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Question Paper Code: AHS005

MODEL QUESTION PAPER – I

Four Year B.Tech I Semester End Examinations, December – 2016

Regulation: R16

ENGINEERING CHEMISTRY

(Common for all branches)

Time: 3 Hours **Max Marks: 70**

Answer any ONE question from each Unit
All questions carry equal marks
All parts of the question must be answered in one place only

Unit – I

1. (a) Derive Nernst equation for a single electrode potential and explain the terms involved in it. What are its applications. [7M]
   (b) Define the specific resistance of a solution? Explain the specific conductance with diagrammatic illustrate of specific conductivity. What are its units? [4M]
   (c) The resistance of $N/2$ solution of an electrolyte in a cell was found to be 50 $ohms$. Calculate the equivalent conductance of the solution, if the electrolyte in cell are 2.2 cm apart and with an area of 3.8 $sq.cm$. [3M]
2. (a) What are the reference electrodes? Describe the construction, working and applications of calomel electrode. [7M]
   (b) Describe the construction, working and applications of Ni-Cd cell. [7M]
   (c) Specific conductance of an electrolyte decreases whereas equivalent conductance increases on dilution Explain? [7M]

Unit – II

3. (a) Give an account of the various factors influencing corrosion by giving suitable examples. [8M]
   (b) What is oxidation corrosion and how does it takes place? Describe the mechanism of oxidation corrosion. [6M]
4. (a) What is a paint? Explain the constituents and function of a paint. [7M]
   (b) Explain the process of galvanizing and tinning? Mention its applications. [7M]

Unit – III

5. (a) How do you estimate dissolve oxygen in water? [6M]
   (b) What is meant by sterilization of water? Explain non sterilization of water is carried out by using chlorine and ozone. [6M]
   (c) What is meant by carbonate and non-carbonate hardness of water? Explain with examples. [2M]

6. (a) Describe the ion-exchange process for softening of water? What are its advantages and limitations. [10M]

   (b) One liter of water sample collected from a water source in Telangana from Nalgonda has shown the following analysis. $Ca(HCO_3)_2 = 4.86\ ppm$, $Mg(HCO_3)_2 = 5.84\ ppm$, $CaSO_4 = 6.86\ ppm$ and $MgSO_4 = 8.4\ ppm$ Calculate temporary and permanent hardness in degree clark. [4M]

Unit – IV

7. (a) What are elastomers? Give the preparation, properties and applications of Buna-S and Thiokol rubber. [7M]

   (b) Explain the difference between thermoplastic and thermosetting resins. [4M]

   (c) Define refractories and how they are classified and give the examples. [3M]

8. (a) Write the reaction involved in setting and hardening of cement. [7M]

   (b) What are cloud point and pour point. [4M]

   (c) What is vulcanization of rubber? How does it improve natural rubber. [3M]

Unit – IV

9. (a) Explain proximate analysis of coal? How is it carried out. What its significance. [7M]

   (b) Define calorific value of fuel. Distinguish gross and net calorific value. [4M]

   (c) What are the characteristics of a good fuel. [3M]

10. (a) Explain the refining of petroleum by giving composition, boiling range and uses of various fractions obtained during refining. [7M]

    (b) A sample of coal contains the following composition Carbon=84%, Hydrogen=12%, Oxygen=2%, Sulphur=1%, and the remainder being ash. Calculate the gross and net calorific values of the fuel. [4M]

    (c) What is octane number and cetane number? Explain their significance. [3M]