

D 90297

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SEVENTH SEMESTER B.TECH. (ENGINEERING) [09 SCHEME]
DEGREE EXAMINATION, NOVEMBER 2015

ME/PTME 09 704—POWER PLANT ENGINEERING

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. Mention the advantages of closed feed water heaters.
2. What is turbine governing ?
3. What do you mean by electrostatic precipitator ?
4. What is boiler trial ?
5. Define chain reaction.

(5 × 2 = 10 marks)

Part B

Answer any four questions.

6. Write about gas power cycle.
7. Discuss the functioning of cooling tower.
8. Explain the ash handling systems.
9. Discuss the boiler inspection and safety regulations.
10. Mention the MHD power cycle principle.
11. Discuss the fast breeder reactors.

(4 × 5 = 20 marks)

Part C

Answer all the questions.

12. In an electric generating station, using a binary vapour cycle with mercury in the upper cycle and steam in the lower, the ratio of mercury flow to steam flow is 10 : 1 on mass basis. At an evaporation rate of 10,00,000 kg/h for the mercury, its specific enthalpy raises by 356 kJ/kg while passing through the boiler. Superheating steam in the boiler furnace adds 586 kJ to the steam specific enthalpy. Mercury gives up 251.2 kJ/kg during condensation and steam gives up 2003 kJ/kg in its condenser. The overall boiler efficiency is 85%. The combined turbine mechanical efficiencies are each 95% for the mercury and steam units. The steam auxiliaries need 5% of the energy generated by the units. Find the overall efficiency of the plant.

Or

Turn over

13. Explain the Rankine reheat and regenerative cycle.
14. Discuss the pulverized fuel combustion system.

Or

15. Explain various stoker systems.
16. (a) Discuss the guide lines for selection of boiler for steam power plants. (5 marks)
- (b) Give the advantages of bent tube boilers. (5 marks)

Or

17. Explain thermal power plant pollution and its controlling mechanisms.
18. What are the critical factors considered while selecting the nuclear power plant ?

Or

19. A thermal power plant of 210 MW capacity has the maximum load of 160 MW. Its annual load factor is 0.6. The coal consumption is 1 kg per kWh of energy generated and the cost of the coal is Rs. 450.00 per tonne. Calculate :
 - (a) the annual revenue earned if energy is sold at Re 1 per kWh and
 - (b) the capacity factor of the plant.

[4 × 10 = 40 marks]