1E1026

B. Tech. (Sem. I) (Main/Back) Examination, January/February - 2011
Engineering Chemistry-I
(Common to All Branches of Engg.)

Time : 3 Hours]   [Total Marks : 80
                                                               [Min. Passing Marks : 24

*Attempt any **five** questions selecting one question from each Unit.
All questions carry equal marks.*

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205)

1. _____ Nil _____   2. _____ Nil _____

UNIT-I

1. (a) What are the requisites of water for municipal water supply? Explain the various processes involved in purification of raw water for domestic use.

                                                                      4+4

   (b) Explain break point chlorination in detail and give its advantages over other methods of chlorination.

                                                                      8

OR

1. (a) What is hardness of water? How it is determined by EDTA method?

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   (b) 1 gram of $CaCO_3$ was dissolved in dilute HCl and the solution was diluted to 1 litre. 100 ml of this solution required 90 ml of EDTA solution while 100 ml of sample water required 40 ml of EDTA solution. On the other hand 100 ml of boiled water sample when titrated consumed 20 ml of EDTA solution. Calculate temporary, permanent and total hardness of this water sample in ppm of $CaCo_3$ equivalents.

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UNIT-II

2 (a) Discuss in detail the process of softening hardwater by lime-soda process. Also give the chemical reactions involved in the process.

8

(b) Analysis of water sample gave following results

$CaSO_4$ = 0.4 g/l

$MgCO_3$ = 0.44 g/l

$CaCO_3$ = 2.00 g/l

$MgSO_4$ = 0.80 g/l

$MgCl_2$ = 0.78 g/l

SiO_2 = 2.40 g/l

$NaCl$ = 2.50 g/l

Calculate the amount of lime and soda required to soften 20,000 litres of water. If purity of lime is 90% and that of soda is 95%.

8

OR

2 (a) Explain zeolite method of water softening in detail. give also the comparison of zeolite method with lime-soda process.

4+4

(b) Write short note on (any two) :

(i) Caustic embrittlement

(ii) Scale of sludge

(iii) Priming and foaming
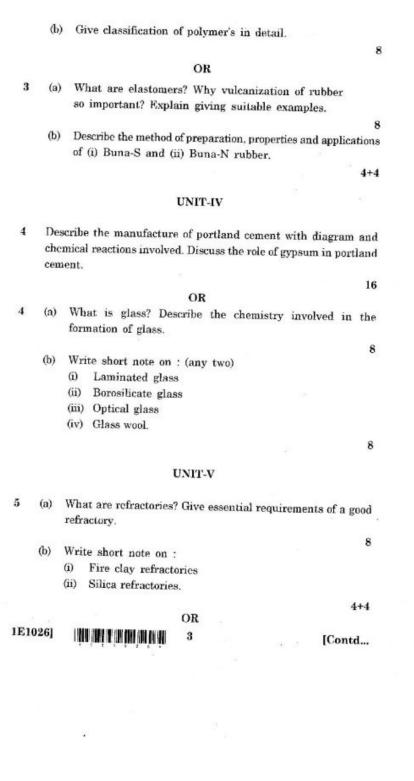
(iv) Calgon conditioning.

4+4

UNIT-III

3 (a) Write preparation, properties and uses of (any two)

(i) Bakelite

(ii) Nylon

(iii) Polyethylene

(iv) Terylene.

4+4

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(b) Give classification of polymer's in detail.

8

OR

3 (a) What are elastomers? Why vulcanization of rubber so important? Explain giving suitable examples.

8

(b) Describe the method of preparation, properties and applications of (i) Buna-S and (ii) Buna-N rubber.

4+4

UNIT-IV

4 Describe the manufacture of portland cement with diagram and chemical reactions involved. Discuss the role of gypsum in portland cement.

16

OR

4 (a) What is glass? Describe the chemistry involved in the formation of glass.

8

(b) Write short note on : (any two)
   (i) Laminated glass
   (ii) Borosilicate glass
   (iii) Optical glass
   (iv) Glass wool.

8

UNIT-V

5 (a) What are refractories? Give essential requirements of a good refractory.

8

(b) Write short note on :
   (i) Fire clay refractories
   (ii) Silica refractories.

4+4

OR

5 (a) Discuss the significance of viscosity in lubricating oils. How viscosity of lubricating oil is determined using Redwood viscometer?

8

   (b) Write short note on (any two) :

       (i)   Steam Emulsification Number (SEN)

       (ii) Precipitation Number

       (iii) Neutralization Number

       (iv) Viscosity Index.

4+4