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10ME833

Eighth Semester B.E. Degree Examination, Feb./Mar. 2022
Power Plant Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer any FIVE full questions, selecting at least TWO questions from each part.
2. Use of thermodynamic data book is permitted.

PART – A

- 1 a. With a neat sketch explain the working principal of spreader stoker. (10 Marks)
b. What are the advantages and disadvantages of pulverized coal in thermal power plants? (06 Marks)
c. List different types of fuels used for steam generation. (04 Marks)
- 2 a. Classify the ash handling system. Explain the working principal of mechanical ash handling system with a neat sketch. (10 Marks)
b. With the help of a neatly labeled sketch, explain the working of La Mont boiler. (10 Marks)
- 3 a. Prove that draught produced in mm of water head by chimney is,
$$h_w = 353H \left[\frac{1}{T_a} - \frac{1}{T_g} \left(\frac{Ma+1}{Ma} \right) \right]$$

Where H = Height of chimney above the grate.
Ma = Mass of air supplied per kg of fuel. (10 Marks)

b. What is the function of a super heater? Mention its advantages. (05 Marks)
c. Explain with a sketch any one type of pre-heater. (05 Marks)
- 4 a. Explain importance of cooling and lubrication system for the diesel engine plants. (10 Marks)
b. State advantages and disadvantages of gas turbine power plants over diesel and thermal power plant. (06 Marks)
c. With a neat sketch explain open cycle gas turbine. (04 Marks)

PART – B

- 5 a. Explain the following :
i) Surge tank
ii) Hydrograph (08 Marks)
b. Classify the hydro – electric power plants. (06 Marks)
c. Explain with neat sketch high head power plants. (06 Marks)
- 6 a. With the help of a sketch, show the important parts of a nuclear reactor describing briefly the function of each part. (12 Marks)
b. Explain with a neat sketch pressurized water reactor. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

- 7 a. Define the following terms :
- Load factor
 - Diversity factor
 - Demand factor
 - Capacity factor.
- (08 Marks)
- b. What factors should be considered while selecting the site for a hydro-electric plant.
- (05 Marks)
- c. The yearly duration curve of a certain plant can be considered as a straight line from 300MW to 80MW. Power is supplied with one generating unit of 200MW capacity and two units of 100MW capacity each. Determine :
- Installed capacity
 - Load factor
 - Plant factor
 - Maximum demand
 - Utilization factor.
- (07 Marks)
- 8 a. Explain with sketch performance and operating characteristics of power plants. (10 Marks)
- b. Two electrical units used for same purpose are compared for their economical working :
- Cost of unit – 1 is Rs. 6000 and it takes 120 KW
 - Cost of unit – 1 is Rs. 16800 and it takes 72KW
- Each of them has a useful life of 40,000 hours. Which unit will prove economical if the energy is charged at Rs. 96 per KW of maximum demand per year and 6p. per KWh?
- Assume both units run at full load. (10 Marks)
