B.Sc. Part (III) (1+1+1) Chemistry Honours (CEMA)
Practical Examination 2020
SHIBPUR DINOBUNDHOO INSTITUTION (COLLEGE)
Paper – VII B (CHP-35a)
Full marks – 25

A. Answer **any one** of the following

1. Determine the rate constant of reaction between H_2O_2 and acidified KI by Clock reaction using the following data.

t (sec)	V_t (ml)	V_o (ml)
174	18	42
238	22.7	
277	25.2	
311	27.4	
343	29.2	
378	31.1	

(All the terms have their usual significance)

i) Write down the principle mentioning the reactions involved and the working formula. **(5)**

ii) Calculate the required quantities for plotting using the supplied data. **(5)**

iii) Plot the data for determination of rate constant. **(5)**

iv) Calculate the rate constant of the reaction from the graph. **(5)**

Or,

2. Determine the rate constant of acid catalyzed hydrolysis of an ester using the following data.

Time (sec)	Vol. of NaOH V_n (ml)	V_∞ (ml)
133	23.0	39.1
688	24.2	
1176	25.3	
1784	26.8	
2547	27.6	
3552	29.5	

(All the terms have their usual significance)

i) Write down the principle mentioning the reactions involved and the working formula. **(5)**

ii) Calculate the required quantities for plotting using the supplied data. **(5)**

iii) Plot the data for determination of rate constant. **(5)**

iv) Calculate the rate constant of the reaction from the graph. **(5)**

B. Laboratory note book/Internal assessment. **(5)**

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B.Sc. Part (III) (1+1+1) Chemistry Honours (CEMA)

Practical Examination 2020

SHIBPUR DINOBUNDHOO INSTITUTION (COLLEGE)

Paper – VIII B (CHP-35b)
Full marks – 50

A. Answer **any one** of the following

1) Determine the pKa values of a dibasic acid by pH-metric method using the following data.

Number of drops of the NaOH solution	pH
0	1.95
4	2.04
8	2.15
12	2.30
16	2.50
20	2.86
24	3.32
28	3.87
32	4.02
36	4.35
40	4.87
42	5.53
43	9.02
44	10.34
46	10.68

i) Write the theory mentioning the cell representation, involved electrodes and working formula. **(10)**

ii) Plot pH vs. Number of drops of the NaOH solution added. **(15)**

iii) Determine the pK_a^1 and pK_a^2 values of the dibasic acid using the graph. **(10)**

Or,

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2) Determine the Critical Solution Temperature of phenol-water system using the given data.

Weight of phenol	Vol. of water added (ml)	Miscibility temperature (°C)	
		Turbidity disappearance	Turbidity reappearance
5g	3	55.2	54.9
	1	62.2	62.6
	1	66.0	65.3
	1	66.7	67.1
	1	68.5	68.3
	1	68.4	68.0
	1	69.0	68.2
	1	68.5	67.9
	1	68.0	67.9
	1	67.8	67.6
	1	67.5	67.4
	1	67.1	67.0
	1	66.1	66.0
	1	65.3	65.0
	1	64.3	64.1

i) Write down the theory mentioning phase diagram, consolute temperature along with the working formula. Also calculate the number of degrees of freedom under the region of the solubility curve. **(10)**

ii) Complete the table for plotting of the graph using the given data. **(5)**

iii) Draw the solubility curve by plotting mean temperature against weight percentage of phenol. **(15)**

iv) Determine the CST and consolute composition for the system from the graph. **(5)**

B. Laboratory note book/Internal assessment. **(5)**

C. Laboratory quiz test (Answer **any five** questions from the following)   **(5x2 = 10)**

1) How does the solubility of a sparingly soluble salt change in i) presence and ii) absence of a common ion?

2) On which factors molar extinction co-efficient depends?

3) The equivalent conductance at infinite dilution of HCl, NaCl and NaOAc are 426.2 ohm^{-}^{1}cm^2, 126.5 ohm^{-1}cm^2 and 91.0 ohm^{-1}cm^2, respectively at 25°C. Calculate $\Lambda°$ for CH$_3$COOH.

4) The emf of a cell obtained by coupling through a salt bridge with quinhydrone electrode by dipping into a buffer solution and a saturated calomel electrode (E= 0.2415V) is 0.0042V. What is the pH of the buffer?

5) Why does the consolute temperature of phenol-water system increases by adding KCl in the mixture?

6) State whether the rate constant for the inversion of the cane sugar will change when, i) wavelength of the light is changed; ii) temperature is changed.

7) Calculate the pH of 0.1N AcOH solution while titrating with 0.1N NaOH after half neutralization. Given K$_a$ for AcOH is 2x10^{-5}.

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