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DEC-23-0344

CH-101 (Engineering Chemistry)

B.Tech-1st (CBCS)

Time : 3 Hours

Max. Marks : 60

**Note:** Attempt Five questions in all, selecting one question each from Section A, B, C and D. Section E is compulsory.

### SECTION- A

- (a) Describe the ion-exchange process for water softening. What are its advantages? (5)  
(b) What do you mean by caustic embrittlement? How it can be avoided? (5)
- (a) What are reference electrodes? Explain the working principle of glass electrodes. (5)  
(b) Describe the construction and working of Li-ion battery. (5)

### SECTION-B

- (a) What is wet corrosion? Describe the various factors affecting the corrosion. (6)  
(b) Explain IR spectrophotometer with principle and instrumentation. (4)
- (a) Discuss the basic principle and application of XRD. (5)  
(b) Define State Beer- Lambert's law and derive mathematical expression for Beer- Lambert's law. (5)

### SECTION-C

- (a) What is meant by proximate analysis of coal? What are the quantities estimated in this analysis and their significance? (6)  
(b) Write a short note on octane number and cetane number? (4)

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- (a) What is the saponification number of lubricants? Give significance. (5)  
(b) What are solid and semi solid lubricants? Mention their applications. (5)

### SECTION-D

- (a) What are polymers? Write a short note on condensation polymerization. (6)  
(b) Explain thermoplastic and thermosetting polymers with suitable examples. (4)
- (a) Write a short note on synthesis, properties and uses of carbon nanotubes. (6)  
(b) How can nanomaterials be classified? Discuss in brief. (4)

### SECTION-E

- Answer all the questions: (10×2=20)
  - What is synthetic and natural lubricant?
  - Differentiate between temporary hardness and permanent hardness.
  - Define standard electrode potential.
  - Give applications of nanowires.
  - What is salt bridge?
  - Differentiate: Hyperchromic and hypochromic shift.
  - What is power alcohol?
  - Write short note on Bakelite.
  - What is aniline point? Mention its significance.
  - Define galvanization.