

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. Sem-I Examination January 2010****Subject code: 110001****Subject Name: CHEMISTRY****Date: 01 / 01 / 2010****Time: 11.00 am – 1.30 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) Describe the demineralization process of softening of hard water. What are its advantages over zeolite process? **07**
- (b) What is meant by calorific value of a sample of coal? Distinguish between gross & net calorific value. **07**
Calculate the gross & net calorific value of coal having the following composition.
Carbon = 85%, Hydrogen = 8%, Sulphur 1%, Nitrogen = 2%, Ash = 4%, Latent heat of steam = 587 cal./ gm.
- Q.2** (a) Discuss the different steps involved in the manufacture of Portland cement by dry process. **07**
- (b) Define the term: Functionality, Degree of Polymerization, Step polymerization. Give the preparation structure and use of SBR & Bakelite. **07**
- OR**
- (b) Write a short-note on heat treatment of steel & their effects on alloy. **07**
- Q.3** (a) What is hardness of water? Mention various units use for its expression and show their relation also. Calculate the temporary hardness, permanent hardness and total hardness of water containing $\text{Ca}(\text{HCO}_3)_2 = 4 \text{ mg/l.}$, $\text{Mg}(\text{HCO}_3)_2 = 6 \text{ mg/l.}$, $\text{CaSO}_4 = 8 \text{ mg/l.}$, $\text{MgSO}_4 = 10 \text{ mg/l.}$ in ppm, $^{\circ}\text{Fr}$ and $^{\circ}\text{Cl}$. **07**
(*M.wt. of $\text{Ca}(\text{HCO}_3)_2 = 162$, $\text{Mg}(\text{HCO}_3)_2 = 146$, $\text{CaSO}_4 = 136$, $\text{MgSO}_4 = 120$*)
- (b) Define the term lubricants. Mention their important functions. Discuss the properties of lubricants. **07**
- OR**
- Q.3** (a) What is meant by fermentation? Discuss the manufacture of ethyl alcohol from molasses by fermentation process. **07**
- (b) What are abrasives? How are they classified? Describe a process of manufacture of carborundum. **07**
- Q.4** (a) Define the term paint, varnish & enamel. Mention the essential constituents of paint & their function. **07**
- (b) Differentiate between chemical corrosion & electro chemical corrosion. Discuss the role of nature of oxide formed in oxidation corrosion. State the Pilling - Bedworth rule. **07**

OR

- Q.4 (a)** Explain the following term and their effects on the environment; **07**
1. Green house effect.
 2. Acid rain
 3. Ozone depletion.
- (b)** Give the composition of bio-gas with the help of a diagram. Explain a bio-gas plant. **07**
- Q.5 (a)** Justify the statement “Solar energy is the ultimate sources of all types of energy”. **07**
- (b)** What is principle underlying conductometric titration? Discuss the titration curve obtain in the case of strong acid with a strong base. **07**

OR

- Q.5 (a)** Describe processes of; (i) Melt spinning & (ii) Wet spinning of fibres. **07**
- (b)** Explain nuclear energy in details. **07**
