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Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (CSE/ECE/CIVIL) (Sem.-2)
CHEMISTRY/ENGINEERING CHEMISTRY
Subject Code : CH-101
M.Code : 54003

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION - B & C. have FOUR questions each.
3. Attempt any FIVE questions from SECTION B & C carrying EIGHT marks each.
4. Select atleast TWO questions from SECTION - B & C.

SECTION-A**Write short notes on :**

- 1) What does Chemical oxygen demand measures?
- 2) What are the characteristics of a good adsorbent in chromatographic technique?
- 3) What are buffer solutions?
- 4) What is Caustic Embrittlement?
- 5) Explain the principle of NMR spectroscopy
- 6) Define quantum efficiency.
- 7) Define phase rule and reduced phase rule.
- 8) What is overvoltage?
- 9) Why is oxygen unsuitable as a carrier gas for GLC?
- 10) Why is chlorine added to water?

SECTION-B

- 11) (a) What is water softening and what are the different methods of water softening? (3)
- (b) Why does tap water often smells like Chlorine? (3)
- (c) What affects water hardness? (2)
- 12) (a) Why does impure metal corrodes faster than pure metal? (2)
- (b) Iron corrodes faster than aluminium, even though iron is placed below aluminium in electrochemical series. Why? (2)
- 13) (a) What is chromatography are the advantages of chromatography over other techniques? (3)
- (b) What are the main differences between High Pressure Liquid Chromatography and Gas Chromatography? (3)
- (c) What type of solvents are generally employed for chromatography? (2)
- 14) (a) What is the function of salt bridge in electrochemical cell? (2)
- (b) Write a short note on reversible and irreversible cell (3)
- (c) Calculate the potential of the following electrochemical cell at 25°C : (3)
- $$\text{Cu (s)} \parallel \text{Cu}^{2+} \text{ (aq) (0.50M)} \parallel \text{H}^{+} \text{ (0.01)} \mid \text{H}_2 \text{ (0.95 atm); Pt}$$

SECTION-C

- 15) (a) What is photochemical reaction and where does it occur? (3)
- (b) A solution containing bromine and cinnamic acid dissolved in CCl_4 was irradiated with light of wavelength 4358\AA for 20 min. The intensity of light was $20,000 \text{ erg s}^{-1}$ and the solution absorbs only 90% of the light passing through it. If the amount of bromine consumed in this interval is $6.36 \times 10^{-3} \text{ mol}$. What is the quantum yield? (5)

- 16) (a) Explain the Beer-Lambert's law. (4)
- (b) Why water cannot be used as a solvent in IR spectroscopy? (2)
- (c) What are the basic requirements for the Franck-Condon principle? (2)
- 17) (a) From the following sets of proton NMR data, give a structure consistent with each of the following : (4)
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|-------------------|--------------------------|-------------------------|
| a) $C_9H_{11}Br$ | (i) Quintet (2.15), 2H | (ii) Triplet (2.75), 2H |
| | (iii) Triplet (3.38), 2H | (iv) Singlet (7.25), 5H |
| b) $C_{10}H_{14}$ | (i) Singlet (0.88), 9H | (ii) Singlet (7.28), 5H |
- (b) Write a short note on application of NMR in MRI. (4)
- 18) (a) Discuss the application of phase rule to Phenol- Water system. (4)
- (b) Discuss the following colligative properties :
- (i) Elevation in boiling point
- (ii) Relative lowering in vapor pressure (4)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.