2007-PUNJAB TECHNICAL UNIVERSITY

B.TECH DEGREE EXAMINATION

CHEMISTRY QUESTION PAPER

I AND II SEMESTER

TIME-3HOUR
MARKS-100

1 (a) Explain the difference between Soft Water and Demi9neralised Water.

(b)corrosion of water filled with steel tanks occus below the waterline. Give reasons.

(c) A copper equipment should not possess a small steel bolt. Give reasons.

(d) What is meant by Conjugate Asid-Base pair? Give one example.

(e) The electrode potential of Zn is assigned a nagative value whereas that of Cu is assigned a positive value. Give reasons.

(f) State Phase Rule.

(g) Discuss the significance of Tripple Point.

(h) Explain what is meant by optical density of a material.

(i) List the factors that determine the suityability of a nucleus for investigation by NMR spectroscopy.

(j) Why does molecular spectroscopy utilise Absorption spectra and not Emission spectra?

2. (a) Write a short note on Reverse Osmosis
for Desalination of water.

(b) Calculate the amount of Lime and soda needed for softening a water sample cantaining 36 ppm Mg2+, 20 ppm Ca2+ and 183 ppm HCO3-.

3. Write short notes on:

(a) Atmosphere corresion.

(b) Cathodic proctection against corrosion.

4. (a) With the help of suitable examples, discuss the effects of solvent on the strength of an acid and a base. (b) Calculate the degree of Hydrolysis of a 0.01 M solution of ammonium chloride, Kb = 1.8 X 10-5, Kw = 1 X 10-14. (c) The solubility of silver chloride in water at 25 C is 0.0179 g/l. Calculate its solubility product at 25 C.

5. (a)For the Daniell cell involving the cell reaction:

Zn (s) + Cu2+ (aq) = Zn2+ (aq) + Cu (s), the standard free energies of formation for
Cu2+ (aq) and Zn2+ (aq) are 15.66 kcal mol-1 and -35.14 kcal mol-1, respectively.
Calculate E not of the cell.

(b) Calculate the EMF of the Zn-Ag cell at 25 C when [Zn2+] = 0.01 M and [Ag+] = 10 M.

(c) Write a short note on Colomel Electrode.

6. (a) Write a short note on MASERS.
(b) In an absorption cell, the transmittance of a 0.1 M solution of a substance X is 80% and that of 0.1 M solution of another substance Y is 60 % at agven wavelength. Whta is the transmittance of a solution that is simultaneously 0.1 M in X and 0.1 M in Y.

(c) For the photochemical formation of ethylene from di-n-propyl ketone using a radiation of wavelength 313 nm, the quantum yields is 0.21. Calculate the number of moles of ethylene formed when the sample is irradiated with 50 watt of this radiation assuming thatall tha radiation is absorbed by the sample.

7. (a) Define the term Phase. Explin with suitable examples.

(b) Daw the phase diagram of KI-water system and discuss the concept of freezinf mixtures, with suitable examples.

8. Draw the block diagram of a typical instrument for making UV/Visible absorption measurement. Briefly describe the various components of the instrument.

9. Explin the following in respect of NMR spectroscopy :

(a) Chemical shift.

(b) Shelding and Deshielding of protons.

(c) Spin-spin interaction.