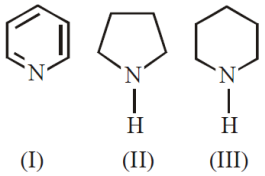
Name: **Enrolment No:**	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

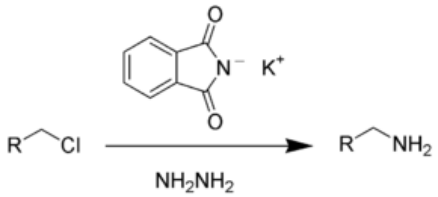
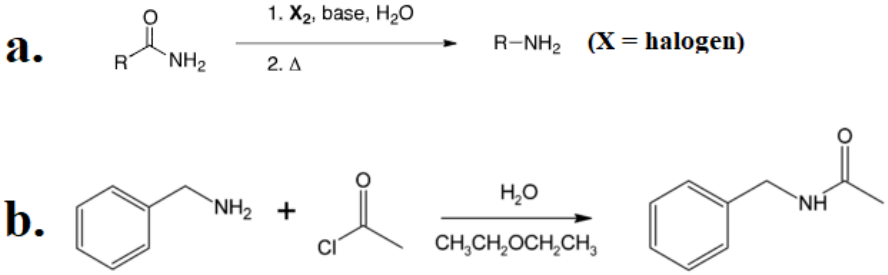
Course: Solutions, Phase Equilibrium, Condt., Electro-Chem & Functional Group Organic Chemistry II
Semester: III
Program: BSc. Hons. Elective (Common for BSc. Hons Physics and BSc. Hons Mathematics)
Time 03 hrs.
Course Code: CHEM 1003 **Max. Marks: 100**
Instructions: Attempt all the questions.

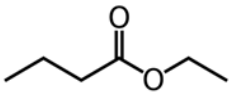
SECTION A

S. No.		Marks	CO
Q 1	Differentiate between anomers and epimers.	**4**	**CO1**
Q 2	Arrange the amines given below, based on increasing basicity. Also, explain the reason for this trend.  (I) (II) (III)	**4**	**CO2**
Q 3	What is mutarotation ? Describe in context of glucose.	**4**	**CO2**
Q 4	Calculate the single electrode potential for copper metal in contact with 0.10 M Cu^{2+} solution. E^0 for copper is 0.34 volt.	**4**	**CO1**
Q 5	Explain the following: (a) Effect of particle size on solubility (b) Effect of rise in temperature on solubility of a substance	**4**	**CO1**

SECTION B

Q 6	Arrange the following compounds in increasing order of basic strength: $C_6H_5NH_2$, $C_6H_5N(CH_3)_2$, $(C_6H_5)_2NH$,CH_3NH_2	**8**	**CO2**

Q 7	Write a detailed, stepwise mechanism for the reaction given below  **OR** Comment on the following: (a) An ionic solid dissolves in water when hydration energy is more than the lattice energy. (b) Insolubility of glucose in benzene	**8**	**CO3**
Q 8	Write a short note on Perkin condensation for the synthesis of an α,β-unsaturated aromatic acid.	**8**	**CO3**
Q 9	Explain the following terms used in the phase rule study of heterogeneous equilibria: (a) Transition point, (b) Congruent melting point, (c) Eutectic point, (d) Invariant system. **OR** How will you differentiate between the amines by using a Carbylamine test ?	**8**	**CO1**
Q 10	Calculate the molar and equivalent conductivities at infinite dilution of the salt KOOC.COONa. Given the molar ionic conductivities at infinite dilution of Ox^{2-}, K^+, and Na^+ as 148.2, 50.1, and 73.5 S cm^2 mol^{-1}, respectively.	**8**	**CO3**
SECTION-C			
Q 11	(a) Identify the reactions 'a' and 'b' given in Figure. Write a stepwise mechanism for the formation of products in these reactions.  **Figure**	**10 + 10**	**CO1 CO2**

	(b) A conductivity cell filled with 0.1 M solution of potassium chloride at 25 ^{0}C has a measured resistance of 24.96 Ω. Calculate the cell constant if the conductivity *K* for 0.1 M solution of KCl is 0.012 S cm^{-1} and conductivity with water *K* = 7.5 x 10^{-8} S cm^{-1} is used to make up the solutions. When the cell is filled with a 0.01 M solution of acetic acid, the cell resistance is 1982 Ω. Calculate the molar conductivity of acidic acid at this concentration.		
Q 12	(a) Write a detailed mechanism for both the acid and base catalyzed hydrolysis of the ester given below  (b) What is a reversible electrode? What type of reversible electrodes are commonly known? Explain with examples. ***Or*** (a) Explain the basic principles of the following by giving suitable examples: a. Ninhydrin test b. Fehling's test (b) What are concentration cells? Derive an expression for the EMF of a concentration cell. Calculate the potential developed on a copper electrode at 25 ^{0}C when it is dipped in a 0.1 M solution of copper sulphate. The standard electrode potential of Cu/$CuSO_{4\,(s)}$ system is 0.337 volts at 25 ^{0}C.	**10 + 10**	**CO2 CO3**