VIT
Vellore Institute of Technology

Final Assessment Test – April 2019

Course: CHY1701 - Engineering Chemistry

Class NBR(s): 4104 /4109 / 4116 / 4122 / 4128 / 4134 / 4138 / 4142 / 4148 / 4154 / 4160 / 4166

Slot: E1+TE1

Time: Three Hours

Max. Marks: 100

Answer any TEN Questions
(10 X 10 = 100 Marks)

1. Explain the method of softening that gives water with less than one ppm hardness. Support your answer with diagram, working and regeneration. Mention any two disadvantages.
2. Elaborate on conducting mechanism of polyacetylene. Mention any four applications.
3. How do the vetrified tiles manufactured by coating a thin layer of silica. Illustrate a method with the labelled diagram and reactions.
4. Discuss the construction and working of rocking chair battery used in the mobile phones.
5. What is GCV and LCV? Describe a process used to determine the calorific value of gaseous fuel. Write formulae to find out GCV and LCV.
6. Illustrate any two methods used for moulding thermosetting polymers.
7. What is cathodic protection? Identify the types of cathodic methods involved in the protection of blades of exhaust fans and underground tanks. Elaborate both the methods with appropriate figures.
8. List out the steps involved in the treatment of water to get palatable water. Write a note on coagulation and disinfection using chlorine with breakpoint chlorination.
9. Describe the environmental factors affecting the rate of corrosion of metal with respect to following: Nature of ions present in the surrounding; Polarisation of electrodes; Oxygen concentration; Impurities in the atmosphere; pH value of the surrounding and humidity.
10. a) Illustrate the complexometric method of determination of hardness of water sample. [5]

    b) Determine total, temporary and permanent hardness of a given water sample from the following data: [5]

    (i) 0.7 g Calcium carbonate dissolved in minimum quantity of Conc. HCl and diluted to 750 mL with demineralized water.

    (ii) 50 mL of this water consumed 44 mL of EDTA solution

    (iii) 100 mL of water sample required 56 mL of EDTA solution

    (iv) 50 mL of boiled filtered water sample required only 11 mL EDTA solution.
11. a) What is the principle of SOFC? Describe with a suitable diagram and chemical reactions. Mention its disadvantages. [5]

    b) Explain H_2-O_2 fuel cell with necessary chemical reactions and a diagram. List the advantages of this fuel cell. [5]
12. a) What is octane and cetane number? How does octane and cetane value enhance by blending with suitable compounds? Give one example under each. [5]

    b) Calculate the amount of theoretical air required for the complete combustion of one Kg of coal sample containing following constituents: C = 83% ; H = 6% ; O = 0.9% ; N = 1.2% ; and remaning ash. [5]

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