

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Sem-II [All Branch] Examination June 2009

Subject code: 110001

Subject Name: Chemistry

Date: 08/06/2009

Time: 10.30am. - 1.00pm

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) What are lubricants? Classify lubricants and mention various properties assessed for lube oils. **06**
- (b) What is meant by caustic embrittlements for boilers and break point chlorination for water treatment? **04**
- (c) Give classification of plastics and also give at least two points of difference between them. **04**
- Q.2** (a) Mention different methods for analysis of coal. Discuss characteristics of good quality coke. **06**
- (b) Explain problems which arise due to direct use of untreated hard water in boilers. **04**
- OR**
- (b) Explain Lime Soda process for water treatment. **04**
- (c) Calculate temporary hardness and permanent hardness of water in ppm from following results. Mg (HCO₃)₂ = 16.8 mg/l, MgCl₂ = 19.0 mg/l, KCl = 74.5 mg/l, Mg (NO₃)₂ = 29.6 mg/l, CaCO₃ = 20.0 mg/l and MgSO₄ = 24.0 mg/l. **04**
- OR**
- (c) 10,000 liters of hard water was made soft with zeolite; the zeolite requires a total amount of eight liters of NaCl solution containing 150 gm/l of NaCl for regeneration. Calculate the hardness of water **04**
- Q.3** (a) What are Portland cements? How is Portland cement manufactured? Give the chemical composition of Portland cement. **06**
- (b) Describe the fabrication techniques of plastics. **04**
- (c) Write short note on: **04**
- i. Styrene Rubber (Buna – S)
 - ii. Nitrile Rubber (Buna – N)
- OR**
- Q.3** (a) Give classification of lime with its uses. Describe manufacturing process of lime. **06**
- (b) What are elastomers? Explain vulcanization of natural rubber. **04**
- (c) Explain in brief. **04**
- i. Photochemical smog
 - ii. Acid Rain
- Q.4** (a) Mention general characteristics of alloys. What is the need to make alloys? **06**
- (b) Give the factors responsible for corrosion of boiler. How can you prevent it? **04**
- (c) Explain various types of inorganic surface coatings. **04**

OR

- Q.4** (a) What is metallurgy? Explain general steps involved in metallurgy. **06**
(b) State purification processes for metals. **04**
(c) Explain cathodic protection. **04**
- Q.5** (a) What is fermentation? Explain enzymes and its applications in industries. **06**
(b) What is grease? Mention few properties of grease. **04**
(c) The following data were obtained in a bomb calorimeter experiment. **04**
Weight of crucible = 3.649 gm
Weight of crucible + fuel = 4.678 g;
Water equivalent of calorimeter = 570 gm
Water taken in calorimeter = 2200 gm
Observed rising temperature = 2.3 °C
Cooling correction = 0.047 °C
Acid correction = 62.6 Calories
Fuse wire correction = 3.8 Calories
Calculate the gross calorific value of the fuel sample. If the fuel contains 7.0 % H₂, determine the net calorific value.
- OR**
- Q.5** (a) Give the characteristics of potable water. Mention various processes for removal of impurities. **06**
(b) Write short note on: **04**
i. Bio-fuels
ii. Bio-membranes
(c) Calculate weight and volume of air required for the combustion of 3 kg of carbon. **04**
