

B.E. First Semester (Fire Engineering) (C.B.S.)
Engineering Chemistry Paper - III

P. Pages : 2

Time : Two Hours



TKN/KS/16/7286

Max. Marks : 40

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Due credit will be given to neatness and adequate dimensions.
 7. Diagrams and chemical equations should be given whenever necessary.

1. a) Calculate Quantity of Lime & Soda required for softening 2,00,000 lit of water using 16.4ppm of NaA102 . Result of analysis of raw water & softened water are as follows. **8**

Raw Water

$$\text{Ca}^{+2} = 160\text{ppm}$$

$$\text{Mg}^{+2} = 72\text{ppm}$$

$$\text{HCO}_3^- = 732\text{ppm}$$

$$\text{Diss. Co}_2 = 44\text{ppm}$$

Softened Water

$$\text{CO}_3 = 30\text{ppm}$$

$$\text{OH}^- = 17\text{ppm}$$

- b) Define sterilisation ? Explain sterilisation using bleaching powder with its merits and demerits. **4**

OR

2. a) A zeolite softener was completely exhausted when 10,000 lit of water sample was passed through it. If it requires 300 lit of 2.6% NaCl solution for complete regeneration. Calculate hardness of water sample. **4**

- b) How corrosion in boiler caused due to dissolve oxygen & How it can be removed chemically & mechanically ? **4**

- c) Distinguish between Zeolite & Ion exchange process ? **4**

3. a) Discuss in brief mechanism of chemical corrosion with respect to oxygen absorption. **4**

- b) Attempt following **any two**. **6**

i) Pitting corrⁿ

ii) Tinning

iii) Galvanic corrosion

OR

4. a) Discuss importance of Design & Material Selection ? 4
- b) Write note on **any two**. 6
- i) Water line corrosion.
- ii) Cathodic Protection by Impressed current.
- iii) Electro Plating.
5. a) How Is Portland cement manufactured by wet process ? Give various reactions taking place in rotary kiln ? Also discuss significance of rate of cooling of clinkers ? 6
- b) Discuss following with respect to advantages & limitation. 4
- i) Ready mix Concrete
- ii) Fly Ash as Cementing Material

OR

6. a) What is setting & gardening of Portland cement ? Discuss with the help of reactions involved ? 6
- b) Write informative Note on: 4
- i) Heat of Hydration
- ii) Cement Additives
7. a) Discuss in brief $H_2 - O_2$ Alkaline fuel cell with respect to working, advantages and disadvantages. 4
- b) Explain concept of carbon credit. 2
- c) Discuss applications of Lithium ion battery. 2

OR

8. a) Explain the following **any two**. 4
- i) Reserve Battery.
- ii) Power density and Energy Density.
- iii) Green chemistry with its significance.
- b) Write a note on CO_2 as a supercritical fluid with the help of phase diagram. 4
