



Q.P. Code : 28592

(2. Hours)

| Total Marks : 60

- N.B. : (1) Question No. 1 is compulsory.  
 (2) Answer any three questions from remaining five questions.  
 (3) Figure to the right indicates full marks.  
 (4) Atomic weights : Ca = 40, Mg = 24, Cl = 35.5, S = 32, H = 1, C = 12.  
 O = 16.

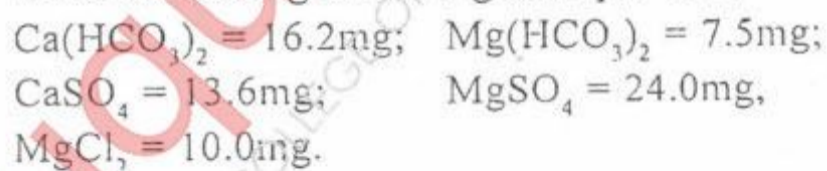
1. Attempt any five from the following :

15

- Write two balanced equations to describe the changes that occur when hard water is boiled.
- Give reasons to explain why natural rubber needs vulcanization.
- Give the preparation and uses of silica bricks.
- Give the number of phases in the following system (any three) :
  - Saturated solution of NaCl
  - Mixture of rhombic and monoclinic sulphur
  - Mixture of  $O_2$  and  $N_2$
  - Ice  $\rightleftharpoons$  Water equilibrium
- What is grease ? What are the conditions in which greases are used?
- Thermosetting polymers cannot be reshaped and reused. Give reasons.
- Calculate the COD of an effluent sample if 25c.c. of the effluent sample required 8.3 c.c. of 0.001M  $K_2Cr_2O_7$  for oxidation.

2. (a) Calculate the quantity of lime and soda required for softening 50,000 L of water containing following salts per litre.

6



(b) Explain the following terms :

5

- Condensed Phase rule
- Triple point

(c) What are carbon nanotubes ? Describe the laser method of preparation of CNT.

4

TURN OVER

3. (a) (i) Discuss the mechanism of Extreme pressure lubrication. (ii) Name any four additives in blended oil and give two examples of each. 6
- (b) Describe a moulding method suitable for thermoplastic resins. 5
- (c) Discuss the limitations of phase rule. 4
4. (a) Give the preparation, properties and uses of (any two) : (i) PMMA (ii) Silicone rubber (iii) BunaS. 6
- (b) Write brief notes on any two methods of disinfecting municipal water with reactions. 5
- (c) 1.5g of an oil was saponified with 50ml of 0.1N KOH solution. After refluxing the mixture required 7.5ml of 0.1N HCl for neutralisation. Find the saponification value of oil. 4
5. (a) Draw a neat diagram of rotary kiln in the manufacture of portland cement and mention the reactions in each zone. 6
- (b) What is glass transition temperature ? What are the factors affecting glass transition temperature ? What is its significance ? 5
- (c) The hardness of 10,000 litres of a water sample was completely removed by passing it through a zeolite softener. The softener then required 400litres of sodium chloride solution containing 100g/L of NaCl for regeneration. Calculate the hardness of the water sample. 4
6. (a) (i) Discuss the softening and regeneration reactions in the Ion-exchange process. 6
- (ii) Discuss the Reverse Osmosis method of purification of water.
- (b) Explain the functions of the following constituents in the compounding of plastic (any two) : 5
- (i) Plasticiser (ii) Lubricants (iii) Stabiliser.
- (c) Define and explain the significance of the following properties of lubricants (any two) : 4
- (i) Flash and Fire point
- (ii) Acid value
- (iii) Viscosity and viscosity Index.