

(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)

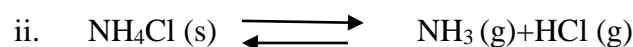
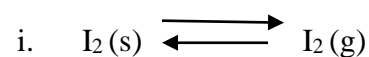
- Define Phase with example.
- Distinguish between COD and BOD.
- Give the preparation, properties and uses of Kevlar.
- Find the Saponification value of an oil weighing 1.7 gm, reflux with 35 ml of 0.4 N KOH, required 25 ml of 0.4 N HCl for titration. The Blank reading was 35ml of 0.4N HCl.
- What are the good characteristics of refractories?
- Explain conducting polymer.
- Calculate temporary and total hardness of a sample of water containing following impurities;
 Ca (HCO₃)₂=162 mg/L, MgCl₂=23 mg/L, NaCl=58.5 mg/L,
 Mg (HCO₃)₂=155 mg/L, CaCl₂=111mg/L.

- Q.2.** (a) Calculate the amount of lime and soda (100% pure) required for softening 50,000 liters of hard water containing CaCO₃=25ppm, MgCO₃=144ppm, CaCl₂=111ppm, MgCl₂=95ppm, Na₂SO₄=15ppm and Fe₂SO₄=25ppm. (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)**
- i. Explain role of chlorine in disinfection of water.
 - ii. 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)**
- i. concrete
 - ii. silicon carbide
 - iii. 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)**
- i. Explain principle involve in EDTA method
 - ii. 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)**
