10ME53

Fifth Semester B.E. Degree Examination, June/July 2016
Energy Engineering

Time: 3 hrs.   Max. Marks:100

Note: 1. *Answer any FIVE full questions, selecting*
atleast TWO questions from each part.
2. *Use of Steam table with Molier chart permitted.*

PART – A

1   a. Explain with a neat sketch, working of multiretort stocker and their advantages. **(10 Marks)**
    b. Explain pneumatic or vacuum extraction ash handling system. **(06 Marks)**
    c. What are the advantages of liquid fuels used in thermal power plants? **(04 Marks)**

2   a. With a neat sketch, explain the working of Schmidt – Hartman Boiler. **(08 Marks)**
    b. What are the different types of cooling ponds and cooling towers? **(08 Marks)**
    c. Explain the comparisons between forced and induced draughts. **(04 Marks)**

3   a. Classify the fuel storage and supply systems used in a diesel power plant. **(08 Marks)**
    b. With a neat diagram, explain the working of a diesel power plant. **(08 Marks)**
    c. What are the outstanding features of a diesel power plant over thermal power plant? **(04 Marks)**

4   a. Explain water hammer and surge tanks. What are the different types of surge tanks? Brief with neat sketches. **(08 Marks)**
    b. Define the term Hydrograph and Unit Hydrographs. **(06 Marks)**
    c. A catchment area of the dam used for hydroelectric station is 250 km^2. The annual rainfall is 125cm. If 70% of water is used for power generation in the dam, calculate the capacity of power plant in MW. Assume that the turbine efficiency is 90% and generator efficiency is 95%. Neglect the losses. **(06 Marks)**

PART – B

5   a. With a neat sketch, explain the working of a fast breader reactor and write the advantages and disadvantages. **(08 Marks)**
    b. What are the general components of nuclear reactor? **(08 Marks)**
    c. Explain the terms Nuclear Fusion and Nuclear Fission reaction. **(04 Marks)**

6   a. What is Flat Plate Collector? Write a brief description of Liquid collector. **(08 Marks)**
    b. Write with a neat sketch, the working of a Horizontal axial machines. **(08 Marks)**
    c. Derive an expression for overall conversion efficiency and coefficient of performance in terms of velocity of blade element. **(04 Marks)**

7   a. What are the components of a tidal power plant? Brief each. **(08 Marks)**
    b. A hot water geothermal plant of the total flow type receives water at 225^{0}C. The pressure at the turbine inlet is 10.5 kg/cm^2. The plant uses a direct contact condenser that operates at 0.35 kg/cm^2. The turbine has a polytrophic efficiency of 0.65 for a cycle net output of 10MW. Calculate by using stream table and Molier chart.
       (i)   The hot water flow in kg/hr.
       (ii) The condenser cooling water flow in kg/hr at water temperature at 27°C.
       (iii) The cycle efficiency.   (iv) The plant heat rate. **(08 Marks)**
    c. Write the advantages and disadvantages of tidal power generation. **(04 Marks)**

8   a. Explain photosynthesis with example. **(08 Marks)**
    b. With a neat diagram, explain the working of continuous and batch type Biogas plants. **(08 Marks)**
    c. Write the classification of Biomass gasifiers. **(04 Marks)**

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