Roll No. _____

[Total No. of Pages : 4]

2E1004

2E1004

B. Tech. I Year II Semester (Old Back) Examination, June/July-2011
Common to all Branches of Engineering
(203/103) Engineering Chemistry

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 may 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.   *Scientific calculator*   2.   *Log table*

Unit - I

1.   a)   What are the characteristics of drinking water? Explain the various processes involved in purification of raw water for drinking purpose.   (8)

     b)   A sample of water on analysis gave the following results.   (8)

Ca^{+2} = 30 mg/L, Mg^{+2} = 18 mg/L

K^+ = 19.5 mg/L CO_2 = 11 mg/L

HCO_3^- = 122 mg/L Cl^- = 35.5 mg/L

SO_4^{--} = 48 mg/L

Calculate :-

i)   Total hardness and alkalinity present in water

ii) Lime and soda required for softening 1000 Lit of given water

a) What are ion - exchange resins? How water is purified by using these resins? Explains the regeneration of resins. Discuss the advantages of purification of water by this process. **(8)**

b) Differenciate between scale and sluge. How scales are formed. Discuss the disadvantages of scale. How to minimise the formation of scale. **(8)**

Unit - II

2. a) Describe how proximate analysis of fuel is carried out. Discuss the importance of proximate analysis. **(8)**

b) A sample of coal have following percentage composition by weight :- **(8)**

Element %

C = 75%

H = 5.2%

O = 12.1

N = 3.2

Ash = 4.5

Calculate :

i) Minimum amount of oxygen and air by weight is necessary for complete combustion of one kg. of coal

ii) Gross and net calorific value of coal sample.

OR

a) Write short notes on any **two** of the followings :- **(2×4=8)**

i) Flue gas analysis by or sat apparatus.

ii) Synthetic petrol

iii) Otto - Hoffmann process for preparation of coke.

b) Draw neat labelled diagram of Bomb Calorimeter and explain the determination of Gross and net calorific value of a fuel. (8)

Unit - III

3. a) Write notes on any **two** of the following (2×4)

i) Vulcanisation of rubber

ii) Preparation, properties and uses of Nylon

iii) Thermoplastics and thermo settings polymer.

b) What is phase rule? Explain the terms involve in it. Discuss Pb - Ag system with its application. (8)

OR

a) Discuss any **two** of the following (2×4)

i) Viscosity and viscosity index and its significance.

ii) Flash and Fire point and its significance.

iii) Extreme pressure lubrication.

b) What is 'reduced phase rule'? Explain sulphur system with its phase diagram. (8)

Unit - IV

4. a) What is corrosion? Discuss the mechanism of electro chemical corrosion. Explain why gold does not get corroded? Suggest some methods to minimise corrosion. (8)

b) Discuss 'super conductivity' and narrate the applications of super conductors. (8)

OR

a) Write notes on any **two** of the followings

i) Stress corrosion

ii) Concentration cell

iii) Factors affecting corrosion. (2×4=8)

b) Discuss preparation, properties, & application of Fullerenes. **(8)**

Unit - V

5. a) Describe 'The wet process of manufacture of cement' with the help of rotary kiln. Explain various reaction involved in it. **(8)**

b) Explain the following (any **two**)

    i) Annealing of glass

    ii) Seger cone test and RUL test of refractory materials.

    iii) Silica glass - properties and uses. **(2×4)**

OR

a) Describe the process of setting and hardening of cement. Explain the role of water in hardening of cement. **(8)**

b) What is glass? Explain the general properties of glass. How safety glass is prepared. **(8)**