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Question Paper Code : 80857

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2021.

Seventh Semester

Mechanical Engineering

ME 2403/ME 1353/10122 ME 704/ME 73 — POWER PLANT ENGINEERING

(Regulations 2008/2010)

(Common to PTME 2403 for B.E. (Part-Time) Seventh Semester – Mechanical Engineering — Regulations 2009)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List out the major advantages of high pressure boilers in modern thermal power plants.
2. What are types of fluidized bed boilers?
3. What is meant by surface condenser?
4. Classify Pulveriser.
5. Why shielding of a reactor is necessary? What do you understand by thermal shielding?
6. What are mini and micro-hydel plants?
7. What is the use of surge tank and day tank in diesel engine power plant?
8. How the Brayton cycle is applied for Gas turbine power plant?
9. Differentiate between renewable and non-renewable sources of energy.
10. Define demand factor and load factor.

PART B — (5 × 16 = 80 marks)

11. (a) Draw a detailed layout of modern steam power plant and mention the essential requirements and site selection for steam power station.

Or

- (b) (i) Discuss the working principle of MHD power generation. (10)
(ii) A power station has to supply load as follows: (6)

Time (hours)	0-6	6-12	12-14	14-18	18-24
Load (MW)	45	135	90	150	75

Draw the load and load duration curve.

12. (a) (i) Discuss the relative merits of different out plant coal handling. (8)
(ii) Describe the hydraulic ash handling system. (8)

Or

- (b) Explain the principle of different types of electrostatic precipitator. (16)

13. (a) (i) Explain the principal parts of nuclear reactor in brief. (8)
(ii) Explain with neat sketch the working of CANDU type reactor. (8)

Or

- (b) (i) Explain the factors that should be considered while selecting the site for hydro power plant. (8)

- (ii) Explain the working of Pelton turbine with a neat diagram. (8)

14. (a) How do you select engine for a diesel power plant? Describe the auxiliary equipments of a diesel engine power plant. (16)

Or

- (b) Explain the working and construction of Gas turbine power plant with layout. (16)

15. (a) (i) Draw a neat diagram of a power generating system illustrating the use of solar thermal central receiver system as a source of energy. (10)
- (ii) Explain the basic principle of OTEC. Define the figure of merit and show its effect on the efficiency of the OTEC power plant taking source temperature as a parameter. (6)

Or

- (b) (i) The following data pertains to a power plant of 120 MW capacity :
- The capital cost = Rs. 15,000/kW
Interest and depreciation = 10% on capital
Annual running charges = Rs. 20×10^6
Profit to be gained = 10% of the capital
The energy consumed by the
power plant auxiliaries = 5% of generated
The annual load factor = 0.6
Annual capacity factor = 0.5
- Calculate (1) the reverse capacity and (2) cost of generation per kWh. (10)
- (ii) What is the significance of two part tariff and three part tariff? Explain the advantages of each over other. (6)