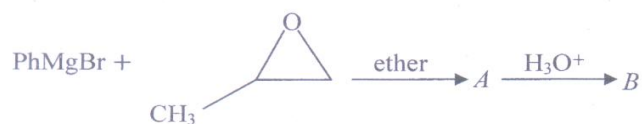
2

(b) Apply Corey House synthesis to prepare the alkane, $\text{Me}_3\text{C}-\text{CH}_2-\text{CH}_2-\text{CH}_3$

3

(c) Identify *A* and *B* in the following reaction sequence—

1



—X—