CHEM136

[ST]

Enroll. No. -_____

END SEMESTER EXAMINATION : Nov-Dec, 2020

Engineering Chemistry

Time : Hrs

Maximum Marks :60

Note: Attempt questions from all sections as directed.

Use of simple calculator is allowed

Section - A : Attempt any Four questions out of Five . Each question carries 06 marks. [24 Marks]

Q1. Explain the electrochemical theory of corrosion taking iron as corroding metal. What is meant by the term 'passivity'?

(6)

Q2. What is meant by Gross calorific value? What are the corrections to be made in the calorific value of a fuel, determined by Bomb calorimeter?

(6)

Q3. Explain scale and sludge fromation in boiler? What are the disadvantages and what are the methods of prevention of scale formation?

(6)

Q4. Discuss the various types of molecular vibrations considered in IR spectroscopy. Distinguish between 2-propanol and propanone on the basis of their IR spectra.

(6)

Q5. Explain the mechanism of free radical polymerization with a suitable example.

(6)

Section – B : Attempt any two questions out of three. Each question carries 10marks. [20 Marks]

Q6. (a)

Define functionality and degree of polymerization of a polymer giving suitable examples. (4)

(b) What are living polymers? Taking any one example of living polymer, give the detailed mechanism of its synthesis.

(6)

Q7. (a)

What are the disadvantages of using hard water? What is the basic principle applied to remove the hardness of water by Lime -Soda process? (5)

(b) An exhausted zeolite softener was regenerated by passing 150 litres, of NaCl. Solution containing 150 gm per lit. of NaCl. How many lit. of a sample of H_2O of hardness 400 ppm can be softened by this softener? (Given at wts. for C = 12, O = 16, Na = 23, CI = 35.5, Ca = 40)

(5)

Q8. (a)

How many NMR signals expected in each of the following compounds? (4)

(a) $CH_3OCH_2CH_2CH_3$ (b) CH_3CHO (c) $CH_3CH=CH_2$ (d) $BrCH_2CH_2Br$

(b) What is oxide layer formation on metal? What are its different types? What is meant by pilling bed-worth rule?

(6)

Section - C : Compulsory question

Q9. (a)

Calculate the voulme of the air actually required, if 25% excess air is used, for the complete combustion of $1m^3$ of a gaseous fuel containing the following composition by volume. CO = 25%, H_2 = 10%, CH_4 = 8%, CO_2 = 5%, N_2 = 50% and O_2 = 2%. (4)

(b) What are cation exchange resins? Explain with a suitable example.

(4)

(c) Write short notes on (a) Cetane number (b) Octane number

(4)

(d) Define and explain the following properties of lubricant: (i) viscosity and viscosity. Index (ii) Cloud and Pour point.

(4)