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10ME833

Eighth Semester B.E. Degree Examination, June/July 2016
Power Plant Engineering

Time: 3 hrs.

Max. Marks: 100

Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.
2. Use of steam tables/cost analysis charts/ TD handbook is permitted.

PART – A

- 1 a. Explain the working of a spreader stoker with the help of a neat diagram and state its limitations. (10 Marks)
- b. Sketch and explain the following pulverized fuel handling systems: (10 Marks)
 - i) Unit system
 - ii) Central or bin system
- 2 a. Mention the important properties of coal used in power plant applications. (05 Marks)
- b. What are the principal advantages of forced circulation boilers? (05 Marks)
- c. What are the factors to be considered in selection of a boiler? Explain with a neat diagram, a Velox boiler. (10 Marks)
- 3 a. Explain Draught and give its classification. (06 Marks)
- b. Explain the function of a superheater and mention its advantages. (04 Marks)
- c. A chimney of 28 m high and the temperature of hot gases inside the chimney is 320°C. The temperature of outside air is 23°C and furnace is supplied with 15 kg of air per kg of coal burnt. Calculate: (10 Marks)
 - i) Draught in mm of water
 - ii) Draught head in meters of hot gases.
- 4 a. State the applications of diesel engines in power field. (05 Marks)
- b. What are the advantages and disadvantages of diesel power plant and gas turbine power plant? (05 Marks)
- c. Explain air intake and admission system of diesel power plant with a neat sketch and mention the precautions should be taken care while constructing it. (10 Marks)

PART – B

- 5 a. Hydro projects are developed for what purpose? List the advantages and disadvantages of hydro electric power plants. (10 Marks)
- b. The mean monthly discharge at a particular site is given in table below. Draw the hydrograph and the flow duration curve.

Month	Discharge, m ³ /s	Month	Discharge, m ³ /s
January	200	July	2000
February	450	August	2400
March	600	September	1800
April	1200	October	1200
May	1500	November	800
June	1600	December	400

(10 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.

- 6 a. Explain Pressurized Water Reactor (PWR) power plant with a neat schematic diagram. (08 Marks)
- b. Write short notes on disposal of radioactive wastes. (04 Marks)
- c. Explain with a neat sketch the elements of the nuclear reactor. (08 Marks)
- 7 a. Define the following:
- Load factor
 - Utility factor
 - Capacity factor
 - Demand factor
 - Diversity factor
- b. A power station has to supply load as follows: (10 Marks)
- | Time (hrs) | 0-6 | 6-12 | 12-14 | 14-18 | 18-24 |
|------------|-----|------|-------|-------|-------|
| Load (MW) | 45 | 135 | 90 | 150 | 75 |
- Draw the load curve.
 - Draw load duration curve.
 - Choose suitable generating units to supply the load.
 - Calculate the load factor.
 - Calculate the plant capacity factor. (10 Marks)
- 8 a. Name some important remedies to reduce the cost of power generation. (05 Marks)
- b. For what purpose the expenses are made in a construction cost of a power plant? (05 Marks)
- c. The capital cost of a power generating equipment in a steam power plant is RS 80×10^6 . The useful life of the plant in 30 years and its salvage value is 5% of the capital cost. Determine by the sinking fund method the amount of money to be saved annually for replacement if yearly rate of compound interest is 6%. (10 Marks)
