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Roll No. Total No. of Pages: 02

Total No. of Questions: 09

B.Tech. (2008-2010 Batches) (Sem.-1,2)

ENGINEERING CHEMISTRY

Subject Code: CH-101 Paper ID: [A0110]

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

l. Write briefly:

- (a) Why the water is soften before using in boiler?
- (b) Why rusting of iron in saline water is quicker than ordinary water?
- (c) What is the basic principle of chromatographic techniques?
- (d) What is the difference between specific conductance and equivalent conductance?
- (e) Distinguish between Thermal and Photochemical Reactions.
- (f) Define Syndiotactic Polymers.
- (g) What is Chemical shift in NMR?
- (h) What is Frank-Condon principle?
- (i) Determine the number of components, number of phase and degree of freedom on the following equilibrium:
 - (i) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$
 - (ii) $NH_4Cl(s) \rightleftharpoons NH_3(g) + HCl(g)$

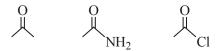
When $P(NH_3) \neq P(HCl)$

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(j) Which of the following will absorb at higher wave number for C=O stretching



SECTION-B

- 2. Explain the cold lime-soda process for the removal of hardness of water and give the difference between cold and hot lime-soda process. [8]
- 3. (a) Describe sacrificial anodic method for corrosion prevention with an example.

[4]

(b) What are inhibitors? Explain types of inhibitors employed to control corrosion.

[4]

4. Write short notes on gas chromatography and HPLC.

[8]

5. (a) Derive Nernst equation and give its significance.

[5]

(b) Calculate the EMF of the given cell at 298°K

[3]

 $Ag(s)|Ag(NO_3) (0.018 m)|| Ag(NO_3) (1.2 m)| Ag(s)$

SECTION - C

- 6. (a) Discuss various theories of mechanism of photosynthesis. [5]
 - (b) Define quantum yield. Discuss reasons for low and high quantum yield. [3]
- 7. (a) "IR spectra is often characterized as molecular finger prints." Justify this statement.
 - (b) Calculate the number of vibrational degrees of freedom in following compounds:
 - (i) CO₂
- (ii) SO₂
- (iii) CH₄

[3]

(c) Which of the following molecules will show IR Spectra and why?

[2]

8. Discuss the application of NMR with respect to Magnetic Resonance Imaging.

[8]

9. State and explain phase rule. Describe phase diagram of Phenol-water system and triethylamine-water system. [8]

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