Name:

Enrolment No:

UPES

End Semester Examination, December 2023

Course: Chemistry **Semester : I**

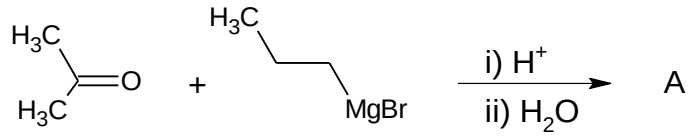
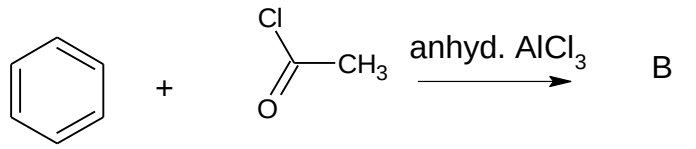
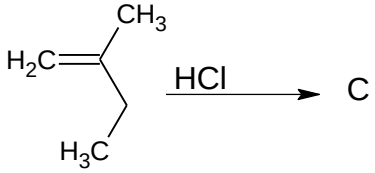
Program: B.Tech(BE)/B.Tech(FT)/B.Tech(BT) **Duration : 3 Hours**

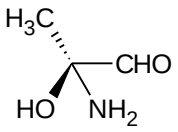
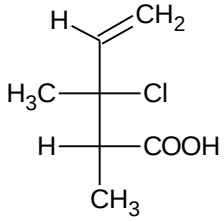
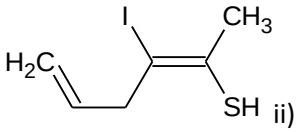
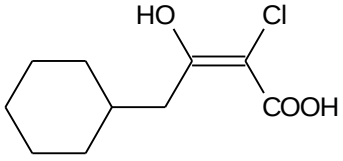
Course Code: CHEM1001 **Max. Marks: 100**

Instructions:

1. **Write your enrolment number on the top left of the question paper**
2. **Do not write any thing else on the question paper except your enrolment number**
3. **Attempt all part of a question at one place only.**

S. No.	Section A Short answer questions/ MCQ/T&F (20Qx1.5M= 30 Marks)	Marks	COs
Q 1	Write electronic configuration of Nickel.	1.5	CO1
Q 2	How many axial nodes and angular nodes are in 3p orbital?	1.5	CO1
Q 3	What is hydrogen bond?	1.5	CO1
Q 4	What is unit of molar extinction coefficient?	1.5	CO3
Q 5	Draw an organic molecule with at least one chiral carbon.	1.5	CO2
Q 6	Write two applications of paracetamol.	1.5	CO2
Q 7	Arrange the following groups in increasing order of priority based on selection rule (write first with least priority). NH_2 , CH2OH, OH, COOH.	1.5	CO2
Q 8	Comment on the significance of Ψ (Psi) ?	1.5	CO1
Q 9	What will be formed if chloroethane reacts with KOH dissolved in ethanol?	1.5	CO2
Q 10	Reduction is……	1.5	CO2
Q 11	Calculate spin multiplicity of following configuration. Show calculation. 	1.5	CO1
Q 12	Electron affinity increases on moving from left to right in a period. True or False?	1.5	CO4
Q 13	Write application of fluorescence in medicinal field.	1.5	CO3
Q 14	What is molecular geometry of NH_3?	1.5	CO4
Q 15	Bromide ion is smaller than Bromine atom. Yes or No?	1.5	CO4
Q 16	Write a reaction in which $NaBH_4$ is used as reagent.	1.5	CO2

Q 17	4d has more energy than 5s. True or False?	**1.5**	**CO1**
Q 18	Which force of attraction is present between water and NaCl?	**1.5**	**CO2**
Q 19	Magnetic quantum number gives us……..	**1.5**	**CO1**
Q 20	A soft acid will combine with soft base only. True or False	**1.5**	**CO4**
	Section B **(4Qx5M=20 Marks)**		
Q 1	Comment on different weak intermolecular interactions.	**5**	**CO4**
Q 2	a) Explain principle of electronic spectroscopy. b) Illustrate the possible electronic transitions in the following molecules i) Ketone ii) Amines iii) haloalkanes	**5**	**CO2**
Q 3	Determine effective nuclear charge on the following electrons a) 4s electron in chromium b) 3p electron in aluminum	**5**	**CO1**
Q 4	Calculate the EMF of the cell, $Cu \mid Cu^{+2}(0.005M) \parallel Ag^{+}(0.01M) \mid Ag$; Given; $E^{\circ}_{Ag+/Ag} = +0.80V$ and $E^{\circ}_{Cu/Cu^{+2}} = +0.34V$.	**5**	**CO2**
	Section C **(2Qx15M=30 Marks)**		
Q 1	a) Complete the following reactions    b) Give reasons: i) Why order of reactivity in SN1 is tertiary > Secondary > Primary?	**6+6+3**	**CO3**

	ii) Why is nitration of benzene done in presence of sulphuric acid? c) Explain enantiomers and diastereomers with suitable examples.		
Q 2	a) i) Identify the more stable from AgI_2^- or AgF_2^-. Support your answer with suitable reasoning. ii) Aluminum occurs in nature as oxide ore and not sulfide ore, explain. b) The concentration of tryptophan in an aqueous solution is 5M. The absorbance is found to be 0.301 when the solution is placed in 1 cm cuvette and 260 nm radiation is passed through it. i) Calculate molar extinction coefficient. ii) What will be absorbance if the solution is 10 M? iii) What will be absorbance if the path length of the original solution is increased to 2.5 cm?	**6+9**	**CO1** **CO3**
	Section D **(2Qx10M=20 Marks)**		
Q 1	a) Assing R/ S configuration to the following molecules. i)  ii)  b) Assign E-Z configuration to the following molecules.  ii) 	**5+5**	**CO2**
Q 2	a) Describe rotational-vibrational spectroscopy? b) Explain the principle of fluorescence? Explain in detail.	**5+5**	**CO3**