

**CH – 101 ENGINEERING CHEMISTRY**

Time: 3 hrs

Max Marks: 60

**Note:** Attempt six questions. Question No. 1 is compulsory. Attempt five questions from Part – A and Part – B by selecting at least two from each part.

- 1 (a) What is cathodic protection?  
 (b) Most absorption bands in the UV-Visible spectra are very broad. Explain.  
 (c) What is the range of radiations usually used in photochemical reactions?  
 (d) What is chromatography?  
 (e) What happens when temporary hard water is boiled? Write chemical equations.  
 (f) What is over voltage?  
 (g) What is meant by term component?  
 (h) Why hardness of water is expressed in terms of calcium carbonate equivalent?  
 (i) What information is obtained from number of signals in NMR?  
 (j) What is metastable state?

(2 x 10)

**Part – A**

- 2 (a) Determine the hardness of following samples in ppm.  
 (i) Sample A containing 820 mg of calcium nitrate and 4 mg of silica per litre.  
 (ii) Sample B containing 10 gm of potassium nitrate and 1.0 gm of calcium carbonate per 250 mL.  
 (b) Describe Zeolite method for softening of water. (4,4)
- 3 (a) Define corrosion. Discuss the mechanism of wet corrosion.  
 (b) What are the protective measures against corrosion? Discuss. (4,4)
- 4 (a) Define chromatography. Discuss various types of chromatography.  
 (b) Give the applications of chromatography. (4,4)
- 5 (a) What are concentration cells? Discuss electrolyte concentration cells.  
 (b) Explain liquid junction potential. (5,3)

**Part – B**

- 6 (a) What are lasers and masers?  
 (b) Define and explain Grothuss-Draper law and Lambert-Beer law. (4,4)
- 7 (a) Discuss Franck-Condon principle.  
 (b) Discuss resonance and inductive electronic effects in IR (3,5)

- 8 (a) Explain the  $^1\text{H}$  NMR patterns and intensities of the isopropyl group in isopropyl iodide. (4)  
(b) What type of information can be obtained from  $^{13}\text{C}$  NMR spectrum? (4)
- 9 (a) What is phase rule?  
(b) Discuss phase diagram of helium. (2,6)

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