# DRONACHARYA COLLEGE OF ENGINEERING
# KHENTAWAS ,FARUKHNAGAR, GURGAON

**Sessional Examination April 2009, II Semester App. Sc.**
**Subject: Chemistry (CH-103-E)**

**Max Marks: 100**

**Time Allowed:3 hours**
**NOTE: 1. Attempt any five question.**
**2. Each question carry equal marks.**

Q1 a) Define spontaneity and free energy. Describe the relationship between hemholtz work function and Giff's free energy. 10
b) The free energy change ($\Delta G$) accompanying a given process is – 85.77 and -83.68 KJ at $25^0$C and $35^0$C. 10

Q 2 a)Draw labeled phase diagram of pf-Ag system and discuss the salient feature of the system. 10
b) Explain the following (2.5 + 4)
(i) Triple point
(ii) Critical point
(iii) Reduced phase rule equation
(iv) Meta stable equilibrium

Q 3 Distinguish between desalination and demineralization of water. Describe both processes (above mentioned) by choosing one technique from each.

Q 4 Write short note on any two:
(i) Various conditioning method for treatment of scales.
(ii) Sterilization of water by chlorination
(iii) Function of li,me and soda in lime soda process.
500 mg of $caco_3$ was dissolved in dil. HCL and the solution was diluted to 500ml. 50ml of this solution required 45ml of EDTA solution. While 50ml of unknown water sample required 18ml of EDTA solution. On the other hand 50ml of boiled water sample when titrated against EDTA consume 9ml of solution of EDTA. Calculate each type of hardness in ppm.

# DRONACHARYA COLLEGE OF ENGINEERING

## Sessional Examination

## CHEMISTRY

## II-Semester (ECE, ME & BME)

***Time Allowed: 3hrs.*** ***Max. Marks: 100***

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***Note: -*** *Attempt any five Questions. All questions carry equal marks*

1. (a) Define spontaneity and free energy. Describe the relationship between hemholtz work function and Gibb's free energy. [10]

   (b) The free energy change ($\Delta G$) accompanying a given process is -85.77 and -83.68 KJ at $25^{O}C$ and $35^{O}C$ respectively. Calculate change in enthalpy for the process at $30^{O}C$. [10]

2. (a) Draw labelled phase diagram of Pb-Ag system and discuss the salient feature of the system. [10]

   (b) Explain the following [2.5 x 4]

   (i) Triple point

   (ii) Critical point

   (iii) Reduced phase rule equation

   (iv) Meta stable equilibrium

3. Distinguish between desalination and demineralization of water. Describe both processes (above mentioned) by choosing one technique from each. [20]

4. Attempt any two parts: [10+10]

   (i) Various conditioning method for treatment of scales.

   (ii) Sterilization of water by chlorination

   (iii) Function of lime and soda in lime soda process.

   (iv) 500 mg of $caco_3$ was dissolved in dil. HCl and the solution was diluted to 500ml. 50ml of this solution required 45ml of EDTA solution, while 50ml of unknown water sample required 18ml of EDTA solution. On the other hand 50ml of boiled water

sample when titrated against EDTA consume 9ml of solution of EDTA. Calculate each type of hardness in ppm.

5. (a) Explain the mechanism of hydrogen evolution and oxygen absorption in electrochemical corrosion. [10]

   (b) Describe cathodic protection method for prevention of corrosion. Discuss its merits and demerits. [10]

6. (a) Describe the mechanism of lubrication for sewing machines and give its some more examples. [10]

   (b) Write short notes on any two : [5+5]

   (i) Specification value of oil and its significance

   (ii) Iodine No. and its significance

   (iii) Aniline No. and its significance

7. Write short notes on following (any two) : [10+10]

   (i) Phenol formaldehyde or urea formaldehyde.

   (ii) Polymeric composites or additives of polymers.

   (iii)Silicones as inorganic polymers.

8. (a) Write principle and method of TGA. Write its applications.

   (b) Explain conductometric titration of a mixture of weak acid and strong acid against strong base.

[10+10]

# DRONACHARYA COLLEGE OF ENGINEERING

## Sessional Examination

### CHEMISTRY

### II-Semester (ECE, ME & BIO-MED)

***Time Allowed: 90 Min.*** ***Max. Marks: 30***

***Note: -*** *All Question carrying equal marks. Attempt any three Questions.*

1. (a) Draw a neat and labelled diagram of water system. (5)
   (b) Explain the following terms: (5)
      (i) Reduced phase rule.
      (ii) Metrstable equilibrium.
2. Write short notes on any four topics : (2.5 x 4)
   (i) Electro dialysis
   (ii) Caustic embrittlement
   (iii) Principal of EDTA method
   (iv) Difference in hot and cold lime soda process.
   (v) Reverse Osmosis
3. (a) 50 ml of alkaline water sample required 20 ml $N/_{50} H_2SO_4$ for phenolphthalein end point and another 5 ml for methyl orange indicator i.e. complete neutralization. Describe the type of alkalinity and calculate the amount and type of alkalinity. (5)
   (b) Explain the following terms : (2.5 x 2)
      (i) Congruent Melting Point
      (ii) Components.
4. (a) Calculate the amount of lime required for softening of 5000 litre water sample which contains 72 PPM of $MgSO_4$. (5)
   (b) Explain various methods of sterilization of water during domestic water treatment. (5)