



DOON UNIVERSITY, DEHRADUN

End Semester Examination,

2017-2018

School of Physical Sciences (SoPS)

Date: Dec 2017

Integrated M.Sc. 5 Years (Chemistry)

3rd Semester

Course Title: *Org. Chem. II: Oxygen Containing Functional Groups* Course Code: *CYC-203*

Time Allowed: 03 Hours

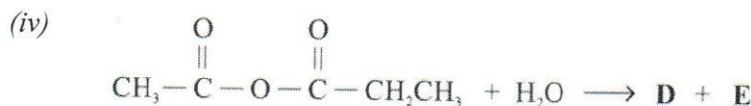
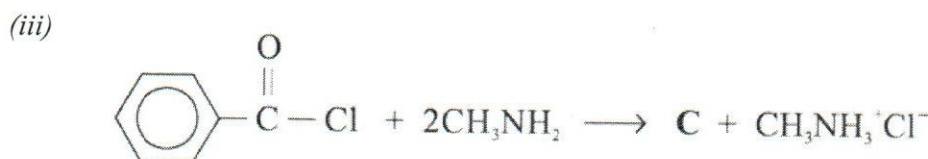
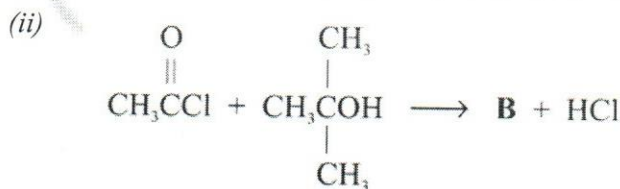
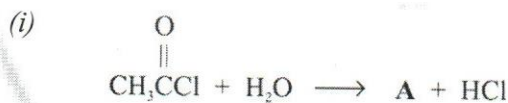
Maximum Marks: 30

Note: Attempt All Questions from Sections A,B,C.

SECTION: A

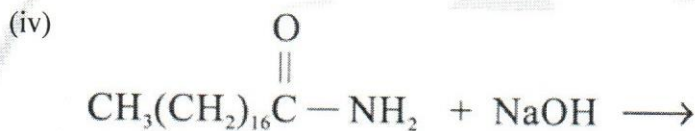
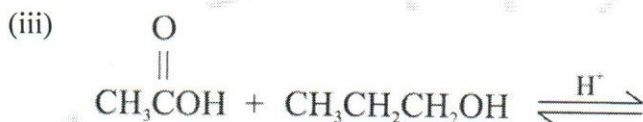
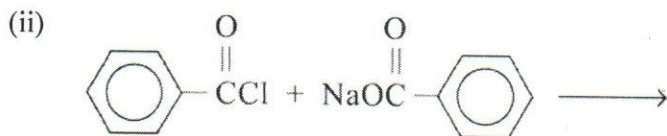
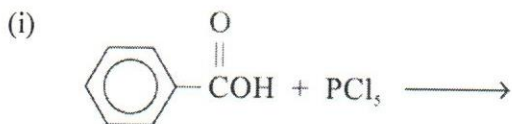
(Marks: 6)

[1] Draw the structural formula of the missing compounds A to D. [1/4+1/4+1/4+1/4]



[2] Explain why ethanoyl chloride must be protected from atmospheric moisture during storage. [1]

[3] Complete the following reactions: [1]



[4] Write the chemical equations for the acid-catalyzed and alkali-catalyzed hydrolyses of each of the following compounds: [1]

(a) Ethyl butanoate

(b) Propanamide

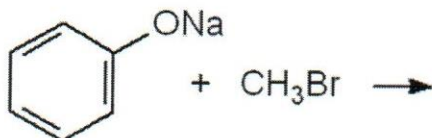
(c) Benzoyl Chloride

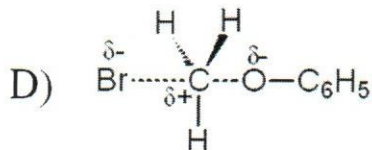
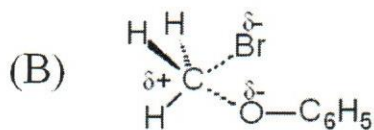
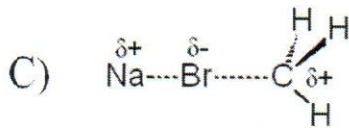
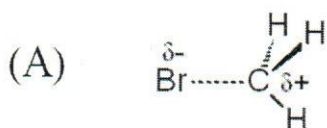
[5] (a) Arrange the following compounds in decreasing order of solubility in water: [1/2]



(b) Propanedioic acid forms intramolecular hydrogen bonds. Draw its structural formula, showing clearly the formation of intramolecular hydrogen bonds. [1/2]

[6] (a) Which of the following best represents the rate-determining transition state for the reaction shown below, and **Why**? [1/2]





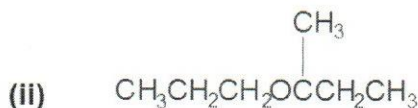
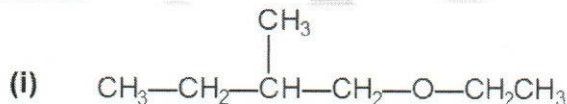
(b) Most effective pair of reagents for the preparation of *tert*-butyl ethyl ether is [1/2]

- A) potassium *tert*-butoxide and ethyl bromide.
 B) potassium *tert*-butoxide and ethanol.
 C) sodium ethoxide and *tert*-butyl bromide.
 D) *tert*-butyl alcohol and ethyl bromide

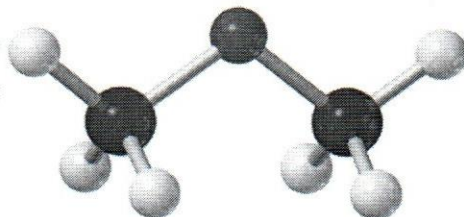
SECTION: B

(Marks: 12)

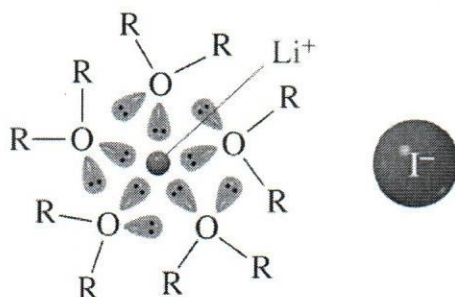
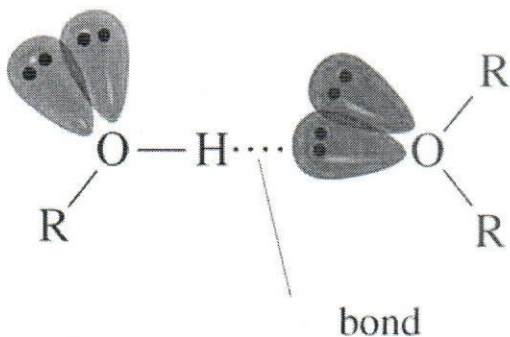
[7] (a) Give the major products that are formed by heating each of the following ethers with HI. [1]



(b) See the following image and briefly describe the compound in terms of electron domain geometry, molecular geometry, shape, angle around central atom and hybridization. [1]

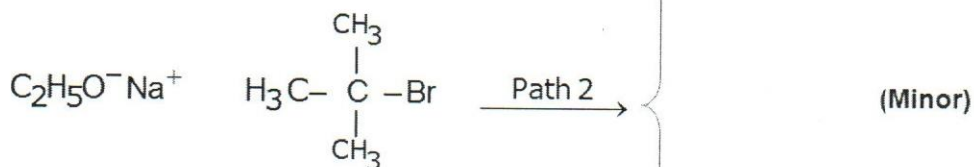
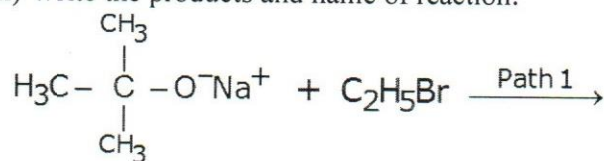


[8] (i) Comment on the following two images: [1]



(ii) Write the products and name of reaction:

[1]

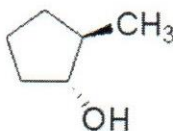
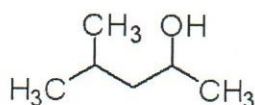
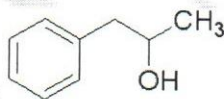


(Minor)

(Major)

[9] (a) What will be the product of dehydration of following alcohols?

[1]



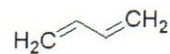
(b) Predict the starting compound for following reactions:

[1/2]

?

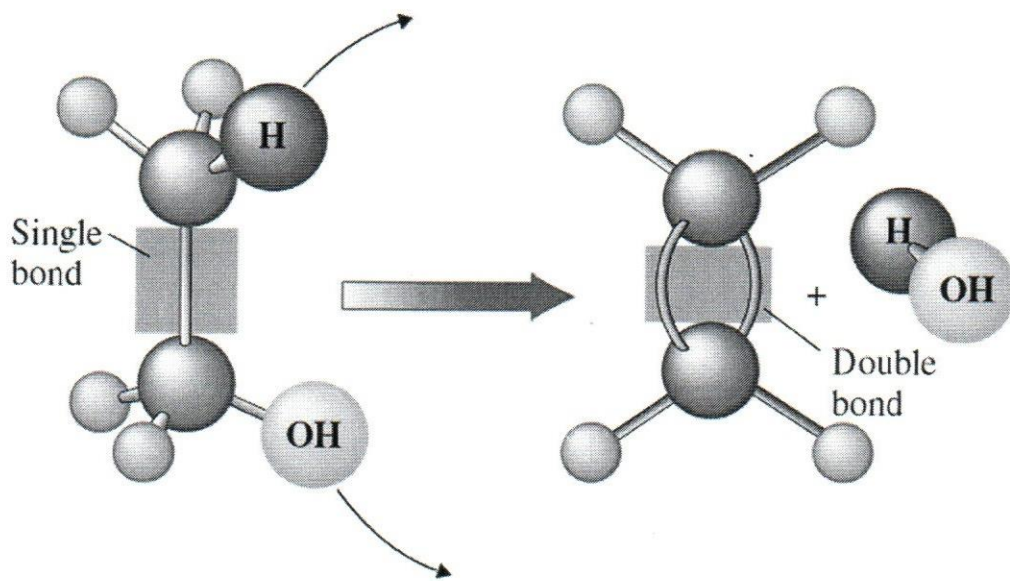


?



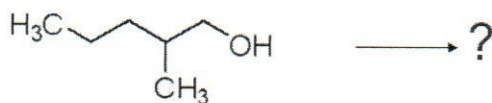
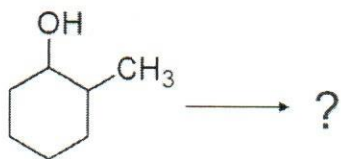
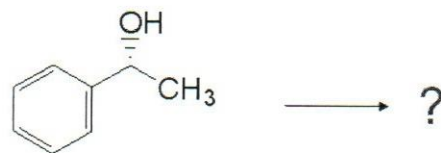
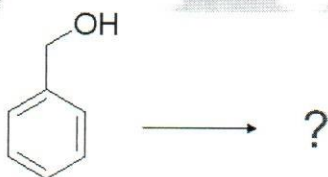
(c) Comment on following type of reaction:

[1/2]



[10] (a) Write the products in the following oxidation reaction:

[1]



(b) Write short note on Periodic Acid Oxidation of Glycols. [1]

[11] (a) Write Short notes on: [1]

- (i) *Bouveault-Blanc reduction*
- (ii) *Williamson's Process*

(b) *Pinacol-Pnacolone Rearrangement and its mechanism.* [1]

[12] (a) Write a detailed note on Lead tetraacetate (LTA) in context of Glycols? [1]

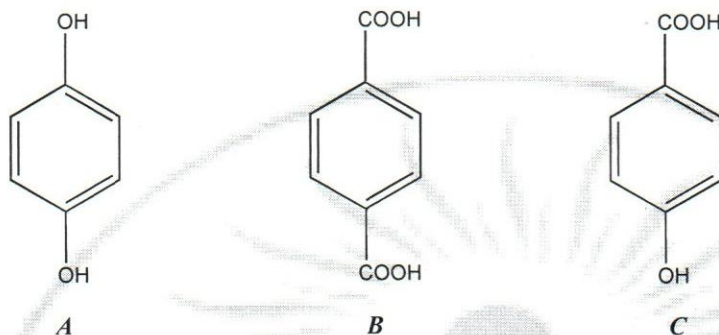
(b) Explain the reason for difference in acidic strength of Phenol and Acetic Acid? [1]

SECTION: C

(Marks: 12)

[13] Answer the following:

(i) Outline a chemical test to distinguish between **A** and **B**? [1]



(ii) Compound **C** also gives a +ve result on reaction with NaHCO_3 . Show how you would determine whether the sample is **C** or a mixture of **A** and **B**? [1]

(iii) Write a note including the mechanism of following reactions: [4]

- Kolbe Reaction
- Reimer Tiemann's Reaction
- Fries Rearrangement
- Claisen Rearrangement

[14] Describe in details the mechanism and other aspects of the following reactions: [1.5+1.5+1.5 + 1.5]

- Claisen Condensation
- Dieckmann Cyclization
- Reformatsky reaction
- Industrial Preparation of Phenol