B.E - Bachelor of Engineering (CBCS Pattern) First Semester

1BEAB03 - Applied Chemistry-I

P. Pages : 2 **GUG/W/18/11467**

Time : Two Hours * 3 5 5 2 * Max. Marks : 40

Notes : 1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Diagrams and Chemical equation should be given wherever necessary.
4. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) What are ion exchange resin and how are they used in deionization of water? **6**

b) How does dissolved oxygen affect the quality of water used in boiler. What are the various methods employed in deaeration of water. **5**

c) Write a note on caustic embrittlement. **3**

OR

2. a) A water sample on analysis gave the following constituents analysis in mg/lit. **10**

$Mg(HCO_3)_2 = 73$; $CaSO_4 = 68$;

$Ca(HCO_3)_2 = 61$; $MgSO_4 = 48$;

$MgCl_2 = 35$; $NaCl = 3.5$

Calculate the lime (88 % pure) and soda (92 % pure) required to soften five million litres of water using sodium aluminate as a coagulant at the rate of 7.6 ppm.

b) An exhausted zeolite softener was regenerated completely by passing 400 litres of NaCl solution containing 4.5% NaCl. How many litres of hard water sample having hardness 560 ppm can be softened using this softener. **4**

3. a) Distinguish between Boundary and Hydrodynamic lubrication with reference to film thickness and mechanism. **4**

b) A lubricating oil has same viscosity as standard naphthenic and paraffinic type oils at 210ºF. Their viscosities at 100ºF are 320 SUS; 440 SUS and 240 SUS respectively. Find viscosity index of the oil. **4**

c) Define the terms cloud point and pour point. Write its significance. **5**

OR

4. a) Under which conditions are semisolid lubricants preferred name the important test for semisolid lubricants and explain any one of them. **5**

b) Define lubricants. Discuss the classification of lubricants with suitable examples. **4**

c) Explain criteria for selection of lubricating oil for: **4**
i) IC engine. ii) Steam turbine.

5. a) Draw a labelled diagram of a rotary kiln used for the manufacture of Portland cement by wet process and discuss the various reactions taking place in the furnace. **6**

b) "The properties of portland cement depend upon the relative proportions of its constitutional compounds". Justify this statement. **4**

c) Write notes on Rapid hardening cement. **3**

OR

6. a) What do you mean by setting and hardening of cement? Discuss the various reactions involved. **6**

b) Explain. **5**

i) Soundness of cement.

ii) Heat of hydration.

c) Write notes on high Alumina cement. **2**

****