

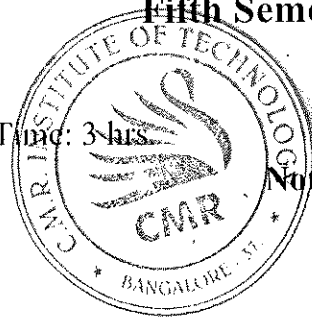
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**Fifth Semester B.E. Degree Examination, June/July 2016**

**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<sup>2</sup>. 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 breeder 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<sup>0</sup>C. The pressure at the turbine inlet is 10.5 kg/cm<sup>2</sup>. The plant uses a direct contact condenser that operates at 0.35 kg/cm<sup>2</sup>. 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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