

BE - 101

B.E. I & II Semester

Examination, December 2015

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.

1. a) Write various units used for expression of hardness of water and show their interrelationship.
b) What is boiler corrosion?
c) Explain break point chlorination.
d) i) Write the chemical reactions involved in lime-soda process.
ii) Calculate lime and soda needed for softening of 10^5 litres of water containing $MgSO_4 = 12.0$ mg/l; $Mg(HCO_3)_2 = 14.6$ mg/l; $CaCl_2 = 22.2$ mg/l; $NaCl = 5.85$ mg/l.

Or

Describe and distinguish the zeolite and lime-soda processes of softening hard water.

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2. a) Distinguish clearly between peat, lignite and brown coals.
- b) Explain the process of reforming.
- c) Calculate the amount of minimum air required for complete combustion of 1 kg of coal sample containing C = 75%; H = 5.2%; O = 12.1%; N = 4.5% and remaining ash.
- d) What is cracking and for what it is used? What are the types of cracking? Describe the working of fluid bed catalytic cracking unit.

Or

What is carbonization? Point out the difference between carbonization and combustion. Also describe low and high temperature carbonization.

3. a) What are solid lubricants? Give examples.
- b) "Oils having high viscosity need not necessarily have high viscosity index". Justify the comment. *
- c) Write brief note on synthetic lubricants.
- d) Why viscosity is an important property of lubricants? What are the methods to determine viscosity? Explain any one method.

Or

What are the factors which are to be considered while selecting a lubricant for a particular purpose? How can we obtained lubricants from crude oil?

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Contd...

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4. a) What are thermoplastic and thermosetting plastics?
- b) Write characteristics of polymers.
- c) What are epoxy resins? Write important properties of epoxy resins.
- d) What is natural rubber? What do you understand by compounding of rubber? Name the ingredients used in compounding rubber. What are their functions?

Or

What is the difference between Nylon-6 and Nylon-6:6? Describe the method of synthesis of these using hydrocarbons.

5. a) Explain Beer-Lambert's law.
- b) What is BOD and COD? What is their significance?
- c) Discuss the principles involved in gas chromatography.
- d) Discuss the origin of ultraviolet spectra and explain the working of UV spectrometer. Write important applications of UV-spectroscopy.

Or

Briefly describe the methods used for the analysis of the following parameters in water and waste water:

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|---------------|--------------|
| i) Alkalinity | ii) Hardness |
| iii) Chloride | iv) DO |
| v) BOD | vi) COD |

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