

Marks Scored:

KATHMANDU UNIVERSITY  
End Semester Examination  
February/March, 2019

Level : B.Sc.

Year : II

Exam Roll No. :

Time: 30 mins.

Course : CHEM 207

Semester : I

F. M. : 20

Registration No.:

Date FEB 25 2019

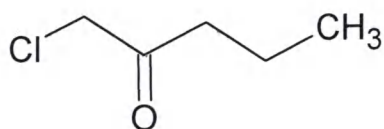
SECTION "A"

[20 Q. × 1 = 20 marks]

I. Select the most appropriate answer.

1. Which of the following exhibits aldol condensation?  
 HCHO       C<sub>6</sub>H<sub>5</sub>CHO       Cl<sub>3</sub>CCHO       CH<sub>3</sub>COCH<sub>3</sub>

2. The IUPAC name for the compound below is



1-Chloropentan-2-al

Chloropentan-2-one

1-Chloropentanone

1-Chloropentan-2-one

3. A chemist wishes to make an organic molecule less acidic. Which of the following functional group should be added to the molecule?

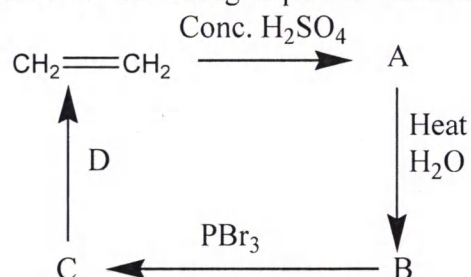
Hydroxyl

Sulfhydryl

Phosphate

Amino

4. Identify B and D in the following sequence of reactions.



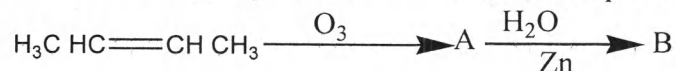
Ethanol and alcoholic KOH

Methanol and bromoethane

Ethyl hydrogen sulphate and alcoholic KOH

Ethyl hydrogen sulphate and aq. KOH

5. In the following sequence of reactions, the compound B is



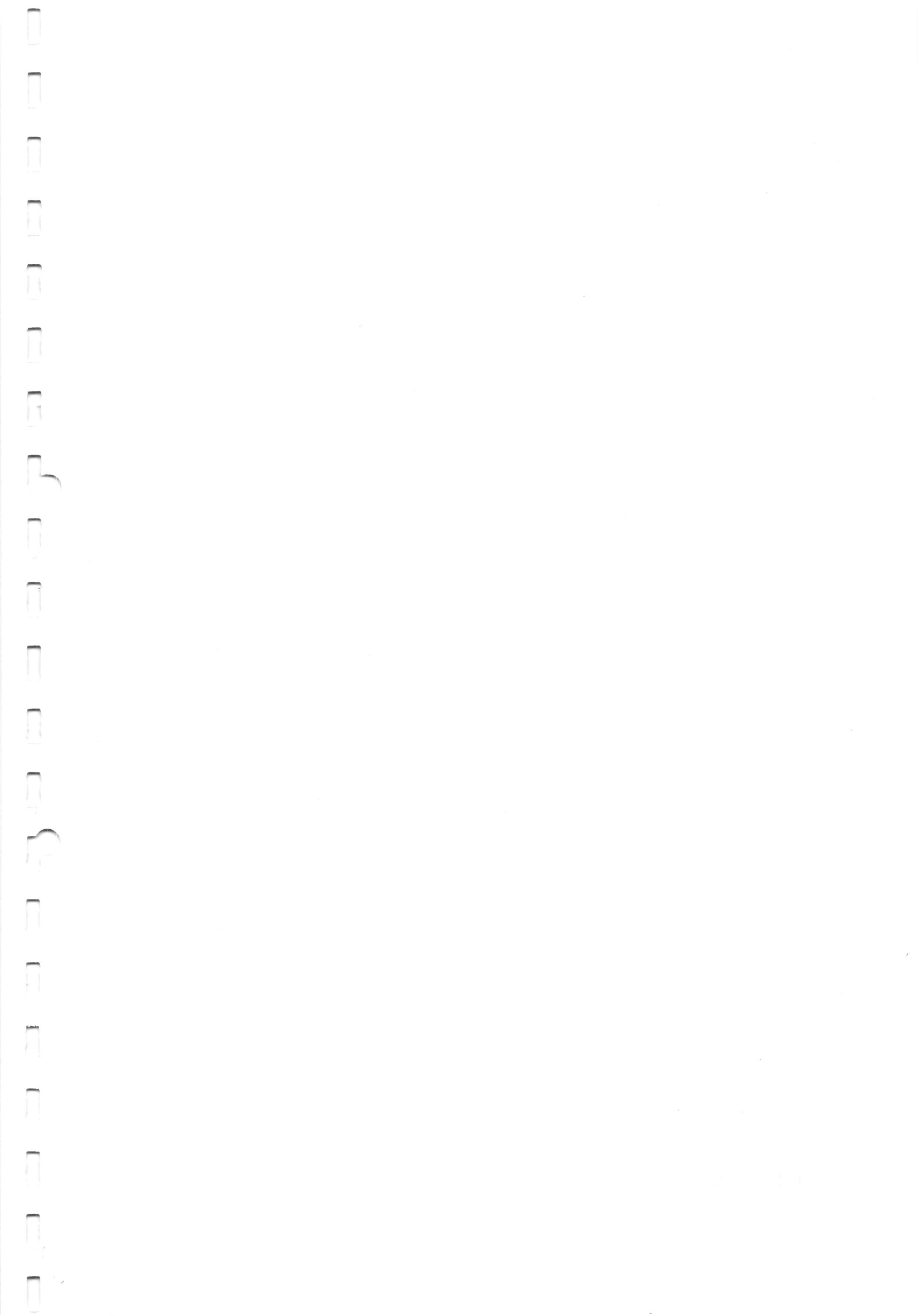
- $\text{CH}_3\text{CH}_2\text{CHO}$       $\text{CH}_3\text{COCH}_3$       $\text{CH}_3\text{CH}_2\text{COCH}_3$       $\text{CH}_3\text{CHO}$
6. Alkyl halides undergo  
 Electrophilic substitution reaction     Electrophilic addition reaction  
 Nucleophilic substitution reaction     Nucleophilic addition reaction
7. The most typical reaction of simple alkene is  
 Electrophilic substitution     Nucleophilic substitution  
 Electrophilic addition     Nucleophilic addition
8. Sulphonation of chlorobenzene gives  
 (i) 2-chlorobenzenesulphonic acid     (ii) 3-chlorobenzenesulphonic acid  
 (iii) 4-chlorobenzenesulphonic acid     (i) + (iii)
9. When alcohol reacts with phosphorous halides, it gives  
 Alkyl halides     Alkyl amine     Alkanes     Alkynes
10. Petroleum refining is  
 Distillation of petroleum to get different fractions  
 Obtaining aromatic compounds from aliphatic compounds present in petroleum  
 Cracking of petroleum to get gaseous hydrocarbons  
 Purification of petroleum
11. Which of the following statements is not correct?  
 Aldehydes and ketones undergo nucleophilic addition  
 Aldehydes and ketones undergo electrophilic substitution  
 Lower members of aldehydes and ketones are soluble in water due to hydrogen bonding  
 Aldehyde and ketones contain polar carbonyl group
12. Bond formed between two amino acid molecules is-----  
 Peptide bond     Sulfur linkage  
 Ionic bond     Coordinate covalent bond
13.  $\text{CH}_3\text{MgI}$  reacts with -----to form  $\text{CH}_3\text{-CH}_2\text{-CH(OH)-CH}_3$ .  
  $\text{CH}_3\text{CHO}$       $\text{CH}_3\text{CH}_2\text{CHO}$       $\text{CH}_3\text{COCH}_3$       $\text{C}_2\text{H}_5\text{OH}$
14. Wolf Kishner reaction is used for the reduction of  
 Olefins     Carboxylic acids  
 Nitro compounds     Carbonyl compounds

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15. The substance that is so effective, which can suppress the rate as well as degree of polymerization is?  
 Retarder       Inhibitor       Promoter       Cation and Anion

II. Fill in the blanks with appropriate words/symbols.

16. Organic compounds generally exhibit -----bonding.
17. Diethyl ether reacts with HCl to yield -----(give structural formula).
18. The reactivity order of the alkyl halide for  $S_N1$  reaction is -----.
19. Ziegler-Natta polymerization offers linear polymer and-----as its major advantages.
20. During sulphonation of benzene,-----generates as the electrophile.



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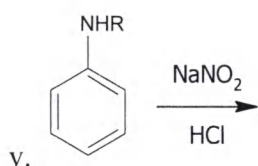
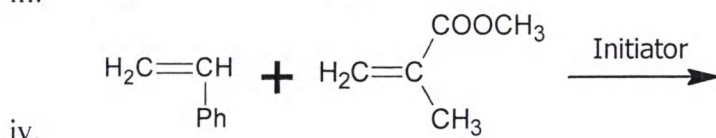
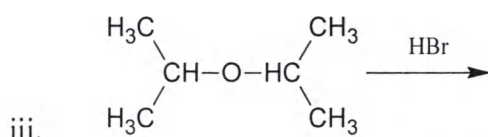
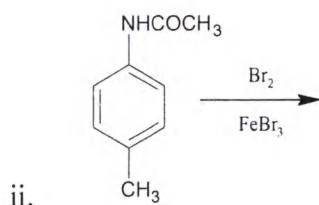
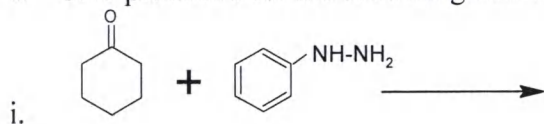
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F. M. : 55

SECTION "B"

Attempt ALL questions.

1. a. Draw structural formulas of [4 × 1 = 4]  
i. 3-Ethyl-2-methylhexane ii. 3-Methylcyclohexene  
iii. Methyl benzoate iv. 1-Bromo-2-chlorocyclobutane  
b. Write down the chemical reaction of primary, secondary and tertiary amines with  $\text{CH}_3\text{COCl}$ . [2]  
c. How can you show that alcohol acts as weak acids and weak bases? [2]

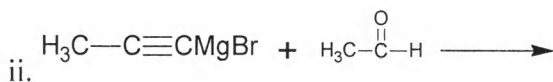
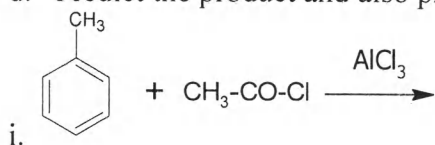
2. a. Give product/s for the following reactions. [5 × 1 = 5]



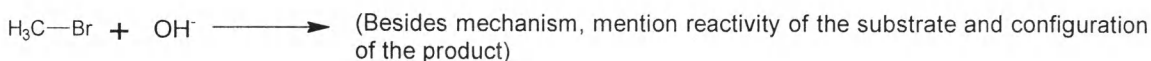
- b. What happens when alkanes are burnt in presence or in absence of oxygen (write chemical reactions)? [2]  
c. What happens when  $\text{CH}_3\text{-CH=CH}_2$  reacts with  $\text{Cl}_2$  in high temperature (gas phase) and low temperature (in  $\text{CCl}_4$  solution)? [2]

3. Give appropriate reasons (*ANY FOUR*). [4 × 2 = 8]
- Electrophilic substitution in nitrobenzene takes place at *meta* position.
  - Amino acids are soluble in water.
  - Nucleophilic aromatic substitution reaction goes with extreme difficulty.
  - Aldehydes are more reactive than ketones.
  - Acyl halides are the most reactive derivatives of carboxylic acids.

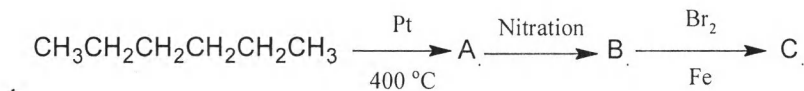
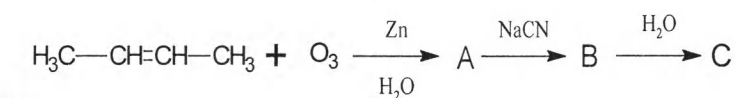
4. a. How can you selectively prepare *cis* and *trans* alkene from alkyne? [2]  
 b. Highlight the physical properties of carboxylic acids? [2]  
 c. Organometallic compounds function as either bases or nucleophiles. Elaborate the statement. [2]  
 d. Predict the product and also propose the mechanism for the following reaction. [2 × 3 = 6]



iii.



5. Assign structures to the compounds represented by the letters for the following series of reactions. [2 × 3 = 6]



6. Write short notes on (*ANY FOUR*) [4 × 3 = 12]
- Fibers
  - Aldol reaction
  - Organic chemistry in environmental studies
  - Mechanism of enzyme action
  - Nucleophilic aliphatic substitution