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

Question Paper Code : 80235

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2019.

Third Semester

Electrical and Electronics Engineering

ME 8792 — POWER PLANT ENGINEERING

(Regulation 2017)

Time : Three hours | Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. When a boiler is said to be supercritical boiler?
2. Why the preparation of coal is necessary?
3. List the various thermodynamic processes involved in Otto cycle.
4. State the merit and demerit of use of Mercury as working fluid in binary cycle power plants.
5. What is breeding in nuclear reactor?
6. What is the purpose of reprocessing of nuclear waste?
7. Mention few turbines that are widely used in hydro-electric power stations.
8. State the function of 'dyke' and 'sluice ways' refers in tidal power plants.
9. What do you understand by the term tariff?
10. What is Thermal Discharge Index (TDI)?

PART B — (5 × 13 = 65 marks)

11. (a) Explain how the Rankine cycle efficiency is improved when increasing the pressure of steam and reducing the condenser pressure.

Or

(b) What is Fluidised Bed Combustion (FBC)? Describe the function of bubbling Fluidised bed boiler. (3 + 10)

12. (a) What is Brayton cycle? Using a schematic of closed cycle gas turbine engine, discuss the thermodynamic processes of Brayton cycle and then arrive the efficiency expression.

Or

(b) (i) What is IGCC? Discuss the benefits of IGCC plant over pulverized coal-fired power plants. (6)

(ii) List out the advantages of combined gas and steam cycle power generation. (7)

13. (a) (i) List the desirable properties of a moderator and a coolant. (6)

(ii) Draw a schematic of a direct-cycle BWR plant and discuss its function. (7)

Or

(b) What does Liquid Metal Fast Breeder Reactor (LMFBR) mean? Discuss the working principle of LMFBR.

14. (a) (i) List the various advantages and disadvantages of hydro-electric power stations. (8)

(ii) What is low head hydro power plant? Explain its function. (5)

Or

(b) Show and explain the different layers in the cross section of the earth. Also explain the hydrothermal based geothermal source.

15. (a) The following loads are connected to a power plant:

Type of load	Max. demand (MW)	Diversity factor	Demand factor
Domestic	15	1.25	0.70
Commercial	25	1.20	0.90
Industrial	50	1.30	0.98

If overall diversity factor is 1.5, determine the

(i) maximum load and

(ii) connected load of each type.

Or

(b) Discuss the issues of various gases that are released into the atmosphere from diesel engine power plant.

PART C — (1 × 15 = 15 marks)

16. (a) A power station has to supply load as follows:

Time (hours)	0-6	6-12	12-14	14-18	18-24
Load (MW)	30	90	60	100	50

(i) Draw the load curve

(ii) Draw the load duration curve

(iii) Select suitable generating units to supply the load

(iv) Calculate the load factor

(v) Calculate the capacity of the plant and the plant capacity factor.

Or

(b) A steam power plant uses the following cycle:

Steam at boiler outlet –150 bar, 550°C

Reheat at 40 bar to 550°C

Condenser at 0.1 bar

Using the Mollier chart and assuming ideal processes, find the

(i) quality at turbine exhaust,

(ii) cycle efficiency and

(iii) steam rate.

———————