

**B.Sc. 3rd Semester (Honours) Examination, 2019-20****CHEMISTRY****Course ID : 31413****Course Code : SHCHE/303/C-7****Course Title: Organic Chemistry–III****Time: 1 Hour 15 Minutes****Full Marks: 25**

*The figures in the margin indicate full marks.  
Candidates are required to give their answers in  
their own words as far as practicable.*

**1. Answer any five questions:**

1×5=5

(a) Arrange the following compounds in order of increasing rate of nitration:

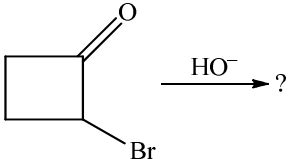
PhMe, C<sub>6</sub>H<sub>6</sub>, C<sub>6</sub>D<sub>6</sub>, PhNO<sub>2</sub>, PhCl(b) Convert: n-C<sub>3</sub>H<sub>7</sub>COOH  $\longrightarrow$  n-C<sub>4</sub>H<sub>9</sub>OH

(c) Complete the following reaction:

Phenol  $\xrightarrow{\text{CCl}_4/\text{NaOH}}$  ?

(d) Give an example of non-aqueous green solvent.

(e) Predict the product :



(f) Write down the missing compound A

CH<sub>2</sub>=CH—CH<sub>2</sub>—C≡CH  $\xrightarrow{\text{Br}_2(1\text{mole})}$  A

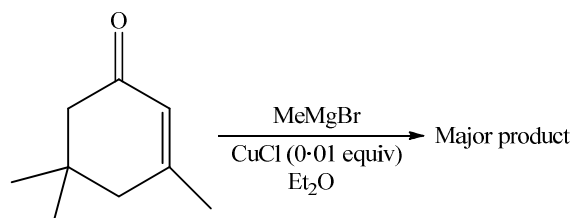
(g) What is Gilman's reagent?

(h) Complete the following reaction:

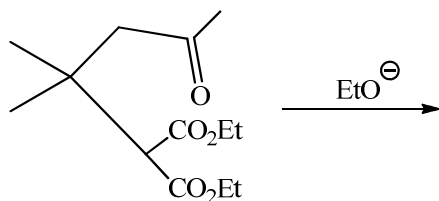
PhCHO  $\xrightarrow[\text{D}_2\text{O}]{\text{NaOD}}$  ? + ?**2. Answer any two questions:**

5×2=10

(a) (i) Explain the formation of major product of the following reaction



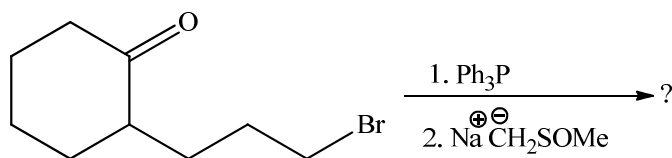
(ii) Give product with mechanism:



$2\frac{1}{2}+2\frac{1}{2}=5$

(b) (i) What are phosphorus ylides? How are they generated? Show the steps in the reaction of this ylide with carbonyl compound.

(ii) Give the product of the following reaction:

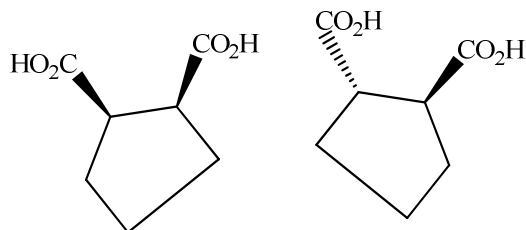


$(1+1+1\frac{1}{2})+1\frac{1}{2}=5$

(c) (i) Identify the products A and B in the following reaction and give mechanism:



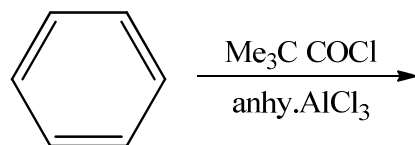
(ii) How the following set of compounds can be distinguished?



$3+2=5$

(d) (i) Write short note on Hell-Volhard-Zelinsky (H.V.Z.) reaction.

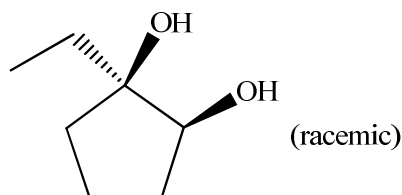
(ii) Give the product with explanation



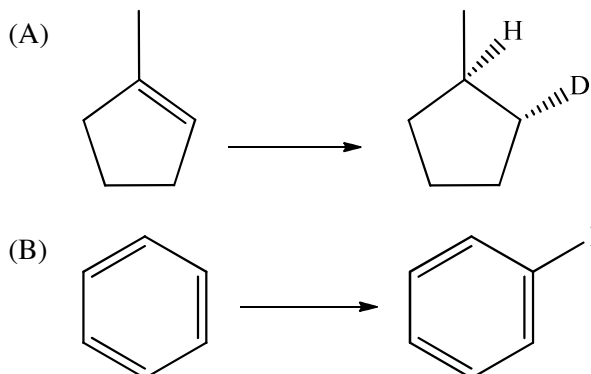
$3+2=5$

3. Answer *any one* question:

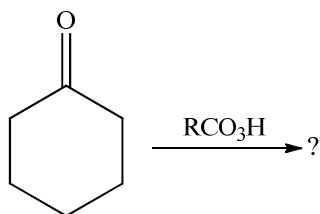
(a) (i) Specify the alkene and reagents needed to synthesise the following diol:



(ii) Carry out the following conversions:



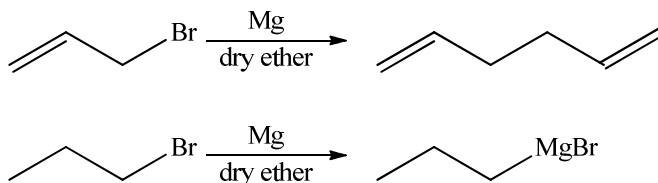
(iii) Predict the product of the following reaction and propose a mechanism.



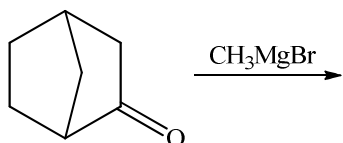
(iv) HCN does not add on to  $C=C$ , but to  $\begin{array}{c} \diagup \\ C=O \\ \diagdown \end{array}$ , why?

2+(2+2)+2+2=10

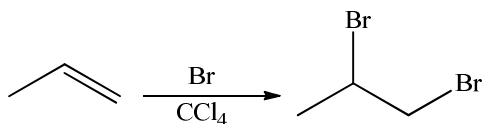
(b) (i) Account for the following observations:



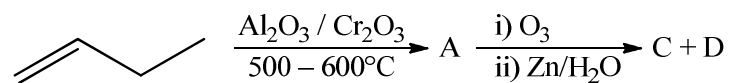
(ii) Identify the stereochemical product(s) of the following reaction and explain their formation.



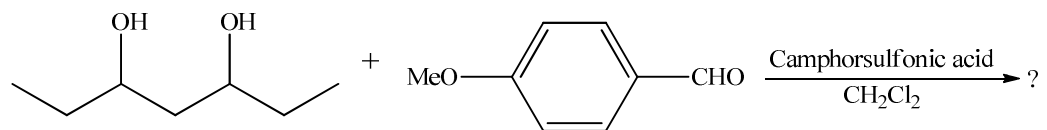
(iii) What is atom economy in green chemistry? Calculate atom economy in the following reaction:



(iv) Identify the products:



(v) Give the product:



$$2+2+(1+1)+3+1=10$$

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