STBSC102 - Engineering Chemistry

P. Pages : 2

GUG/S/25/16147

Time : Three Hours

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3 7 5 0

Max. Marks : 80

Notes : 1. All questions carry equal marks.
         2. Assume suitable data wherever necessary.
         3. Diagrams and Chemical equation should be given wherever necessary.
         4. All questions are compulsory.

1. a) Calculate amount of lime and soda required for 25000 litres of water containing $Ca(HCO_3)_2 = 40.5$ppm, $Mg(HCO_3)_2 = 73$ppm, $CaCl_2 = 55.5$ppm, $MgSO_4 = 60$ ppm, $KHCO_3 = 50$ ppm, $NaCl_2 = 3.1$ ppm, $AI_2SO_4 = 28.5$ ppm purity of lime and soda is 90 and 95% respectively.   **8**

    b) Calculate total, carbonate and non carbonate hardness.   **4**

    c) An exhausted zeolite softener was regenerated by passing 95% ltr. of strength 1.4% NaCl. How many litres of water having hardness 460 ppm can be softened using this softener.   **4**

OR

2. a) Explain zeolite process with principle, advantage and limitation?   **6**

    b) Explain Lime-soda process with chemical reactions.   **6**

    c) Explain Desalination of Brackish water.   **4**

3. a) Explain the corrosion prevention with respect to design and material selection?   **6**

    b) Explain Primary & secondary Battery.   **4**

    c) Explain differential aeration theory?   **6**

OR

4. a) Explain Intergranular corrosion.   **4**

    b) Explain Pitting corrosion.   **6**

    c) Explain electrochemical corrosion mechanism?   **6**

5.   Coal Sample C = 90%, H = 6%, S = 2.5% N = 1.4%, O -1% rest ash is burnt. calculate.

    a) Total air required for complete combustion.   **6**

    b) Percentage composition of dry flue gas if 25% excess air is used.   **6**

    c) Explain Knocking and Anti knocking Agents.   **4**

OR

6. a) Describe bomb calorimeter? **8**

b) Calculate gcv and ncv of coal sample having C = 82%, **4**
$H_2 = 8\%$, $O_2 = 5\%$, S = 2.5%, $N_2 = 1.4\%$ and ash = 2%

c) Explain Proximate Analysis of coal. **4**

7. a) Explain 12 Basic principle of Green chemistry with example. **10**

b) Explain principle and concept of carbon credit and goal of green chemistry? **6**

OR

8. a) Explain traditional and green pathways of.

i) Adipic acid. **4**

ii) Polycarbonate **4**

iii) Indigo dye. **4**

b) Explain efficiency parameters and need of green chemistry? **4**

9. a) Explain free radical mechanism? **8**

b) Explain Urea-formaldehyde Resin. **4**

c) Differentiate Ldpe and Hdpe? **4**

OR

10. Write short note on:

a) Thermosetting **4**

b) Synthetic rubber. **4**

c) Styrene butadiene rubber. **4**

d) Fiber reinforced polymer. **4**

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