

Con. 3682-09.

App. Chemistry

SP-8435

Lib

(2 Hours)

[Total Marks : 75]

- N.B. :** (1) Question No. 1 is **compulsory**.  
 (2) Attempt any **four** from remaining **six** questions.  
 (3) All questions carry **equal** marks.  
 (4) Assume **suitable data**, if **necessary**.  
 (5) At. Wts  $\Rightarrow$  H = 1, C = 12, O = 8, S = 32, Cl = 35.5, Na = 23, Mg = 24, Ca = 40, N = 14.

1. Attempt any **five** :— 15
- (a) Distinguish between thermoplastic and thermosetting polymers.
- (b) Calculate temporary and total hardness of a water sample containing :  
 $\text{Mg}(\text{HCO}_3)_2 = 7.3 \text{ mg/l}$ ,  $\text{Ca}(\text{HCO}_3)_2 = 16.2 \text{ mg/l}$ ,  $\text{MgCl}_2 = 9.5 \text{ mg/l}$ ,  $\text{CaSO}_4 = 13.6 \text{ mg/l}$ .
- (c) 1.25 gram of an oil was saponified with 50 ml 0.1 N potassium hydroxide solution. After refluxing, the mixture required 7.5 ml 0.1 N hydrochloric acid for neutralisation. Find saponification value of the oil.
- (d) What is triple point ? With reference to water-system explain it.
- (e) What are fullerenes ? State their uses.
- (f) Distinguish the allotropes of Irons.
- (g) Distinguish between conventional and non-conventional energy sources.
- (h) State the limitations of Phase Rule.
2. (a) Calculate the amount of lime and soda needed to soften 50,000 litres of water containing the following impurities per litre of water :— 7  
 $\text{CaCl}_2 = 222 \text{ mg}$ ,  $\text{Mg}(\text{NO}_3)_2 = 296 \text{ mg}$ ,  
 $\text{Ca}(\text{HCO}_3)_2 = 324 \text{ mg}$ ,  $\text{H}_2\text{SO}_4 = 196 \text{ mg}$  and organic matter = 130 mg.
- (b) Define the terms lubricants and lubrication-Mention the various types of mechanism involved in the lubrication of Machines. Discuss boundary-film lubrication in detail. 8
3. (a) Write a note on synthesis, properties and uses of the following :— 8  
 (i) Polyethylene (ii) Phenol formaldehyde.
- (b) Explain the Ion-Exchange process of softening of hard water. What are its advantages and disadvantages? 7
4. (a) What are Nanocones ? State the applications of nanomaterials. 5  
 (b) Write a note on Haeckelites. 5  
 (c) Write a note on Photovoltaic Cell. 5

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5. (a) What is solar energy ? Explain the working of solar heating system using plate collectors. 7
- (b) What are special steels ? Explain the specific effects of the following metals on the properties of steels :— 8
- (i) Chromium (ii) Cobalt (iii) Molybdenum (iv) Tungeston.
6. (a) Name the different (various) methods to control water pollution. Explain Activated sludge method in detail. 8
- (b) Name the methods for Fabrication of Plastics. With the help of labelled diagram describe Transfer moulding and Injection moulding. 7
7. (a) Write the Advantages and disadvantages of Lime-Soda process. 5
- (b) Write a note on conducting polymers. 5
- (c) Name and describe the disadvantages (Harmfull effects) if hard water is fed to boilers. 5