

This question paper contains 3 printed pages.]

Your Roll No.

8498

A

B.Tech. (C)/I
Paper ECE-103—CHEMISTRY

Time : 3 Hours

Maximum Marks : 70

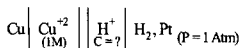
*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

Attempt any five questions.

All questions carry equal marks.

Assume suitable missing data, if any.

1. (a) Derive Nernst's equation for single electrode potential and discuss the effect of concentration of electrolyte on electrode potential. 7
- (b) Distinguish between a galvanic cell and a concentration cell. 3
- (c) EMF of the following galvanic cell was found to be 0.48 V at 25°C:



Calculate the pH of unknown solution. Also write the complete cell reaction 4

(Given : $E^\circ_{\text{Cu}^{+2} \rightarrow \text{Cu}} = +0.34 \text{ V}$)

[P.T.O.]

2. (a) Explain the following :

(i) Melt of lead-silver alloy containing silver greater than 2.6% is allowed to cool.

(ii) Triple point in water system phase diagram.

(iii) Distribution co-efficient. $3 \times 3 = 9$

(b) State Nernst's Distribution Law. How is it applicable for solvent extraction processes ? 5

3. (a) What do you understand by tacticity of Polymer ? How does it affect the properties of a polymer ? Give a method to synthesize isotactic polypropylene. 10

(b) Differentiate between thermoplastic and thermosetting resins. 4

4. (a) Explain the applications of TGA in analysis of polymeric materials. 5

(b) With the help of neat block diagram, discuss the principle and working of DTA. How is it different from DSC ? 9

5. (a) Define order of reaction. How is it determined by integration method ? When the initial concentration of a reactant is doubled, the time of half-completion for a certain reaction is found to change from 50 seconds to 25 seconds. What is order of reaction ? Also calculate the time taken for the concentration to be reduced to 20% of the initial concentration of 0.50 mol litre⁻¹. 9

(b) Using Arrhenius equation derive an expression for determining the activation energy of a chemical reaction. 5

6. (a) Write principle and applications of IR or ESR Spectroscopy. 8
- (b) Define chemical shift, equivalent and non-equivalent protons giving examples. 3
- (c) How will you distinguish between *n*-butane and iso-butane using HNMR spectroscopy. 3
7. (a) How is vulcanized rubber superior over raw rubber ? Write structural unit of vulcanized rubber. 5
- (b) Write preparation, properties and applications of any *three* of the following :
PTFE, Nylon 11, PS, Buna-S rubber, Neoprene, PU Rubber. 9
8. Write short notes on any *three* of the following : 14
- (i) Quinhydrone electrode
 - (ii) Molecular Mass of Polymer
 - (iii) Latex Technology
 - (iv) Pseudounimolecular reaction
 - (v) Origin of absorption band in UV-VIS spectroscopy
 - (vi) Phase diagram of a two-component system with congruent melting point.