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Question Paper Code : C 1385

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2010.

Sixth Semester

Mechanical Engineering

ME 1354 — POWER PLANT ENGINEERING

(Common to B.E. (Part-Time) Fifth Semester (Regulation 2005))

Time : Three hours   Maximum : 100 marks

Any missing data can be assumed suitably.

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Classify power plants on the basis of traditional use.

2.   Indicate the advantage of load duration curve over load curve.

3.   What is a stoker? Classify it.

4.   Mention the uses of fly ash.

5.   What is the function of pressuriser in a PWR?

6.   Why is surge tank important in a hydro plant?

7.   List down the advantages of a diesel power plant.

8.   Why power generation by gas turbines is attractive these days?

9.   What is the principle of operation of OTEC plants?

10. List the energy tariff types.

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PART B — (5 × 16 = 80 marks)

11. (a) Discuss the advantages of combined cycle power generation. Explain the working of GT-ST combined cycle plant.

Or

(b) (i) What is a supercritical boiler? List down its merits and demerits. (8)

(ii) What is acid rain? Explain how sulphur is removed in a fluidised bed combustor. (8)

12. (a) (i) With a neat diagram, explain the operation of an electrostatic precipitator. (8)

(ii) What is a bag house? Describe the working of reverse air fabric filter. (8)

Or

(b) How does a cooling tower operate? What is an FD cooling tower? Mention its merits and demerits.

13. (a) (i) Discuss with a sketch the main characteristic features of BWR. (8)

(ii) Explain how the solid nuclear waste materials are disposed. (8)

Or

(b) Explain with a neat sketch a pumped storage hydro plant. State its advantages.

14. (a) (i) Discuss the applications of diesel electric power plants. (8)

(ii) Explain how engines are selected for diesel power plants. (8)

Or

(b) (i) Bring out the differences between closed cycle and open cycle gas turbine power plants. (8)

(ii) Discuss the effect of intercooling and reheating in a gas turbine plant. (8)

15. (a) What is tidal energy? Discuss the different types of tidal plants with neat diagrams.

Or

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(b) (i) Calculate the cost of power generation per kWh for a power station having the following data : Installed capacity of the plant – 200 MW, Capital cost = Rs. 400 crores, Rate of interest and depreciation = 12%, Annual cost of fuel, salaries and taxation = Rs. 5 crores and load factor = 50%. (8)

(ii) Compare the economics of steam, hydro, nuclear, diesel and gas turbine power plants. (8)

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