Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 50889

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Third/Sixth/Seventh Semester

Mechanical Engineering

ME 8792 — POWER PLANT ENGINEERING

(Common to Electrical and Electronics Engineering/Safety and Fire Engineering)

(Regulations 2017)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the different types of furnaces in which coal may be burnt?

2. Why does the boiler feed water need to be treated?

3. When is diesel power plant installation preferred?

4. What are the applications of gas turbine plants?

5. What is called critical mass of nuclear fuel?

6. Differentiate chemical reaction and nuclear reaction.

7. What are the purposes of hydro projects?

8. What is bio gas? What are its uses?

9. What is the significance of load factor?

10. What are fixed cost and operating cost of a power plant?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Write the advantages of mechanical firing.   (6)

      (ii) Discuss about mechanical dust collector.   (7)

Or

(b) (i) Discuss the important features of Benson high pressure boiler. (6)

      (ii) Describe a mercury and steam binary vapour cycle with a block diagram. (7)

12. (a) (i) List down the advantages of diesel power plant. (6)

        (ii) List the functions of lubricant in a diesel engine plant. (7)

Or

(b) (i) Write a note on Gas turbine chambers of gas turbine plant. (6)

      (ii) Explain how the efficiency of gas turbine plant is increased by regeneration. (7)

13. (a) Describe the various parts of a nuclear reactor.

Or

(b) (i) Highlight the points to be considered while selecting a nuclear plant site. (6)

      (ii) Discuss the safety measures for nuclear power plant. (7)

14. (a) Describe the essential features of hydroelectric power plant.

Or

(b) (i) Explain the construction and working of a solar flat plate collector. (6)

      (ii) Elucidate with a schematic diagram the working of a binary cycle geothermal plant. (7)

15. (a) Define the following :

      (i)   Utility factor (3)

      (ii) Plant operating factor (3)

      (iii) Plant capacity factor (3)

      (iv) Demand factor and (2)

      (v) Diversity factor. (2)

Or

(b) What is depreciation? Explain straight line method and sinking fund method of calculating the depreciation.

PART C — (1 × 15 = 15 marks)

16. (a) A power Generating Station has the Following Daily Load Cycle :

Time in hours	0-6	6-10	10-12	12-16	16-20	20-24
Load in MW	40	50	60	50	70	40

Draw the load curve and Find: Maximum Demand, Unit Generated per day, average load and load factor.

Or

2   50889

B.E/B.TECH, M.E/M.TECH, MBA, MCA, POLYTECHNIC & SCHOOL

Notes   *Available @*
Syllabus
Question Papers   www.binils.com
Results and Many more…

(b) (i) A power generating station has a maximum demand of 40,000 kW and a connected load of 70,000 kW. The number of units supplied annually is 28×10^7 kWh. Calculate load and demand factor. (7)

(ii) A power generating station supplies the following maximum loads:

Domestic Load = 2,000 kW, Industrial Load = 10,000 kW, Commercial Load = 6,000 kW and Irrigation Load = 3,000 kW. The diversity factor of these loads at the generating station is 1.5 and average annual load factor is 55%. Calculate the maximum demand on the station and total energy supplied by the plant in a year. (8)

———