

B.Tech. (Model Curriculum) Sem-I
BSC102 - Chemistry-I

P. Pages : 2

Time : Three Hours



GUG/W/22/13170

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.

1. a) $\text{CaCO}_3 = 75\text{ppm}$, $\text{Mg}(\text{HCO}_3)_2 = 73\text{ppm}$, $\text{CaCl}_2 = 166.5\text{ppm}$, $\text{MgCl}_2 = 190\text{ppm}$, $\text{MgSO}_4 = 30\text{ppm}$, $\text{CO}_2 = 10\text{ppm}$ **14**
Calculate – Theoretical quantities of lime (90% pure) & Soda (95% pure) required to soften 1,00,000 litres water using sodium aluminate as a coagulant at the rate of 8.2 ppm. Cost per 100 kg of lime & soda are Rs. 50/- & Rs. 2000/- resp.
- b) If 10,000 liters of same hard water is passed through zeolite softeners requires 100 litres NaCl solution for complete regeneration. Find concentration of NaCl solution used to regenerate exhausted zeolite bed.
- c) Write short note on – Calgon conditioning. **2**

OR

2. a) Compare Ion exchange & zeolite process with respect to principle involved, advantages & disadvantages. **6**
- b) What is boiler corrosion? How is it controlled. **4**
- c) What is meant by Priming & foaming? Explain it. **6**
3. a) What is anodic protection? Explain the process with a neat labelled diagram. **8**
- b) Discuss in detail Alkaline fuel cell. **4**
- c) Write short note on – Ni-Cd battery. **4**

OR

4. a) Write short note on: **8**
- i) Waterline corrosion.
- ii) Inter granular corrosion.
- b) Write in detail the mechanism of Electrochemical corrosion. **4**
- c) Write explanatory note on – Pilling – Bedworth Rule. **4**

5. a) A gaseous fuel has the following composition by volume: 12
 $\text{CH}_4 = 36\%$, $\text{H}_2 = 44\%$, $\text{O}_2 = 2\%$, $\text{CO} = 6\%$, $\text{N}_2 = 3\%$, $\text{C}_2\text{H}_2 = 4\%$, $\text{CO}_2 = 2\%$ and moisture = 3% is burnt in furnace. Calculate.
 i) Minimum weight of air required for combustion of gas.
 ii) % composition (by volume) of flue gases. If 35% excess air is supplied.
 iii) Air : Fuel ratio

- b) A sample of coal contains C=70%, O=20%, H=8%, S=1%, N=0.5%, ash=0.5%. Calculate GCV and NCV of coal by Dulong's formula. 4

OR

6. a) Write short notes on : 12
 i) CNG
 ii) Knocking in IC engine.
 iii) Biodiesel

- b) Describe the construction of Boy's gas calorimeter. 4

7. a) Discuss traditional & green pathways for manufacture of Polycarbonate. 8
 b) Discuss goals of green chemistry. 6
 c) What is carbon credit? 2

OR

8. a) What is the need of green chemistry? 4
 b) What are the basic principles of green chemistry? Explain it. 8
 c) Discuss the green pathway of manufacture of adipic acid. 4

9. a) Distinguish between Biodegradable and conducting polymers. 4
 b) Write short notes on 8
 i) Compounding of plastics. ii) Glass Transition Temperature.
 c) Describe fiber reinforced plastic in detail. 4

OR

10. a) Explain step growth polymerization in detail. 4
 b) Explain Electroluminescent polymers. 4
 c) Write short notes on : 8
 i) Synthetic rubber ii) LDPE & HDPE
