

1E2004

Roll No. _____

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**B. Tech I Sem. (Main/Back) Exam. Jan-Feb 2013
104 Engineering Chemistry
Common to all Branches**

Time: 3 Hours**Maximum Marks: 80****Min. Passing Marks: 24****Instructions to Candidates:**

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

UNIT-I

Q.1 What is carbonization of coal? Describe with diagram how coke is manufactured by Otto Hoffmann's by-product oven process; account also for the recovery of by product. [16]

OR

Q.2 Write notes on the following:

- (a) Refining of petroleum crude [8]
 (b) Fischer – Tropsch's process of synthetic petrol [4]
 (c) Oil gas [4]

UNIT-II

Q.2. (a) Describe with diagram the construction of Bomb – Calorimeter. Explain how calorific value of solid fuel is determined by Bomb – Calorimeter. [8]

- (b) 0.72 gm coal when burnt in a Bomb – Calorimeter, increased the temperature of water from 27.3° c to 29.1°c. If the calorimeter contains 250 gm of water and its water equivalent is 150 gm, calculate the HCV of fuel. [4]

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- (c) The following data were obtained in a Junker's gas calorimeter experiment:

Volume of gas burnt = 0.1 m^3 at STP

Weight of water heated = 25 kg

Temperature of inlet water = 20°C

Temperature of outlet water = 33°C

Weight of steam condensed = 0.025 kg

Calculate the higher and lower calorific value. Take the latent heat of steam as 580 k cal/kg. [4]

OR

- Q.2 (a) What is the proximate and ultimate analysis of coal? How carbon, hydrogen, sulphur and nitrogen are estimated? [12]
- (b) Discuss the flue gas analysis by Orsat's apparatus and its significance. [4]

UNIT-III

- Q.3 (a) Discuss the free radical polymerization mechanism. [8]
- (b) Discuss Natural rubber and vulcanization [8]

OR

- Q.3 Write notes on any four of the following:

- (a) Fullerenes (C_{60}) [4]
- (b) Conducting polymers [4]
- (c) Butyl Rubber [4]
- (d) Neoprene Rubber and its vulcanization [4]
- (e) Buna - S [4]
- (f) Buna - N [4]

UNIT-IV

- Q.4 (a) Describe the manufacturing of Portland cement by Rotary kiln process. Discuss the role of gypsum in cement. [10]

- (b) Describe the vapor phase deposition method for optical fiber grade glass preparation. [6]

OR

- Q.4 (a) Discuss the type of silicate glasses. Describe the manufacture of soda – lime glass. What are annealing and its importance in glass manufacturing? [16]

UNIT-V

- Q.5 (a) What are refractories? Explain the essential requisites of a good refractory material. [8]
(b) Refractoriness under load (RUL) test. [4]
(c) Pyrometric Cone Equivalent (PCE) test (Segger – cone – test) [4]

OR

- Q.5 Write short notes on any four of the following:
- (a) Extreme pressure lubrication. [4]
 - (b) Liquid lubricants. [4]
 - (c) Viscosity and viscosity index. [4]
 - (d) Flash and fire point [4]
 - (e) Cloud and pour point [4]
 - (f) Greases or semi – solid lubricants. [4]
