Reg. No. : | | | | | | | | | | | |

C 3386

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2008.

Sixth Semester

Mechanical Engineering

ME 1354 — POWER PLANT ENGINEERING

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. State the advantages and disadvantages of the hydroelectric power plants.

2. List out factors with which the unit size of the power plant is being decided.

3. Why does cooling water flow inside the tubes and stem condense outside of the tubes of the surface condenser?

4. What is drift? How is the drift eliminated in the cooling towers?

5. What is "half life" of nuclear fuels?

6. What is the function of a surge tank in a hydro electric power plant?

7. What are all the applications of the diesel power plant?

8. How the gas turbine blades are cooled?

9. What is OTEC?

10. How does the fuel cost relate to the load and the cost of power generation?

PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Draw a neat diagram of hydroelectric power plant and explain the functions of each component in that plant. (10)

(ii) Distinguish between the high pressure boiler and super critical boiler. (6)

Or

(b) (i) Describe the water and steam flow circuit of the thermal power plant layout. (6)

(ii) With neat diagram, explain the working principle of the combined MHD and steam open cycle power plant. (10)

12. (a) (i) Explain the construction and operation of the chain grate traveling stoker. Also enumerate its advantages and disadvantages. (8)

(ii) State and explain the operation of the mechanical draught cooling towers. (8)

Or

(b) (i) Sketch and describe the working principle of the pneumatic system of the ash handling in the boiler plant. (6)

(ii) Explain with a sketch the direct pulverized coal firing system. What are its merits and demerits? (10)

13. (a) (i) Explain the working of a typical fast breeder nuclear reactor power plant, with the help of neat diagram. (10)

(ii) Write short notes on Nuclear waste disposal. (6)

Or

(b) (i) What are the difference between a pressurized water reactor nuclear power plant and boiling water reactor nuclear power plant? (10)

(ii) Discuss the factors to be considered in selecting the turbines for hydro electric power plants. (6)

14. (a) Enlist the advantages and disadvantages of diesel power plant. And discuss the essential components of the diesel power plant with neat layout. (16)

Or

(b) (i) With PV and TS diagram explain the effect of intercooling, reheating and regeneration in a gas turbine plant. (10)

(ii) Discuss the materials which are used for gas turbines and compressors. What properties should the blade materials posses? (6)

15. (a) (i) Explain the spring tides and neap tides. Discuss the different tidal power schemes and configurations with neat sketches. (12)

(ii) Explain the different types of geothermal energy sources. (4)

Or

(b) (i) Explain with a sketch the central receiver concept of solar energy system. (6)

(ii) Determine the generating cost per unit of 80MW power station with the following data : (10)

Capital cost = Rs. 1600×10^6

Annual cost of fuel = Rs. 32×10^6

Annual wages and taxes = Rs. 36×10^6

Interest and depreciation = 10% of capital cost

Annual load factor = 45%.
