

## Applied Chemistry - I.

Q.P. Code: 27875

(2 Hours)

[Total Marks: 60]

- N.B.** (1) Question No.1 is compulsory.  
 (2) Answer any three questions from the remaining five.  
 (3) All questions carry equal marks.

Atomic Weights: Ca=40, Mg=24, H=1, C=12, O=16, Cl=35.5, S=32, Na=23, Fe=55.8

## Q. 1. Solve any Five:

(15)

- Define Phase with example.
- Distinguish between COD and BOD.
- Give the preparation, properties and uses of Kevlar.
- Find the Saponification value of an oil weighing 1.7 gm, reflux with 35 ml of 0.4 N KOH, required 25 ml of 0.4 N HCl for titration. The Blank reading was 35ml of 0.4N HCl.
- What are the good characteristics of refractories?
- Explain conducting polymer.
- Calculate temporary and total hardness of a sample of water containing following impurities;  
 $\text{Ca}(\text{HCO}_3)_2 = 162 \text{ mg/L}$ ,  $\text{MgCl}_2 = 23 \text{ mg/L}$ ,  $\text{NaCl} = 58.5 \text{ mg/L}$ ,  
 $\text{Mg}(\text{HCO}_3)_2 = 155 \text{ mg/L}$ ,  $\text{CaCl}_2 = 111 \text{ mg/L}$ .

**Q.2.** (a) Calculate the amount of lime and soda (100% pure) required for softening 50,000 liters of hard water containing  $\text{CaCO}_3 = 25 \text{ ppm}$ ,  $\text{MgCO}_3 = 144 \text{ ppm}$ ,  $\text{CaCl}_2 = 111 \text{ ppm}$ ,  $\text{MgCl}_2 = 95 \text{ ppm}$ ,  $\text{Na}_2\text{SO}_4 = 15 \text{ ppm}$  and  $\text{Fe}_2\text{SO}_4 = 25 \text{ ppm}$ . (6)

(b) Explain one component water system with phase diagram. (5)

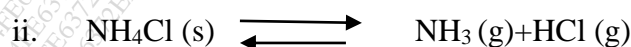
(c) Write any two properties and application of CNT. (4)

**Q.3.** (a) Explain any two of the following properties for lubricant with their significance (6)

- Cloud point and Pour point
- Flash point and Fire point
- Emulsification

(b) Why there is need of vulcanization of rubber? Give the application of Buna S rubber. (5)

(c) How many degrees of freedom are present in the following systems: (4)



- iii. Two partially miscible liquids in absence of vapour .
- iv.  $\text{Ag (s)} \rightleftharpoons \text{Ag-Pb solution (l)} + \text{Pb-Ag Vapour (g)}$

- Q.4.** (a) What do you mean compounding of plastic? Explain the role of each constituent with example. (6)
- (b) Explain following (5)
- Explain role of chlorine in disinfection of water.
  - Explain reverse osmosis and give its application.
- (c) 4.6 gm of vegetable oil required 2ml of N/100 KOH during lubrication .From acid Value state whether the oil is useful for lubrication or not. (4)
- Q.5.** (a) Write a note on (any two) (6)
- concrete
  - silicon carbide
  - Setting and hardening of cement
- (b) Give preparation properties and uses of PMMA and Phenol formaldehyde resin (5)
- (c) The hardness of 30,000 liters of a sample of water was completely removed (4)  
by passing it through a zeolite softener .The softener then required 1500 liters of sodium chloride solution containing 234 gm/liter of NaCl for regeneration.  
Calculate the hardness of the water sample.
- Q.6.** (a) Explain following (6)
- Explain principle involve in EDTA method
  - Draw neat and labeled diagram for ion exchange process
- (b) Define fabrication .Explain compression moulding with labeled diagram. (5)
- (c) Distinguish between Boundary film lubrication and Thick film lubrication (4)

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