19BCL030

Nirma University

Institute of Technology

Semester End Examination (IR), February - 2022

B. Tech. in CL / ME / EE, Semester-V

2CHOE01 Chemical Analytical Techniques

Roll/ Exam No. 19BCL030

Supervisor's initial with date

Time: 2h

Max. Marks: 50

Instructions:

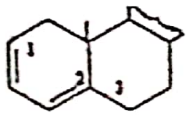
1. Attempt all questions.
2. Figures to right indicate full marks.
3. Draw neat sketches and assume suitable data wherever necessary.

Q-1 **Answer the following question** **[10]**

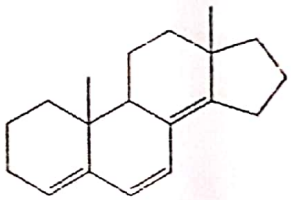
CO-1,4

(i) Calculate the maximum wavelength for the following compounds using Woodward Feiser Rule. [05]

a)



b)



(ii) If the wavelength of radiation is 300nm. Calculate its energy in Joules, Joules mol^{-1} and ev. [05]

Q-2 **Answer the following question** **[10]**

CO-1,2

(a) Define and derive Lambert Beer Law in detail. [05]

(b) A solution of thickness 2 cm, transmitted light is 0.12 times of incident light, molar absorptivity is 0.35 $M^{-1}cm^{-1}$. Calculate the concentration of the solution and absorbance. [05]

OR

(b) Examine the two types of electron microscopic techniques with respect to their magnification, microscope column, images and application. [05]

Q-3 **Answer the following question** **[20]**

CO-2,3

(i) Calculate the wave number of stretching vibration of a carbon-carbon double bond.(Atomic mass of C=12 amu, k= 10×10^5 dynes cm^{-1}) [10]

(ii) Define Analytical Chemistry. Enumerate its application in the field of engineering with suitable examples. Listed different type of analytical Techniques. [10]

Q-4 **Answer the following question** **[10]**

CO-3,4

(i) Predict the number of fundamental vibrational modes in the following molecules. (i) H_2S (ii) C_2H_2 (iii) CO_2 (iv) H_2O (v) C_6H_6 [10]

OR

(ii) Explain the working and applications of XRD in solid chemistry and derive Bragg's law. [10]