2019

B.Sc.

4th Semester Examination

CHEMISTRY (Honours)

Paper - C10T

(Organic Chemistry)

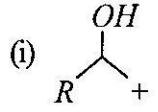
Full Marks : 40 Time : 2 Hours

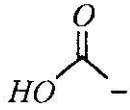
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.

Group - A

1. Answer any *five* questions : 2×5=10

(a) Write the synthetic equivalents of each of the following synthons.

(i) 

(ii) 

(b) Write down the major product with mechanism

$$Et_2NH \xrightarrow{HCHO/HCO_2H}$$

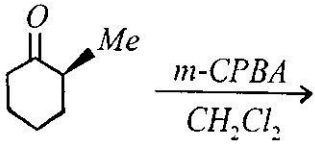
(c) Define the term stereo-selective reaction with an example.

(d) What changes do you expect in the UV spectrum of p-nitrophenol when its methanolic solution is made alkaine ?

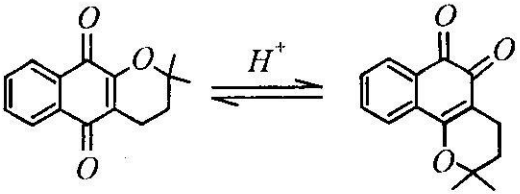
(e) Distinguish between the following molecules by ^1H NMR Spectroscopy.

CH_3OCH_3 and CH_3CH_2OH .

(f) Give the major product of the following reaction and rationalize.



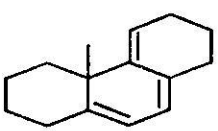
(g) Draw arrow pushing mechanism for the following chemical transformation.



(h) Define the terms "Consonant polarity" and "Dissonant polarity" with one example of each.

Group - B

2. (a) Calculate λ_{max} . Value of the following compound.



2½

(b) Ethanol is a good solvent for UV-visible spectroscopy but not for IR. Explain. 2½

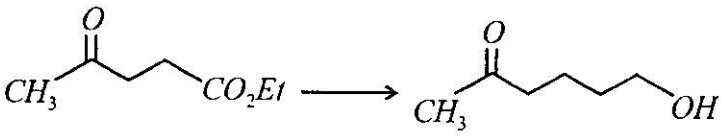
3. (a) Predict the major diastereo isomer in the following reaction using Felkin-Anh model.

$$(R)-CH_3-CH_2-C(OH)(CH_3)-COCH_3 \xrightarrow{EtLi} ?$$

3

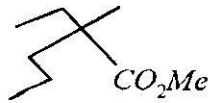
[Turn Over]

(b) Convert :

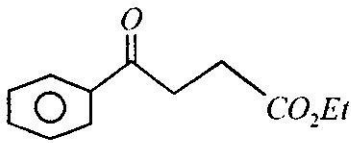


2

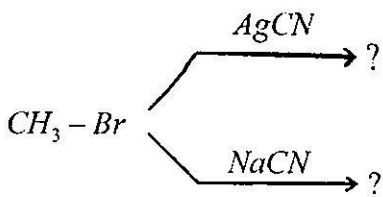
4. Synthesize the following compounds giving retro synthetic analysis (any *two*) : 2½+2½

(a) 

(b) 

(c) 

5. (a) Predict the product(s) with mechanism showing HOMO-LUMO interaction.

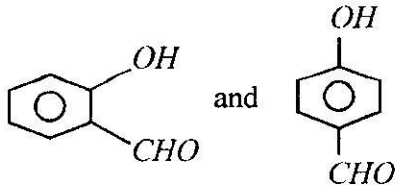


4

(b) Why Baeyer-Villiger rearrangement is not successful with acetaldehyde ? 1

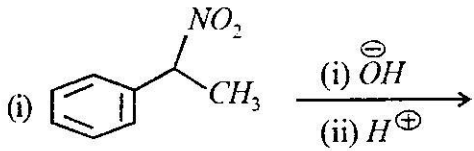
6. (a) The Chemical shift of a proton at 60 MHz instrument was found to be 120 Hz using TMS as internal standard. Find out the chemical Shift of the same proton when the spectra is recorded at 300 MHz instrument using TMS as internal standard. 2½

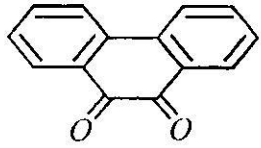
(b) How can you distinguish the following molecules by IR spectroscopy ?



2½

7. (a) Predict the product(s) and write suitable mechanism to show the formation.



(ii)  4

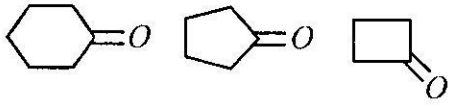
(b) What do you mean by asymmetric synthesis ? 1

Group - C

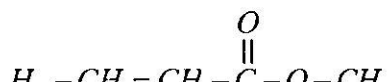
Answer any *one* question. 10×1

8. (a) Ethylene absorbs at 170 nm wavelength of light where as 1, 3 - butadiene absorbs at 217 nm. Explain with M.0 energy level diagram. 2

(b) Arrange the following compounds in the increasing order of carbonyl stretching frequency $\left(\overline{\nu}_{c=0}\right)$. 2

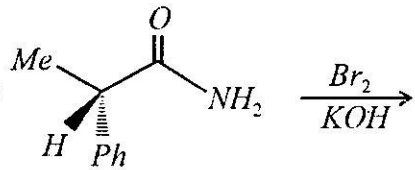


(c) How many signals are possible for the given compound and arrange them according to their chemical shift value.

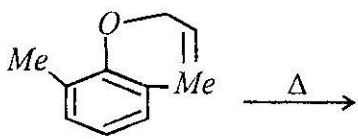
 2

(d) Predict the product(s) with mechanism (any *two*) : 2+2

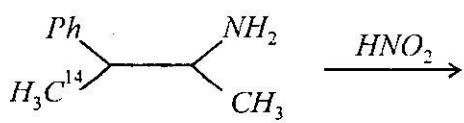
(i)



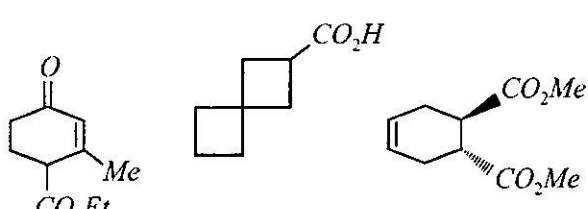
(ii)



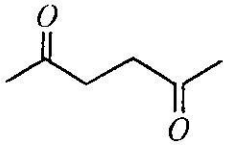
(iii)



9. (a) Synthesize the following compounds from suitable starting material (any *one*) :

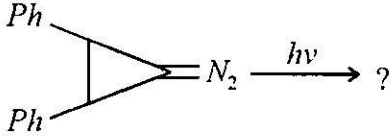


(b) Write the retrosynthetic analysis of the following compound. Give the synthetic method for the preparation of the compound



(c) Give one method for the synthesis of diazomethane.

(d) Explain the product with mechanism.



(e) An organic compound (MF : $C_8H_{10}O$) exhibited the following ^{1}H - NMR data :

$\delta 2.5(3H, S)$, $3.8(3H, S)$,

$6.8(2H, d, J = 8\text{Hz})$,

$7.2(2H, d, J = 8\text{Hz})$ ppm. Predict the structure of the compounds. 2+2+1+2+3