B.Sc. Semester-III Examination, 2022-23

CHEMISTRY [Honours]

Course ID : 31413   Course Code : SH/CHE/303/C-7

Course Title : Organic Chemistry-III

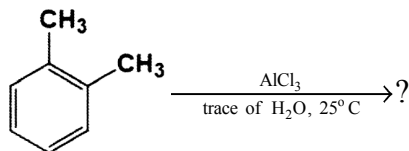Time : 1 Hour 15 Minutes   Full Marks : 25
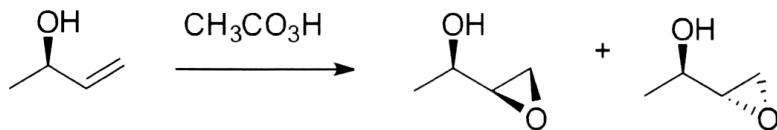
The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

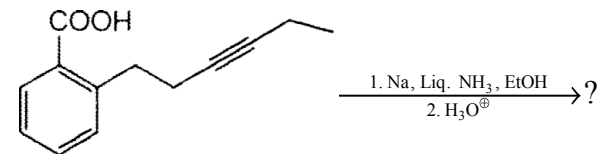1.   Answer any **five** of the following questions: $1×5=5$

   a)   Predict the major product of the following reaction:
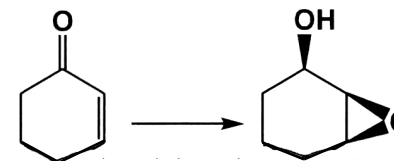

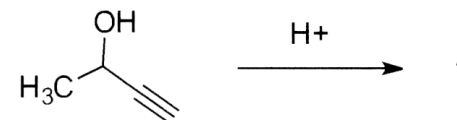   b)   Which of the product is major and why?

   c)   Write the structure of the reduced product

   d)   Mention two weaknesses of Cram's rule.

   e)   Provide suitable reagent(s) to effect the following conversion:

   f)   What happens when *p-tert*-butylphenol is treated with conc. H_2SO_4?

   g)   Write the structure of the product:

   h)   Give one principle of Green Chemistry where cost effectiveness is given less priority.

2.   Answer any **two** of the following questions: $5×2=10$

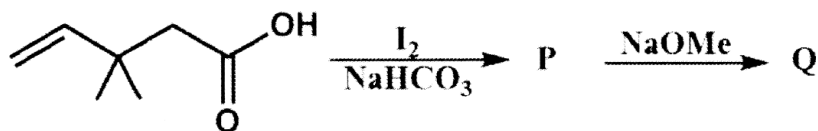   a)   i)   Give products of the following reactions with mechanism: $2+1\frac{1}{2}=3\frac{1}{2}$

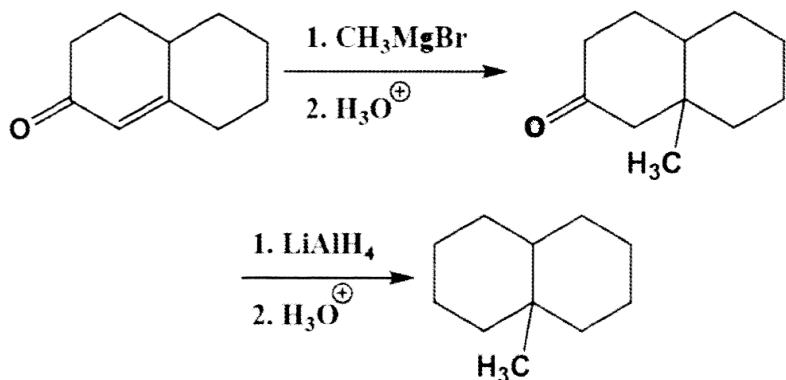d) Give the example of Gilman cuprates reagent. Find the reagents A, B, C, D. 1+4=5
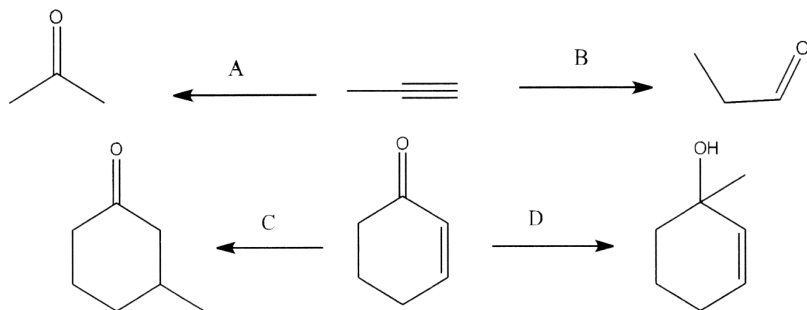
3. Answer any **one** of the following questions:

$$10 \times 1 = 10$$

a) i) Identify the products P and Q: 2

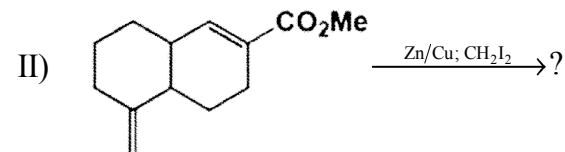ii) The following reaction scheme contains one or more flaws. How would you correct the scheme? 2
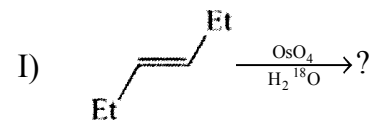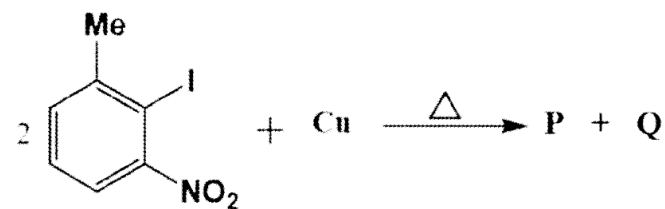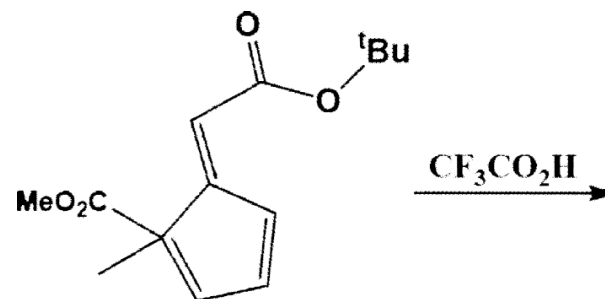

iii) Predict the product(s) in the following reactions along with stereochemistry whenever applicable. 1+1=2

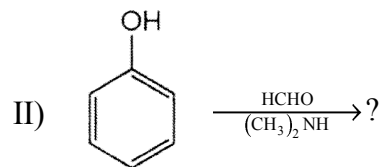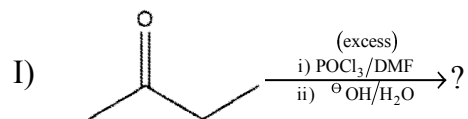I)

II)

iv) Draw the structures of P and Q. 1+1=2

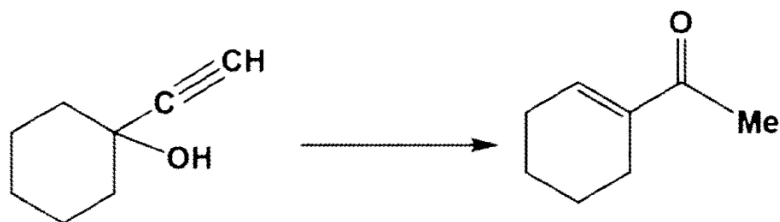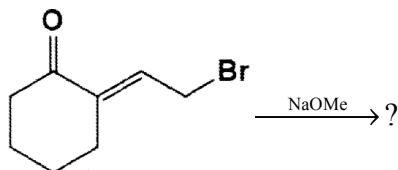v) Give mechanism of ester hydrolysis. 2

I)

i) $POCl_3/DMF$ (excess)
ii) $^{\ominus}OH/H_2O$ → ?

II)
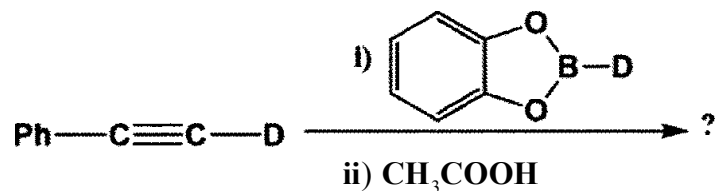

$\xrightarrow[\text{(CH}_3)_2\text{NH}]{\text{HCHO}}$?

ii)   Write suitable reagent for the following conversion: $1\frac{1}{2}$
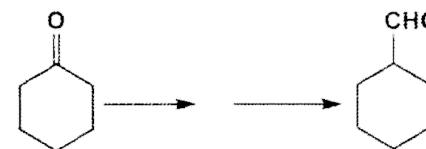

b)   i)   Predict the product with mechanism.   2

$\xrightarrow{\text{NaOMe}}$?

ii)   Give product with stereochemistry.   2

$Ph{-}C{\equiv}C{-}D$

i)

ii) CH_3COOH → ?

iii)   Give the major product formed in the dinitration of 4-bromotoluene.   1

c)   i)   Carry out the following conversion using Wittig reaction: 2

ii)   Complete the following reaction (mention only product):   2

? $\xleftarrow[\text{2. H}_2\text{O}_2, \,^-\text{OH}]{\text{1. BH}_3, \text{THF, 160}^\circ\text{C}}$ $CH_3\overset{\overset{\displaystyle CH_3}{|}}{C}{=}CHCH_2CH_3$ $\xrightarrow[\text{2. H}_2\text{O}_2, \,^-\text{OH}]{\text{1. BH}_3, \text{THF, 25}^\circ\text{C}}$?
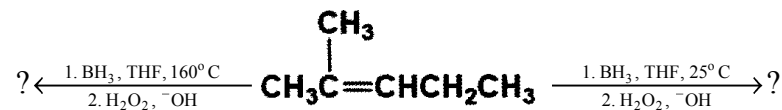
iii)   The reactant, M in the reaction below can be–   1

A)   o-bromoanisole

B)   m-bromoanisole

C)   either of o- or m-bromoanisole

D)   None of these

$M \xrightarrow[\text{Liq.NH}_3]{\text{NaNH}_2}$
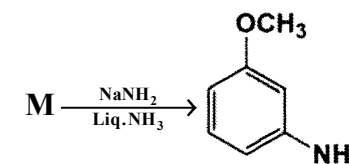
b) 1,3,5-Cycloheptatriene resonance energy 25 kJ/mol (5.9 kcal/mol). It is about six times smaller than the resonance energy of benzene – Explain.

Give the Kekulé forms of naphthalene with explanation.

What are the products of the following reactions?

$$3+2+(1\times5)$$

i)

1. B_2H_6, dyglyme

2. H_2O_2/OH^-

?

ii)

Pt/H_2 (1 mol)

?

iii) $PhCH = CHPh \xrightarrow[\text{Acetic acid}]{CH_3CO_3H} ?$
(E-isomer)

iv) Ph_2HC—⟨ ⟩—CH_3 $\xrightarrow[\text{CCl}_4 \text{ light}]{\text{excess Cl}_2}$?

v)

$\xrightarrow[\text{acetic acid}]{H_2SO_4}$?

————————