

B.Sc. CHEMISTRY
THIRD SEMESTER
ORGANIC CHEMISTRY II
BSC – 302 [SPECIAL REPEAT]
[USE OMR FOR OBJECTIVE PART]

**SET
A**

Duration : 3 hrs.

Full Marks : 70

Time : 30 min.

(Objective)

Marks : 20

Choose the correct answer from the following:

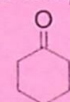
1X20=20

- Which is **not** a correct statement for an S_N1 reaction?
 - Proceed with inversion of configuration for a chiral substrate
 - weak nucleophile will favour the reaction.
 - carbocation is formed as an intermediate.
 - favoured by protic polar solvent.
- The strength of nucleophile CH_3O^- , CH_3S^- , $t-BuO^-$ will follow the order
 - $CH_3O^- > CH_3S^- > t-BuO^-$
 - $CH_3S^- > CH_3O^- > t-BuO^-$
 - $t-BuO^- > CH_3O^- > CH_3S^-$
 - $CH_3S^- > t-BuO^- > CH_3O^-$
- For $CH_3Br + ^-OH \rightarrow CH_3OH + Br^-$,
the rate of reaction is given by the expression :
 - rate = $k [CH_3Br]$
 - rate = $k [^-OH]$
 - rate = $k [CH_3Br] [^-OH]$
 - rate = $k [CH_3Br]^a [^-OH]^a$
- A and B in the following sequence of reactions are respectively
$$ROH \xrightarrow{SOCl_2} A \xrightarrow{AgCN} B$$
 - ROCl and RCN
 - RCI and RCN
 - RCI and RNC
 - ROCl and RNC
- For preparation of any p-alcohol using Grignard reagent (GR), need
 - GR + HCHO
 - GR + RCHO
 - GR + Ketone
 - GR + H_2O
- Boiling point of the following: (1) Ethanol, (2) Dimethyl ether and (3) Propane will follow the order.
 - Dimethyl ether > Ethanol > Propane
 - Ethanol > Dimethyl ether > Propane
 - Ethanol > Propane > Dimethyl ether
 - Dimethyl ether > Ethanol > Propane
- Ethyl acetate reacts with two equivalent of CH_3MgBr to form
 - secondary alcohol
 - tertiary alcohol
 - primary alcohol and acid
 - acid

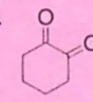
8. An organic compound A reacts with sodium metal and forms B. On heating with conc. H_2SO_4 , A gives diethyl ether. A and B are respectively -
- C_2H_5OH and C_2H_5ONa
 - C_2H_5OH and CH_3ONa
 - C_3H_7OH and C_3H_7ONa
 - CH_3OH and C_2H_5ONa
9. Phenol reacts with aqueous bromine to give -
- o- and p- bromo phenol
 - p-bromo phenol
 - m- bromo phenol
 - 2, 4, 6-tri bromo phenol.
10. Rosenmund reduction of Benzoyl chloride will produce
- benzylalcohol
 - benzaldehyde
 - acetophenone
 - Toluene
11. The alcohol which will give aldehyde upon selective oxidation is
- 3° alcohol
 - 1° alcohol
 - 2° alcohol
 - all type of alcohol
12. Reduction of benzaldehyde with excess $Zn-Hg/HCl$ will give
- Benzyl alcohol
 - Toluene
 - Mixture of benzyl alcohol & toluene
 - none of them
13. Schiff base is a compound can be prepared by the reaction between carbonyl compound and
- 1° amine
 - 2° amine
 - 3° amine
 - all type of amine

14. The compound having active methylene group is

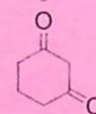
a.



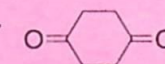
b.



c.



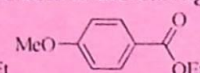
d.



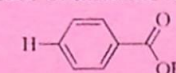
15. Oxime can be prepared by the reaction between a carbonyl compound and
- NH_3
 - NH_2OH
 - H_2N-NH_2
 - any 1° amine
16. Arrange the following esters in increasing ease of alkaline hydrolysis



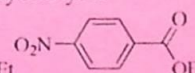
I



II



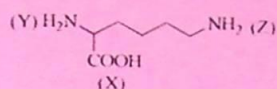
III



IV

- $II < III < I < IV$
- $IV < I < III < II$
- $II < I < III < IV$
- $IV < III < I < II$

17. In the compound given below, the correct order of acidity of the positions X, Y and Z is



- a. $Y < Z < X$
 b. $X < Z < Y$
 c. $Z < Y < X$
 d. $X < Y < Z$
18. Which among the following reacts fastest with dil. aq NaOH?
 a. Butanoic acid
 b. Butanoyl chloride
 c. Butanamide
 d. Butanoic anhydride
19. Nucleophilic acyl substitution is preferred over alkyl substitution because it involves
 a. Hexavalent carbon intermediate
 b. Pentavalent carbon intermediate
 c. Tetravalent carbon intermediate
 d. Trivalent carbon intermediate
20. On treatment with Raney nickel, thiols readily form the corresponding
 a. Mercaptals
 b. Mercaptols
 c. Thioesters
 d. Hydrocarbons

(Descriptive)

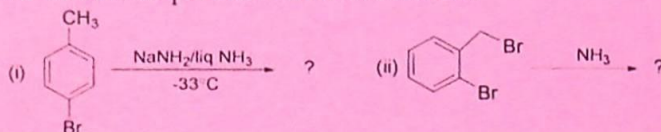
Time : 2 hrs. 30 min.

Marks : 50

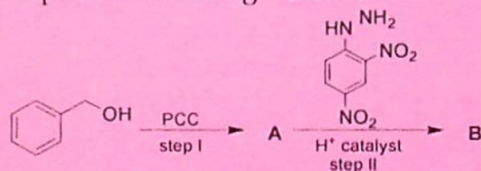
[Answer question no.1 & any four (4) from the rest]

1. a. Write down the product with mechanism

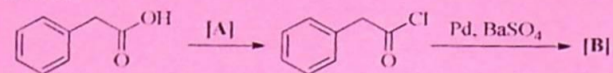
3+2+3+
2=10



- b. Write the structures of A & B and depict the mechanism of the second step of the following reaction.



c. Identify the reagent and product A and B in the following reaction



2. a. What are nucleophiles? what is the difference between a nucleophile and a base? All nucleophiles are bases but all bases are not nucleophiles, justify. 3+4.5
+2.5=10

b. How can you prepare the following compounds using appropriate starting materials?

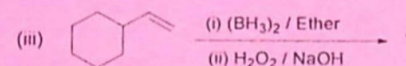
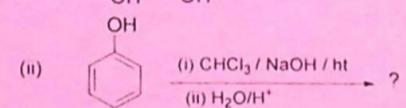
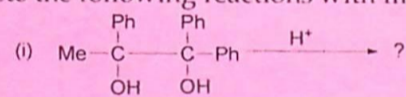


c. Discuss mechanism and kinetics of a general SN^2 reaction. Indicate the energy profile of the reaction

3. How can you prepare Grignard reagent in laboratory? What is the role of ether in their preparation? Why ether need to be dry? (b) How can you prepare the following compounds starting from CH_3MgBr ? 4+6=10

(i) Iso-propyl alcohol. (ii) Acetic acid.
(iii) Ethyl methyl ketone.

4. a. Complete the following reactions with mechanism 7.5+2.5
=10

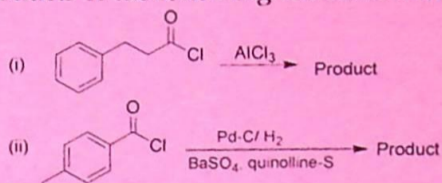


b. Arrange the following compounds in order of their increasing acidic strength. Justify your answer.

(i) $\text{C}_2\text{H}_5\text{OH}$, (ii) $\text{C}_6\text{H}_5\text{OH}$ and (iii) CH_3COOH

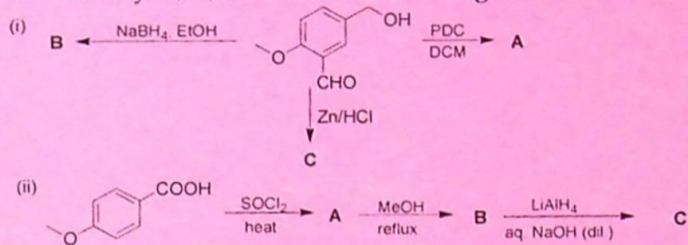
5. a. Discuss the Aldol reaction with substrate selection, reagent and product formation along with the reaction mechanism. 4+3+3
=10

b. Write the products of the following reactions with mechanism.

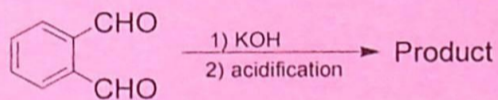


6. a. Identify A, B, and C of the following reactions

3+3+4
=10

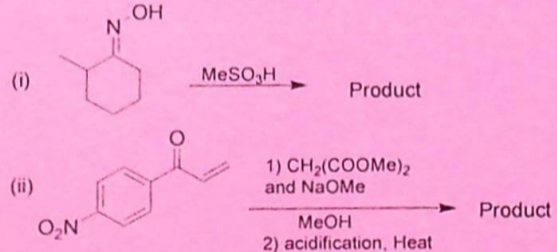


b. Write down the products of the following reaction with mechanism

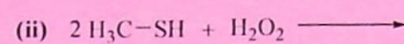
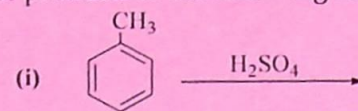


7. a. Write down the products of the following reactions

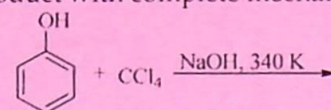
2+3+2+
3=10



b. Write the products of the following reactions.



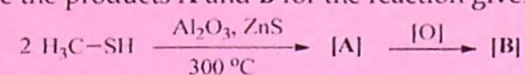
c. Write the product with complete mechanism



8. a. Monocarboxylic acids show higher boiling points compared to alcohols. Justify the statement.

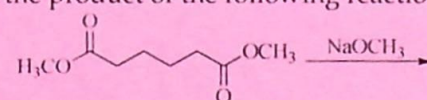
2+2+2+
1+3=10

b. Write the products A and B for the reaction given below.

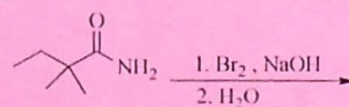


c. Arrange the following in order of acidity and give reason for your answer. 2-chloroethanoic acid, 2-fluoroethanoic acid, propanoic acid, ethanoic acid

d. Write the product of the following reaction



e. Write the product with complete mechanism of the following reactions.



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