

**B.SC. CHEMISTRY
THIRD SEMESTER
ORGANIC CHEMISTRY II
BSC – 302**

**SET
A**

[USE OMR SHEET FOR OBJECTIVE PART]

Duration: 3 hrs.

Full Marks: 70

(PART-A: Objective)

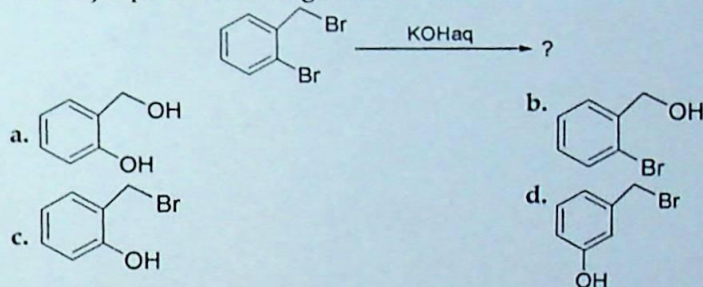
Time: 30 min.

Marks: 20

Choose the correct answer from the following:

1X20=20

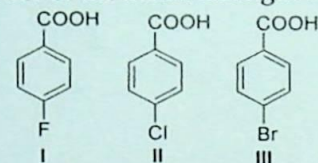
- For preparation of any p-alcohol using Grignard reagent (GR), need
 - GR + HCHO
 - GR + RCHO
 - GR + Ketone
 - GR + H₂O
- An organic compound A reacts with sodium metal and forms B. On heating with conc. H₂SO₄, A gives diethyl ether. A and B are respectively –
 - C₂H₅OH and C₂H₅ONa
 - C₂H₅OH and CH₃ONa
 - C₃H₇OH and C₃H₇ONa
 - CH₃OH and C₂H₅ONa
- The major product in the given reaction



- Which is a not a correct statement for an SN² reaction?
 - Proceed with inversion of configuration
 - strong nucleophile will favour the reaction.
 - weak nucleophile will favour the reaction.
 - polar aprotic solvent favour SN² mechanism.
- A and B in the following sequence of reactions are respectively
$$\text{ROH} \xrightarrow{\text{SOCl}_2} \text{A} \xrightarrow[\text{dry ether}]{\text{Mg metal}} \text{B}$$
 - ROCl and ROMg
 - RCl and RMgCl
 - RCl and RMgOCl
 - ROCl and RCl
- Strength of the following nucleophile will be of the order:
 - CH₃S⁻ > CH₃O⁻ > t-BuO⁻
 - CH₃O⁻ > CH₃S⁻ > t-BuO⁻
 - t-BuO⁻ > CH₃S⁻ > CH₃O⁻
 - CH₃S⁻ > t-BuO⁻ > CH₃O⁻

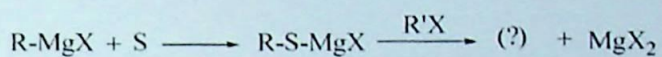
7. The example of a trihydric alcohol is
 a. glyceraldehyde
 c. ethylene glycol
 b. glycerol
 d. ethanol
8. Acetone when reacts with methyl magnesium bromide (CH_3MgBr) produce
 a. 1° alcohol
 c. 3° alcohol
 b. 2° alcohol
 d. no reaction
9. The main reagent for Hydroboration - Oxidation reaction of alkene is
 a. B_2H_6
 c. $\text{CrO}_3\text{-H}_2\text{SO}_4$
 b. H_2/Pd
 d. $\text{Hg}(\text{OAc})_2$
10. When cyclohexene is treated with mCPBA, the product is a/an
 a. alcohol
 c. aldehyde
 b. epoxide
 d. ketone
11. Benzene diazonium chloride upon reaction with aqueous solution produce
 a. benzene
 c. catechol
 b. Bromobenzene
 d. Phenol
12. Reimer-Tieman reaction proceed via the formation of
 a. free radical
 c. carbanion
 b. carbocation
 d. carbene

13. The correct order of the acidic strength of the following:



- a. I>II>III
 c. III>II>I
 b. III>I>II
 d. I>III>II
14. Hoffmann Bromamide reaction convert
 a. primary amide to a primary amine
 c. primary amide to an aldehyde
 b. primary amide to a primary alcohol
 d. primary alcohol to a primary amine
15. The substrate which can undergo Cannizzaro reaction is
 a. Enolizable aldehyde
 c. Enolizable ketone
 b. Non-enolizable aldehyde
 d. Non-enolizable ketone
16. The intermediate compound of Aldol reaction is
 a. α -Hydroxy ester
 c. β -Hydroxy ester
 b. α -Hydroxy carbonyl
 d. β -Hydroxy carbonyl
17. The compound which can be used as Michael acceptor is
 a. α - β unsaturated carbonyl
 c. γ - δ unsaturated carbonyl
 b. β - γ unsaturated carbonyl
 d. All of these

18. The alcohol which does not undergo oxidation with PDC is
- a. isopropanol
 - b. tertiary butanol
 - c. benzyl alcohol
 - d. Ethanol
19. What is the main product obtained by the oxidation of thioethers with KMnO_4
- a. Sulphone
 - b. Sulphide
 - c. Thioacetals
 - d. Sulphoxide
20. Which is the main product of the following reaction?



- a. Thiols
- b. Thioethers
- c. alkane
- d. Halo acids

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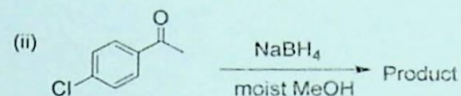
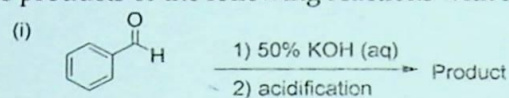
(PART-B : Descriptive)

Time : 2 hrs. 30 min.

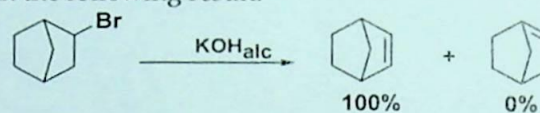
Marks : 50

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

1. a. Write the products of the following reactions with reaction mechanism 3

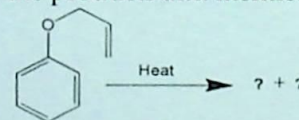


- b. Explain the following result. 2



- c. a. How will you prepare salicylaldehyde starting from phenol via Reimer-Tiemann reaction? Show the detailed mechanism. 3

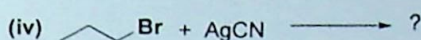
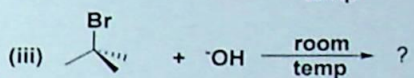
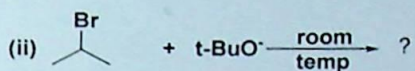
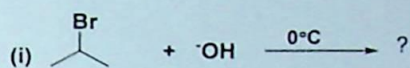
- b. Write down the products and mention which one is the major product 2



2. a. Discuss the stereochemical changes that may be observed when an optically active substrate undergo nucleophilic substitution following S_N1 mechanism. 3
- b. "A strong nucleophile favour S_N2 mechanism and weak nucleophile favours an S_N1 mechanism." Justify the statement. 3

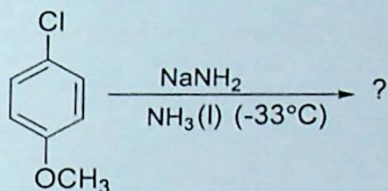
c. Predict the products in the following reactions:

4



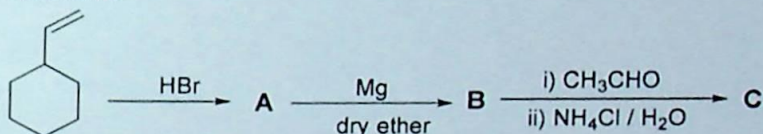
3. a. Write down the product / products formed in the following reaction with mechanism.

3



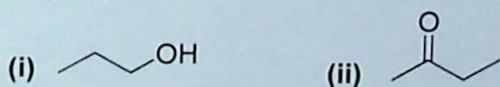
b. Write down the products A, B and C in the following sequence of reactions

3



c. Sketch out a strategy for synthesis of the following compounds using $\text{CH}_3\text{CH}_2\text{Br}$

4



4. a. How will you prepare ethanol from acetaldehyde. Why is the boiling point of ethanol greater than acetaldehyde-explain schematically?

1+2=3

b. Write down the structure of picric acid, 2-nitrophenol and 2-ethylphenol and comment which one is more acidic in nature.

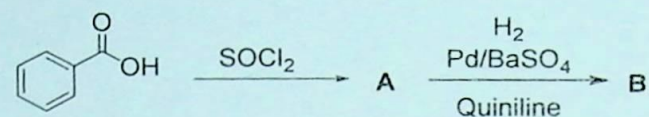
2

c. Describe Pinacol-pinacolone rearrangement.

3

d. How can you prepare epoxide from halohydrins? Explain with a suitable example. 2

5. a. Write the reagents (A & B) of the following reactions. 2



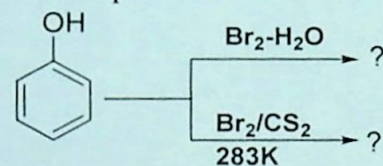
b. Write a short note on Cannizzaro reaction. 5

c. What product will be formed if CO_2 is treated with 2 equivalents of PhLi in anhydrous THF followed by acidic treatment? 3

6. a. Why 4-nitrophenol has greater boiling point than 2-nitrophenol - draw the structures in support of your answer? 2

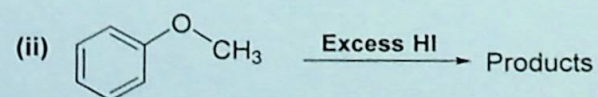
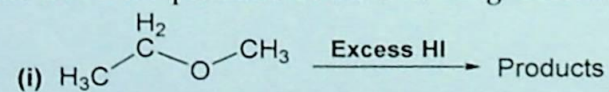
b. Describe Kolbe-Schmitt reaction and show the mechanism for the formation of salicylic acid from phenol. 3

c. Write down the products 2



d. Write down the short note on Fries Rearrangement with detailed mechanism? What is the role of AlCl_3 in the reaction? 3

7. a. Write down the products of the following reactions 2

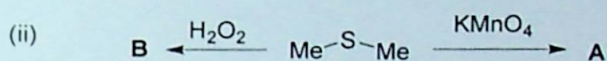
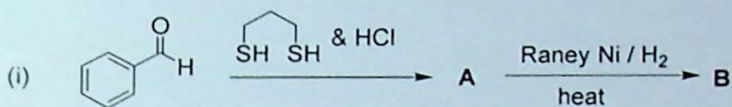


b. Show the mechanistic pathway of Curtius Rearrangement. 3

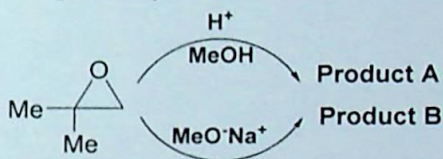
c. Write down the structure of Maleic acid and Fumaric acid. Which one can form corresponding anhydride easily upon heating via intramolecular dehydration? Draw the structure of that anhydride. 3

d. How will you prepare Phthalic anhydride from Phthalic acid? 2

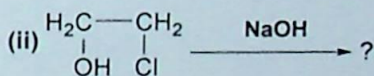
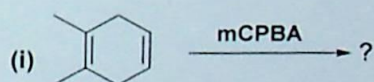
8. a. Identify 'A' & 'B' of the following reactions. 3+2 = 5



b. Write down the product A and B? Show most appropriate mechanistic pathway for the formation of A and B 3



c. What will be the product of the following reaction 2



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