Paper ID [CH101]

MAY 2008

(Please fill this Paper ID in OMR Sheet)

B.Tech. (Sem. - 1st/2nd)

ENGINEERING CHEMISTRY (CH - 101)

Time : 03 Hours   Maximum Marks : 60

Instruction to Candidates:

1) Section - A is **Compulsory.**

2) Attempt any **Five** questions from Section - B & C.

3) Select at least **Two** questions from Section - B & C.

Section - A

Q1)   *(Marks: 2 Each)*

a) Define and explain degree of freedom.

b) Reference used in NMR spectroscopy.

c) Parameters for checking water quality for domestic use.

d) Reduction potential.

e) Two potosensitized reactions observed in daily life.

f) Basic Principle of PES.

g) Passivity.

h) BOD and COD or two method of softning of hard water.

i) Solubility product of water.

j) Why alloys are more resistant to corrosion than pure metals?

Section - B

(Marks: 8 Each)

Q2) (a) What are disinfectants? What are the main requirement in a good disinfectant? Name few disinfectants (at least three) used in our daily life with use and principle of working.

(b) Aluminium is a highly corrosive metal, even than it is used freely in electrical lines for long time. Justify?

Q3) (a) What is corrosion of metals? Explain electro-chemical corrosion with its mechanism.

(b) How does sacrificial anode method helps in prevention of submerged oil pipe lines in sea? Explain with mechanism.

Q4) (a) A silver rod is dipped in a solution at 25°C which is 0.1 M in Ferric ion. Calculate the equilibrium concentration of all the ions in the solution.
$E°$ (Fe^{3+}, Fe^{2+}) = 0.771 V and
$E°$ (Ag^+, Ag) = 0.799 V

(b) Draw a·neat diagram of a standard hydrogen electrode. How does SHE helps in determination of standard electrode potential?

Q5) (a) Calculate the concentration of NO_2 present at equilibrium in a chloroform solution which contained 0.129 mole/litre of N_2O_4. Kc for dissociation of $N_2O_4 = 1.07 \times 10^{-5}$.

(b) Differentiate between Ionic product and solubility product.

Section - C

(Marks: 8 Each)

Q6) (a) Explain stark Einstein law of photochemical equivalence?

(b) Label various photophysical processes in electronically excited molecule in a Jablonski diagram. Explain.

Q7) (a) Explain processes which contribute to the finite width of a spectral line.

(b) What are different kinds of electronic transitions? Explain with examples. (molecules that show these transitions).

Q8) Write notes on:
(a) Shielding and deshielding.
(b) Solvents used in NMR.
(c) Chemical shift in NMR.
(d) Spin spin coupling.

Q9) (a) What is an azeotrope? Azeotrope although distills unchanged in composition at given pressure yet it is not a chemical compound explain?

(b) Draw a phase diagram of CO_2 system. In what respect does the system differ from water system?

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