This question paper contains 3 printed pages.]

Your Roll No. .....

8448 **A**

B.Tech. (M)/I

Paper EME–103–CHEMISTRY

Time : 3 *Hours* *Maximum Marks* : 70

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

1. Atempt any ***six*** : $3 \times 6 = 18$

   (a) Define 'Activation energy' for a chemical reaction. How does the value of the activation energy effect the rate of reaction ?

   (b) Define ionic mobility and transport number. How would you determine the transport number of Ag^+ ions ?

   (c) What do you mean by Thermal method of Analysis? Differentiate betwen DTA and DSC.

   (d) What is degree of polymerisation? Classify polymers based on degree of polymerisation.

   (e) Explain exterme pressure lubrication.

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(f) Explain the different mechanisms of adhesion.

(g) State Beer's – Lambert's law.

2. (a) Derive Nernst's equation for single electrode potential. 6

(b) Explain the working of hydrogen electrode. 7

3. (a) Define the terms: phase, components and degrees of freedom with suitable examples. 6

(b) With the help of phase rule diagram describe Water system. 7

4. (a) The half life period ($t_{1/2}$) of the first order reaction is 15 min. Calculate the rate constant and the time taken to complete 80% of the reaction. 5

(b) Why does the energy of activation change by the use of catalyst? 4

(c) Differentiate between order and molecularity. 4

5. (a) Write a detailed account on instrumentation of DTA ? 6

(b) How does IR spectra originate ? With a labelled diagram, explain the working of an IR spectrometer. 7

6. (a) Discuss free radical chain polymerisation. 6

(b) Differentiate between thermoplastic and thermosetting resin. 4

(c) What is compounding of plastics ? 3

7. (a) Explain thin film lubrication. 7

(b) Define : 6

(i) Flash point

(ii) Aniline point

(iii) Fire point.

8. (a) Discuss various physical factors influencing adhesive action. 6

(b) Write a note on urea-formaldehyde resin as adhesive 7