Applied Chemistry 1 - Dec 18

First Year Engineering (Semester 1)
Total marks: 60
Total time: 2 Hours

INSTRUCTIONS
(1) Question 1 is compulsory.
(2) Attempt any **three** from the remaining questions.
(3) Draw neat diagrams wherever necessary.

1.a. Explain the principle of EDTA method.

(3 marks)

1.b. What is glass transition temperature?
Write its Significance.

(3 marks)

1.c. Write the significance of the following properties of lubricants:
 i)Emulsification ii) Cloud point iii) Fire point

(3 marks)

1.d. What is RCC? What are the advantages of RCC over concrete?

(3 marks)

1.e. Explain the reduced phase rule

(3 marks)

1.f. Distinguish between thermoplastics and thermosetting polymer.

(3 marks)

1.g. 20 ml sample of waste water was refluxed with 30 ml of potassium dichromate solution and after refluxing the excess unreacted dichromate required 11 ml of 0.1 N FAS solution. Blank of 20 ml of distilled water on refluxing with 30 ml of dichromate solution required 14 ml of 0.1 N FAS solution. Calculate the COD value of wastewater.

(3 marks)

2.a. A sample of water contains following impurities: Mg (HOC3)2 = 73mg/lit, $MgSO_4$= 120 mg/lit, $CaCl_2$== 222 mg/lit and $Ca(NO_3)_2$= 164mg/lit. The purity of lime is 74% and soda is 90%. Calculate the quantity of lime and soda needed for softening of 50,000 liters of water.

(6 marks)

2.b. 1. Write a brief note on polymers used in medical field.

2.Name two additives added in blended oils. Give one example of each.

(5 marks)

2.c. Explain with the help of chemical reactions. "Setting and Hardening" of cement.
(4 marks)

3.a. What is fabrication of plastic? Explain injection molding process with neat diagram.
(6 marks)

3.b. 1. Discuss the advantages and limitations of phase rule. 2. Differentiate between SWNT and MWNT.

(5 marks)

3.c. A zeolite softener was completely exhausted and was regenerated by passing 1000 liters of NaCl solution, containing 100mg/lit of NaCl.How many liters of a sample water of hardness 500ppm can be softened by this softener.

(4 marks)

4.a. Draw the diagram of demineralization process and write suitable reactions involved in the process what are the advantages and disadvantages of the method.

(6 marks)

4.b. 1.Find the acid value of the given oil whose 20 ml required 2.8 ml of N/10 KOH during titration (Density of oil = 0.86).
2.Write a short note on decay of concrete.

(5 marks)

4.c. Natural rubber requires vulcanization. Give reasons Write appropriate reactions explain how the drawbacks are overcome?

(4 marks)

5.a. Write preparation, properties and uses of following polymers (Any 2)
1.Kevlar
2.Silicone rubber
3.Buna S

(6 marks)

5.b. 1. Explain activated sludge method with the help of diagram.
2.What is grease? What are the conditions in which grease are used?

(5 marks)

5.c. Draw the phase diagram of one component system and find out the number of degrees of freedom along the curves and areas.

(4 marks)

6.a. What are lubricants? Define Lubrication Explain Hydrodynamic lubrication mechanism with diagram.

(6 marks)

6.b. 1. Define
 a) Phase
 b) Component.
 c)Degree of freedom
2.Write a short note on Reverse Osmosis   (5 marks)

6.c. Explain laser ablation method for production off CNTs.   (4 marks)