Exam Date & Time: 07-Sep-2021 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal Academy of Higher Education, Manipal MPharm Theory End-Semester Examinations.

Advanced Spectral Analysis [PCH-MPC201T]

Marks: 75 **Duration: 180 mins.**

SECTION - A

Answer all the questions.

Answer the following (10 marks x 5 = 50 marks)

1) Explain the principle and methodology involved in 2D NMR technique. (6)

A)

B) List out the differences between HSQC and HMQC and also the features of HMBC technique along with a spectra. (4)

2) What is Chemical shift and Coupling constant? Explain the factors affecting Chemical Shift and Coupling constant. (7)

A)

B) What is the difference between APT and DEPT? Give a representative spectra for each. (3)

3) Explain the Woodward Fieser rules for Conjugated Dienes and polyenes. Calculate the lambda max for following compounds.
a) (2Z, 4Z) -4-Chlorohexa 2, 4 diene-3- amine
b) 1, 2 dicyclohexylideneethane. (10)

4) Discuss with suitable example fragmentation pattern of alcohols in electron impact ionisation. (7)

A)

B) Explain isotopic ion peaks in mass spectra. (3)

5) Write the principle of flash chromatography. With an appropriate schematic diagram explain different parts of flash chromatography. (5)

A)

B) Drawing a schematic diagram of LC-MS explain continuous flow model and Peak trapping method. (5)

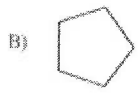
SECTION - B

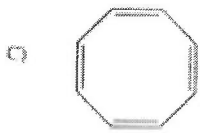
Answer all the questions.

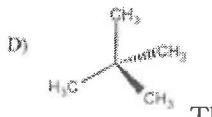
Answer the following (5 marks x 5 = 25 marks)

6) (1.5)

A)







The following have one H1 NMR peak. In each case predict approximately where this peak would be in a spectra.

B)

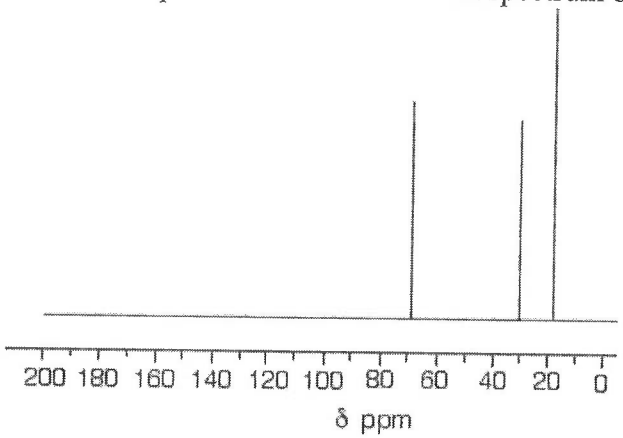
A $CH_3CH_2CH_2CH_2OH$

B $CH_3CH_2CH(OH)CH_3$

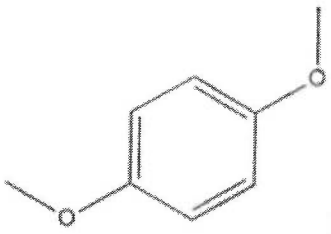
C $CH_3CH(CH_3)CH_2OH$

D $(CH_3)_3COH$

There are four alcohols with the molecular formula C4H10OC4H10O.
Which one produced the C-13 NMR spectrum below? Explain. (2)



C)



Predict how many signals the following molecule would have? Sketch the spectra and estimate the integration of the peaks. (1.5)

7) How hydrogen bonding and ring size affecting the carbonyl stretching vibration? Explain with suitable example. (5)

8) Classify and explain ion exchangers used in ion exchange chromatography. (5)

9) Draw a diagram of LC-MS and explain MALDI and APPI. (5)

10) Explain five chiral stationary phases used with chemical features. (5)

-----End-----