QP Code: R252G040 | Reg. No | | | | | | | | | | | AY 24

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET UNIVERSITY)

M.Sc. (Second Semester - Regular) Examinations, July – 2025

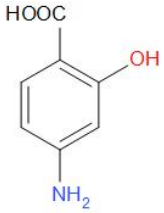
24MCYPC12004 – Organic Spectroscopy

(Chemistry)

Time: 3 hrs | Maximum: 60 Marks

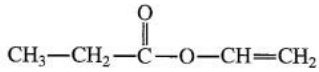
Answer ALL questions
(The figures in the right hand margin indicate marks)

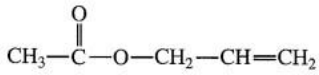
PART – A **(2 x 5 = 10 Marks)**

		CO #	Blooms Level
Q.1.	Answer ***ALL*** questions		
a.	2.5 × 104 m solution of a substance in 1 cm length with λmax 245 nm has absorbance 1.17. Calculate the ε_{max} for this transition.	CO3	K3
b.	What are combination bands?	CO2	K2
c.	Calculate the λ_{max} of 	CO4	K3
d.	Find out the signals of Ethanol, Ethene and Prop-2-ene.	CO5	K4
e.	What is coupling constant?	CO3	K2

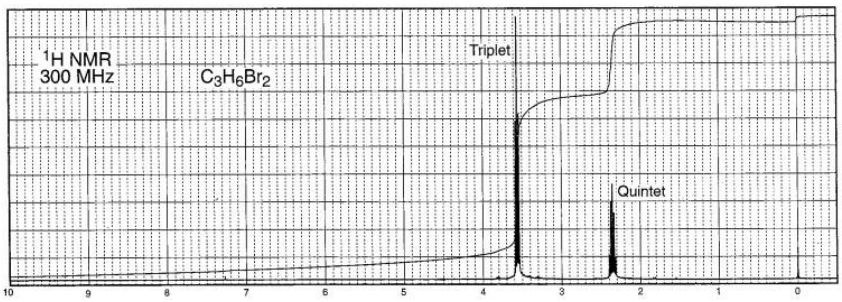
PART – B **(10 x 5 = 50 Marks)**

		Marks	CO #	Blooms Level
	Answer ***ALL*** the questions			
2. a.	State and explain Beer-Lamberts Law.	5	CO3	K3
b.	Write note on Auxochrome with example.	5	CO2	K2
	(OR)			
c.	Explain Various bands in electronic transition.	5	CO2	K2
d.	Explain Bathochromic, Hypsochromic, Hyperchromic, and Hypochromic shift.	5	CO2	K2
3.a.	Draw the instrumentation of FT-IR.	5	CO3	K3
b.	Draw the spectrum of aniline and Benzoic acid.	5	CO4	K4
	(OR)			
c.	What is first and second overtone.	5	CO2	K2
d.	What are the factors affecting vibrational frequency?	5	CO2	K2
4.a.	Describe chemical shift.	5	CO3	K3
b.	Explain the principle of NMR spectroscopy.	5	CO3	K3
	(OR)			
c.	Find out the signals and multiplicity of below compounds.	5	CO4	K4





d. The compound that gives the following NMR spectrum has the formula $C_3H_6Br_2$. Draw the structure.



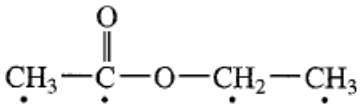
5 CO5 K4

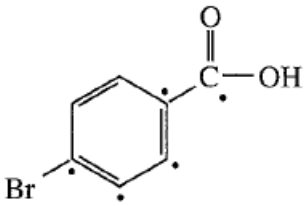
5.a. Find out the structure of a compound having molecular formula C_4H_6O with 28 ppm (quatrate), 130 ppm (triplet), 138 ppm (doublet), 188 ppm (Singlet). 5 CO6 K5

b. Draw the ^{1}H and ^{13}C NMR spectra of 2-methyl 1- Pentene 5 CO5 K4

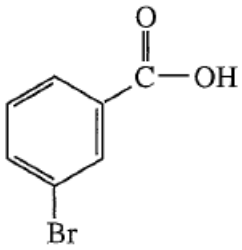
(OR)

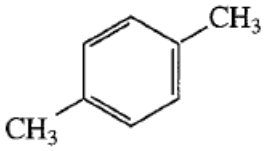
c. Predict the number of signals and Multiplicity of ^{13}C of the following compounds

(a)  Four peaks

(b)  Five peaks

5 CO4 K4

(c) 

(d) 

d. Draw the instrumentation of FT-IR. 5 CO3 K3

6.a. Write the principle of Mass spectroscopy. 5 CO2 K2

b. Differentiate between Hard and Soft ionisation techniques. 5 CO3 K3

(OR)

c. Explain the electron ionisation techniques 5 CO4 K4

d. Describe meta stable peak. 5 CO1 K1

--- End of Paper ---