

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-I Remedial Examination March / April 2010****Subject code: 110001****Date: 30 / 03 / 2010****Subject Name: Chemistry****Time: 12.00 Noon – 02.30 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain with neat diagram ion exchange method of softening of water, Give its merit and demerits **05**
- (b) Define Corrosion. Explain sacrificial anode method for prevention of corrosion. **05**
- (c) What is Galvanic Corrosion? Explain the mechanism of galvanic corrosion. **04**
- Q.2** (a) What is heat treatment of steel? What are the purposes behind it? Explain various processes of heat treatment of steel in details **07**
- (b) Define terms: Sludge, ppm, Demineralization and Disinfection. **04**
- OR**
- (b) Define terms: Priming, Desalination, Ion exchangers, Biotechnology **04**
- (c) Write short note on Biogas Plant. **03**
- OR**
- (c) Explain break point chlorination. What are its advantages? **03**
- Q.3** (a) Analysis of water sample was found to contain following salts impurities in mg/ L : $\text{CaCO}_3 = 25$; $\text{CaCl}_2 = 40$; $\text{Ca}(\text{HCO}_3)_2 = 92$; $\text{Mg}(\text{HCO}_3)_2 = 25.2$; $\text{CaSO}_4 = 35$; $\text{MgSO}_4 = 30$ and $\text{CO}_2 = 8.2$. Calculate temporary and permanent hardness of water sample. Given: Molecular weight of $\text{CaCO}_3 = 100$; $\text{CaCl}_2 = 111$; $\text{Ca}(\text{HCO}_3)_2 = 162$; $\text{Mg}(\text{HCO}_3)_2 = 146$; $\text{CaSO}_4 = 136$; $\text{MgSO}_4 = 120$; $\text{CO}_2 = 44$. **05**
- (b) Explain caustic embrittlement in boilers and how it can be avoided? **05**
- (c) Describe the process of Melt spinning of fibres. **04**
- OR**
- Q.3** (a) Calculate amount of lime and soda required to soften 25000 liters of water containing following salts impurities in mg/ L $\text{CaSO}_4 = 20$; $\text{CaCl}_2 = 10$; $\text{Ca}(\text{HCO}_3)_2 = 52$; $\text{Mg}(\text{HCO}_3)_2 = 45$ and $\text{MgSO}_4 = 15$. Given: Molecular weight of $\text{CaSO}_4 = 136$; $\text{CaCl}_2 = 111$; $\text{Ca}(\text{HCO}_3)_2 = 162$; $\text{Mg}(\text{HCO}_3)_2 = 146$; $\text{MgSO}_4 = 120$. **05**
- (b) Explain the principles involved in (a) anodic coating and (b) hot dipping **05**
- (c) Define Metal, Non metal and Alloy. Give example of ferrous alloy and write use of it. **04**
- Q.4** (a) What is Fuel? Give classification of the fuel and what are the characteristics of a good fuel? **06**
- (b) Define lubricant and lubrication. What are the functions of lubricants? **04**
- (c) Distinguish between thermoplastic and thermosetting polymers or resins. **04**
- OR**
- Q.4** (a) What are the raw materials of portland cement? Explain the processes of manufacturing of portland cement in detail. **06**

- (b) Explain the terms: Acid rain, Green house effect **04**
(c) Give application of rubber. **04**
- Q.5** (a) 1.56 g of the coal was Kjeldahlized and NH_3 gas thus evolved was absorbed in 50.0 ml of 0.1 N H_2SO_4 . After absorption, the excess (residual) acid required 6.25 ml of 0.1 N NaOH for exact neutralization. 2.60 g of the coal sample in a quantitative analysis gave 0.1755 g of BaSO_4 . Calculate the percentage of N and S in the coal sample. **04**
- (b) Explain the factors affecting on fermentation process in detail. **05**
(c) Define the terms: pH, refractories, renewable energy, insulators, Abrasives **05**

OR

- Q.5** (a) An oil sample under test has a Saybolt universal viscosity of 64 seconds at 210°F and 564 seconds at 100°F . The low viscosity standard (Gulf oil) possesses a Saybolt viscosity of 64 seconds at 210°F and 774 seconds at 100°F . The high viscosity standard (Pennsylvanian oil) gave the Saybolt viscosity values of 64 seconds at 210°F and 414 seconds at 100°F . Calculate the viscosity Index of the oil sample under test. **04**
- (b) Discuss the outline of fermentation process **05**
(c) Give flow diagram and applications of UV-Vis spectrophotometer. **05**
