



**B.E. (Full Time) DEGREE SEMESTER EXAMINATIONS, APRIL 2011
MECHANICAL ENGINEERING BRANCH
EIGHTH SEMESTER (REGULATIONS 2004)
ME 482 POWER PLANT ENGINEERING**

Time : 3 h

Max. Marks : 100

Instructions

Approved Steam Tables and Mollier Diagram permitted.

Answer All Questions

Part A (10 x 2 = 20 Marks)

1. Indicate the specific type of Nuclear Power Plants that were involved in the accident following the earth quake and tsunami strike of March 2011 in Japan.
2. Give the salient features of fluidised bed combustion boiler systems for power plants.
3. Outline the role of cooling towers in power plant systems operation.
4. Indicate the power plant mix of Tamil Nadu state.
5. Indicate the type of control system employed in large central power stations.
6. Indicate the features of pumped storage powerplant systems.
7. Give the features of Boiling Water (Nuclear Fission) Reactor power plant systems.
8. Give a brief note on SPV plants vis-à-vis Solar Thermal Power plants.
9. How do cogen plants differ from combined cycle power plants?
10. How the plant load factor is assessed? Indicate typical value for the thermal power plants of our country.

Part B (5 x 16 = 80 Marks)

11. (a) Discuss the layout and working of a modern compression ignition engine power plant, generating, say, 21 MW_e at full load, with an illustration. (12)
- (b) Indicate the trend in diesel power plant development. (4)
12. (a) Give the modern coal fueled power boiler schematic and discuss its salient features. (16)
- OR
- (b) A steam power plant operates with just one regenerative feed water heater. The initial steam conditions are 35 bar(g) and 440°C and the back pressure 0.40 bara. The steam is bled from the turbine for feed water heating at an intermediate pressure of 1.22 bara. Determine the following performance parameters of the system:-
 - (i) Specific steam consumption (6)
 - (ii) Thermal efficiency of the operating cycle (6)
 - (iii) Improvement in cycle thermal efficiency over simple condensing power plant without any regeneration. (4)

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13. (a) (i) Discuss a typical coal handling system of a thermal power plant of 210 MW capacity. (12)
- (ii) Give a brief note on integrated gasifier combined cycle plants using coal fuel. (4)
- OR
- (b) Indicate the major pollutants from pulverised coal fired thermal power plants, typical of those operating in India. Discuss briefly the methodologies of their control. (16)
14. (a) (i) Discuss the construction and working of a pressurised heavy water moderated and cooled nuclear fission thermal reactor power plant, with an illustration. (12)
- Indicate the locations of nuclear power plants operating in India. (4)
- OR
- (b) (i) Discuss a typical MHD power plant schematic indicating its features. Give the seed materials used. (12)
- (ii) What is the basic difference between a MHD power plant system and a conventional coal fueled thermal power plant system? (4)
15. (a) (i) Discuss the power plant operational indices and their significance with an illustration. (8)
- (ii) Outline the schematic of a Geothermal power plant system and briefly discuss. (8)
- OR
- (b) (i) Discuss a typical solar power plant system with an illustration or two and indicate the relevance of such systems for our country. (8)
- (ii) Indicate the vital parameters of a power boiler test and discuss briefly the methodology employed. (8)