1E1004

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B. Tech I Sem. (Back) Exam. Jan. 2016
203 Old Engineering Chemistry
Common to all Branches of Engineering

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.*

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

1. NIL 2. NIL

UNIT-I

Q.1 (a) What is EDTA? How will you determine the hardness of water by EDTA? [3+3=6]

(b) What is Bheak point chlorination? [4]

(c) Water containing $CaCO_3$ 120 mg/lit, $MgCO_3$ 84 mg/lit, $Mg(NO_3)_2$ 74 mg/lit, $CaCl_2$ 111 mg/lit and KCl 100 mg/lit is to be treated with lime soda. Calculate the amount of chemicals required for the treatment of 5000 lit of water. [6]

OR

Q.1 (a) Describe lime soda process for water softening. Give the chemical reactions involved during the softening. [3+3=6]

(b) If silica is present in water, what harmful effects it can cause? [4]

(c) Calculate the amount of lime required for softening of 5000 lit of hard water containing 72 ppm of Mg SO_4. [6]

UNIT-II

Q.2 (a) What are fuels and how are they classified? Give examples. [6]

(b) What is the significance of octane number? [5]

(c) The percentage composition of a sample of bituminous coal was found to be as under.

C = 75.4, H = 4.5, O =12.5, N = 3.1 S = 1.4

The rest being ash, calculate the minimum weight of air necessary for complete combustion of 1 kg of coal and percentage composition of the dry products of combustion by weight. [5]

OR

Q.2 (a) With the help of a neat sketch of Junker's calorimeter describe the determination of calorific value of a gaseous fuel. [8]

(b) Why is net calorific value (NCV) less than gross calorific value (GCV) [4]

(c) Calculate the gross and net calorific value of a coal sample having the following composition -

C = 80%, H = 7%, O = 3%, S = 3.5%, N = 2.1%, and ash = 4.4%. [4]

UNIT-III

Q.3 (a) State the phase rule and give its merits and limitations. [5]

(b) Draw and explain the phase diagram of Pb – Ag system. [6]

(c) Write short note on constituents of plastics. [5]

OR

Q.3 (a) Write preparation, structure and uses of (**any two**) - [6+6=12]

(i) Buna – S rubber

(ii) Buna – N rubber

(iii) Neoprene rubber

(b) What are lubricants? How are they classified? [4]

UNIT-IV

Q.4 (a) What is atmospheric corrosion? Explain rusting of iron with the help of electro-chemical theory of corrosion. [3+7=10]

(b) What is meant by the term "Passivity"? [6]

OR

Q.4 (a) Explain Mesessner effect in super conductors. Write the application of super conductors. [4+4=8]

(b) What are fullerenes? Discuss their properties and uses. [4+4=8]

UNIT-V

Q.5 (a) What are the constituents of cement? Write a note on Vertical Shaft Kiln technology for manufacture of cement. [2+6=8]

(b) Define soundness of cement. [8]

OR

Q.5 (a) Give classification of glass with their respective uses. [7]

(b) What is refractory? How are they classified (with examples)?. Explain the essentials of good refractory. [9]
