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. $Mg(HCO_3)_2 = 16.8$ mg/l, $MgCl_2 = 19.0$ mg/l, $KCl = 34.5$ mg/l, $Mg(NO_3)_2 = 29.6$ mg/l, $CaCO_3 = 20.0$ mg/l and $MgSO_4 = 24.0$ 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

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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 = $2.3\ ^{o}$ C

Cooling correction = $0.047\ ^{o}$ 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 % H_2, 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**

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