

**(REVISED COURSE) Q.P. Code : 1020**

(2 Hours)

[ Total Marks : 60

**N.B.:** (1) Question No.1 is **compulsory**.

(2) Answer **Any Three** questions from the remaining **Five** questions.

(3) **Figures** to the **right** indicate full marks.

(4) **All** questions carry equal marks.

Atomic weights : Ca = 40, Mg = 24, C = 12, O = 16, H = 1, N = 14, S = 32, Na = 23, Cl = 35.5, Si = 28.

1. Attempt any Five from the following: 15
- (a) Differentiate between temporary and permanent hardness.
  - (b) Explain Glass transition temperature of polymer and its significance.
  - (c) Define lubrication and give functions of lubricant.
  - (d) Define Phase, Component and Degree of freedom.
  - (e) Write the preparation, properties and uses of Dolomite bricks.
  - (f) Give the preparation, properties and uses of Buna-S.
  - (g) Calculate all types of hardness of water sample containing:  
 $\text{Ca}(\text{HCO}_3)_2 = 81 \text{ ppm}$ ,  $\text{MgSO}_4 = 60 \text{ ppm}$ ,  $\text{MgCO}_3 = 42 \text{ ppm}$ ,  $\text{Ca}(\text{NO}_3)_2 = 82 \text{ ppm}$ .
2. (a) A water sample has the analytical report as under: 6  
 $\text{MgCO}_3 = 84 \text{ ppm}$ ,  $\text{CaCO}_3 = 40 \text{ ppm}$ ,  $\text{CaCl}_2 = 55.5 \text{ ppm}$ ,  $\text{Mg}(\text{NO}_3)_2 = 37 \text{ ppm}$ ,  
 $\text{KCl} = 10 \text{ ppm}$ . Calculate lime & soda required for softening 1 litre of water.
- (b) State Gibb's phase rule. Give its application to one component system. 5
- (c) What are refractories? Give the preparation, properties and uses Carborundum bricks. 4
3. (a) Define and give the significance of the following properties of lubricants: 6
- (i) Flash point.
  - (ii) Pour point.
  - (iii) Viscosity Index.
- (b) Explain Compounding of plastics. (five ingredients) 5
- (c) What is a Condensed phase systems. Draw the phase diagram of an Ag-Pb system with proper labelling. 4
4. (a) Write the preparation, properties and applications of Bakelite. 6
- (b) Write note on Ultra filtration and Reverse osmosis. 5
- (c) 0.5 g of an oil is saponified with 50 ml of alcoholic KOH solution. 4  
After refluxing the mixture, it required 22 ml of 0.1 N HCl solution.  
Find the Saponification value of given sample.

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5. (a) Explain manufacturing of Portland cement (wet process) with a labelled diagram of a rotary kiln. 6
- (b) Define Fabrication. Explain Compression moulding with labelled diagram. 5
- (c) A Zeolite softener was regenerated by passing 200 litre of NaCl solution, containing 50g / litre of NaCl. How many litre of water of hardness 50 ppm can be softened by this softener. 4
6. (a) Describe Zeolite method with a labelled diagram. 6
- (b) Give the preparation and applications of any two of the following: 5
- (i) PMMA
- (ii) Kevlar and
- (iii) Silicone rubber.
- (c) Under which conditions use of semi solid lubricants is preferred. 4
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