

B.Sc. (Honours) Examination, 2019

Semester-VI

Chemistry (Honours)

Course: BCHC-62

(Organic Chemistry)

Time: Three Hours

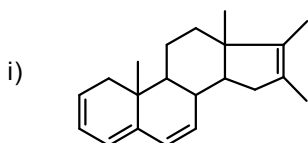
Full Marks: 30

Questions are of value as indicated in the margin.

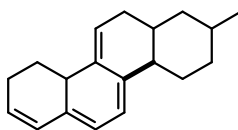
Answer **three** questions taking **any one question** from **each of the units**.

Unit-I

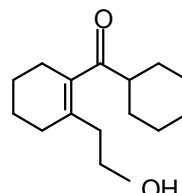
1. a) The position of $\lambda_{\max}$ of acetone shifts in different solvents: 279nm(hexane); 272 nm(ethanol); 264 nm(water). Explain. 3
b) Calculate the $\lambda_{\max}$ for the following compounds by applying Woodward-Fieser Rules: 2x3



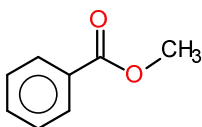
ii)



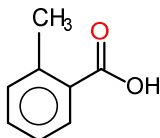
iii)



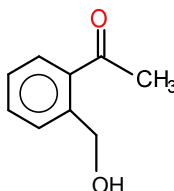
- c) Comment on the exceptionally low carbonyl stretching frequency observed in the IR spectrum of 2,4,6-cycloheptatrienone. 1
2. a) Explain how could you use IR spectroscopy to distinguish following compounds: 5



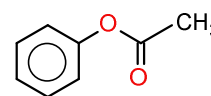
(i)



(ii)

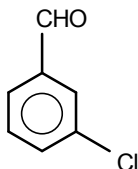


(iii)

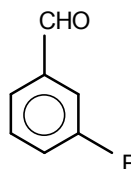


(iv)

- b) Explain which of the following compounds will show the carbonyl stretching frequency at the highest wavenumber: 4



(i)



(ii)

- c) P-Nitroaniline exhibits in its K-band a pronounced red shift but this is not observed in the case of its *ortho*- and *meta*- isomers. Explain. 1

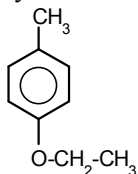
UNIT-II

1. a) Define chemical shift and explain the terms: (i) Downfield and (ii) Up field shifts as used in NMR spectroscopy. Explain why TMS is selected as reference compound. 4

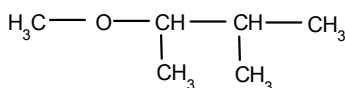
P.T.O.

(2)

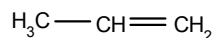
- b) How many ^1H NMR peaks will be observed for each of the following compounds: 3



(i)



(ii)



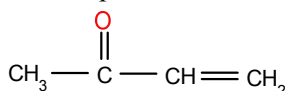
(iii)

- c) Predict the structure of compound(A) having molecular formula, C_8H_{10} on the basis of following ^1H -NMR data:

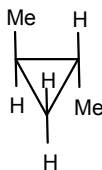
δ	Splitting	^1H - number
1.2	Triplet	3H
2.6	Quartet	2H
7.1	singlet	5H

Give logical explanation in support of your answer.

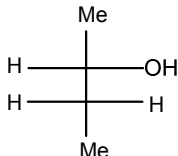
2. a) Comment on the δ -values of different protons of the following compound: 2



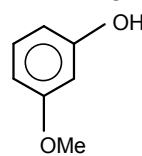
- b) How many ^1H NMR signals will be observed for each of the following compounds? 2



(i)



(ii)



(iii)

- c) Draw the spin-spin splitting pattern observed in the ^1H NMR spectrum of pure ethanol. 2
d) Toluene is oxidized to benzaldehyde. Can you distinguish the reactant from the product with the help of ^1H NMR spectroscopy? 2
e) Explain following observations: 2

Compound	δ -values
CH_4	0.23
$\text{H}_3\text{C-I}$	2.16
$\text{H}_3\text{C-Br}$	2.68
$\text{H}_3\text{C-Cl}$	3.05
$\text{H}_3\text{C-F}$	4.26

UNIT-III

1. a) What do you mean by “invert sugar”? How is it formed? 1+1
b) What is meant by the term “mutarotation”? Discuss whether all of the following compounds will exhibit mutarotation or not? Offer explanation. 1+1x4
(i) glucose (ii) fructose (iii) methyl glucoside (iv) sucrose
c) Give the biosynthesis route for vitamin C from glucose. 3
2. a) Carry out the following conversions: 2x2
(i) Glucose $\rightarrow$ 3-O-methylglucose (ii) Glucose $\rightarrow$ 2,3,-Di-O-methylglucose
b) What is anomeric effect? Explain with a suitable example. 2
c) Write short notes on the following topics: 2x2
(i) Periodic acid oxidation of D(+) glucose (ii) Starch