Name: Enrolment No:		UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
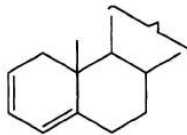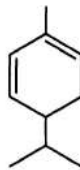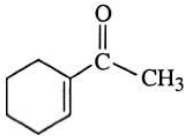**Online End Semester Examination, December 2020**

Course: Analytical Methods in Chemistry	Semester: V
Program: B.Sc. (H) Chemistry	Time 03 hrs.
Course Code: CHEM3008	Max. Marks: 100

Section A

1. Each Question will carry 5 Marks
2. Instruction: Complete the statement / Select the correct answer(s)

S. No.	Question	CO
Q 1	The value of λ_{max} for the following compound on the basis of Woodword-Fieser rule is 	CO1
Q 2	The value of λ_{max} for the following compound on the basis of Woodword-Fieser rule is............ 	CO1
Q 3	The value of λ_{max} for the following compound on the basis of Woodword-Fieser rule is....... 	CO1
Q 4	(i) The value of solvent corrections in case of α, β unsaturated carbonyl compounds for calculating λ_{max} are .... for ether and ....for ethanol. (ii) The highest energy electronic transition in UV-Vis spectroscopy is......... (iii) Hydrogen bonding affect UV absorptions. True or False (iv) If the ion size decreases in the solution, the conductance will..............	CO1
Q 5	(i) Arrange the following compounds in order of their increasing wavelength of UV absorption maxima: (a) Ethylene (b) Naphthalene (c) Anthracene (d) 1,3-Butadiene (ii) Which one of the following will have higher λ_{max}. Methyl iodide or Methyl chloride.	CO1

Q 6	A sample of iron ore was analysed and it gave the following percentage values for the iron content: 7.08, 7.21, 7.12, 7.09, 7.16, 7.14, 7.07, 7.14, 7.18, 7.11. The mean for these values will be ……..	CO2

Section B

1. Each question will carry 10 marks
2. Instruction: Write short / brief notes

Q 7	(i) Explain all types of electronic transitions observed in UV-Visible spectroscopy with suitable examples. (ii) Discuss the solvent effect on the λ_{max} of the conjugated diene in UV-Vis spectroscopy.	CO1
Q 8	Describe the reason why (i) No $n \to \sigma^*$ transition is observed in protonated triethylamine. (ii) The region below 200 nm is called vacuum UV region. (iii) Dimethylamine has higher value of λ_{max} in hexane solution than that in water.	CO1
Q 9	Discuss the basic detail of light source, detector utilized in Atomic Absorption Spectroscopy with schematic diagram.	CO1
Q 10	In an experiment, an aqueous solution of ammonia was shaken with trichloromethane until equilibrium was attained. 10.00 cm^3 of the aqueous layer required 32.55 cm^3 of 0.203 M hydrochloric acid for neutralization, while 25.00 cm^3 of the organic layer required 14.55 cm^3 of 0.0465 M hydrochloric acid for neutralization. Calculate the partition coefficient of ammonia between water and trichloromethane.	CO3
Q 11	In Paper Chromatographic separation of Silver, Lead and Mercury, the solvent front was 18 cm while front due to respective metals were 16(Ag), 12(Pb) and 6(Hg) cm. Rf value of an unknown compound was found to be 0.33. Calculate the Rf values of these metals and identify the unknown compound. **OR** Discuss adsorption and partition chromatography in detail. Write the various separation techniques involved in each case.	CO3

Section C

1. Each Question carries 20 Marks.
2. Instruction: Write long answer.

Q 12	**(i)** Describe principle of thermogravimetric (TG) analysis with instrumentation. **(ii)** Discuss the application of UV-Visible spectroscopy in the study of geometrical isomers and keto-enol tautomers. **(iii)** Describe briefly any two types of atomization techniques, used in atomic absorption process. **OR** **(i)** Find out the concentration of silver if it is electrolyzed with a combination of silver electrode and Standard Calomel Electrode. (Given $E^0_{SCE} = +0.246$ V, $E^0_{Ag} = 0.799$ V if $E_{cell} = 0.450$ V) **(ii)** If 25 ml of 0.01 N FeSO$_4$ solution is titrated with 0.01 N Ceric sulphate with calomel as reference electrode, what was the emf of the cell when 5 ml of Ce(SO$_4$)$_2$ solution was added? (Given $E^0_{Fe} = +0.771$, $E^0_{SCE} = +0.243$, $Fe^{2+} + Ce^{4+} \longrightarrow Fe^{3+} + Ce^{3+}$).	CO1