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B.Tech. I - Sem.(Reback) Exam - Jan-Feb. 2012
203(O) – Engg. Chemistry

(Common to all Branches of Engg.)

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks : 24

Instructions to Candidates:

*Attempt overall **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.*

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. _____**Nil**_____ 2. _____**Nil**_____

UNIT-I

1.　(a)　What is water softening? Describe the water softening by Demineralization method.　　　　　8

1.　(b)　A sample of water was analysed and found to have following impurities:　　　　　8

(i)　$Mg(HCO_3)_2$ = 25 mg/L

(ii)　$MgCl_2$ = 15 mg/L

(iii)　$CaSO_4$ =20 mg/L

Calculate the amount of lime and soda required for complete softening of 30000 litres of hard water.

OR

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1. (a) What are boiler troubles? Explain the Scaling and Sludging problem in boilers. 8

1. (b) Write short note on any two of the following: 4+4

   (i) EDTA method.

   (ii) Various units of hardness and their relationship.

   (iii) Boiler corrosion.

UNIT-II

2. (a) What is metallurgical coal? Describe its manufacturing and properties. 8

2. (b) A sample of coal contains C=93%; H=06% and ash =01%. The following data were obtained when the above coal was tested in a bomb colorimeter: 8

   (i) Weight of coal burnt = 0.92 gm

   (ii) Weight of water taken = 550 gm

   (iii) Water equivalent of bomb and calorimeter = 2200 gm

   (iv) Rise in temperature = 2.42°C

   (v) Fuse wire correction = 10.0 Cal

   (vi) Acid Correction = 50.0 Cal

   Calculate gross and net calorific value of the coal assuming the latent heat of condensation as 580cal/gm

OR

2. (a) What do you mean by ultimate analysis of coal? How this analysis is helpful in deciding the quality of coal? 8

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2. (b) Explain Hue gas analysis by using orsat apparatus in detail. 8

UNIT-III

3. What is phase rule and reduced phase rule? Explain the two component system by using Ag-Pb system with its phase diagram. 16

OR

3. (a) Preparation and properties of low and high density polyethylene. 8

3. (b) Explain thin and thick layer mechanism of lubrication with diagram. 8

UNIT-IV

4. Explain the following: 8+8

(i) Cathodic and anodic protection from corrosion.

(ii) Dry mechanism of corrosion.

OR

Write short notes on any four of the following:- 4+4+4+4

(i) Stress Corrosion

(ii) Conducting polymer and their uses.

(iii) Super Conductor

(iv) Optical fiber and its preparation.

(v) Fullerenes

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5. What are basic constituents of cement? Explain manufacturing of cement in detail with its diagram and proper reactions. 16

OR

5. (a) What are glasses? Explain its manufacturing by flow diagram. 8

5. (b) Define refractory materials? Explain important properties of refractories. 8