

Roll No

BE - 101**B.E. I & II Semester**

Examination, June 2016

Engineering Chemistry*Time : Three Hours**Maximum Marks : 70*

- Note:* i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.
 ii) All parts of each questions are to be attempted at one place.
 iii) All questions carry equal marks, out of which part A and B (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
 iv) Except numericals, Derivation, Design and Drawing etc.

Unit - I

- Why do we express hardness of water in terms of CaCO_3 equivalents?
 - Why disinfection of water is carried out for drinking purpose?
 - How are the exhausted resins regenerated in ion exchange method of water softening?
 - Discuss any two boiler troubles and what are their consequences? How can these boiler troubles can be minimised?

OR

A totally exhausted Zeolite softener required 100 litres of NaCl solution containing 200gm/litre of NaCl. How many litres of sample of water of hardness 500 ppm can be softened by this softener?

Unit - II

- Distinguish between coal and coke.
 - Name the catalyst used for catalytic cracking.
 - What is knocking? How it is related with chemical structure of fuel?

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- Discuss with the help of a labelled diagram, the determination of calorific value of a solid fuel by bomb calorimeter.

OR

3.12 gm of coal was kjeldahlized and NH_3 gas thus evolved was absorbed in 50ml of 0.1N H_2SO_4 . After absorption, the excess acid required 12.5 ml of 0.1N NaOH for exact neutralisation. Determine the percentage of nitrogen in the sample of Coal.

Unit - III

- How can the oiliness of a petroleum oil be increased?
 - What are the causes for failure of a refractory?
 - What is boundary lubrication?
 - Discuss with the help of a neat diagram, various steps involved in the manufacture of portland cement.

OR

Discuss the important properties of lubricating oils, which are useful for their evaluation.

Unit - IV

- What is repeat unit of natural rubber?
 - Why do all simple molecules not produce polymers?
 - Write the structural formula of PMMA.
 - Explain addition and condensation polymerisation with suitable examples.

OR

Write notes on the following:

- Buna-S
- Bakelite
- Nylon 6:6

Unit - V

- Give the types of molecular vibrations.
 - Define chromophore.
 - Draw a labelled diagram of instrument used in gas chromatography.
 - State the principle and reactions of EDTA method for the determination of hardness of water.

OR

100 ml of water sample on titration with N/50 HCl required 8 ml. of the acid to phenolphthalein end point and 9 ml. of the acid to methyl orange end point. Calculate the type and extent of alkalinity present in the water sample.

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