

Roll No .....

**MMTP - 201****M.E./M.Tech., II Semester**

Examination, July 2015

**Thermal Power Plant Engineering****Time : Three Hours****Maximum Marks : 70**

- Note :** i) Attempt any five questions.  
ii) All questions carry equal marks.  
iii) Use of steam tables and Mollier Diagram is permitted.  
iv) Assume suitable data wherever necessary.  
v) Make suitable and neat diagrams wherever necessary.
1. a) Make the general layout of conventional thermal power plant and explain the main circuits.  
b) Explain the working principles of super critical power plants and the steam cycle associated with such plants.
  2. a) What sort of training is given to power plant personnel?  
b) What are the steps taken for thermal power plant management?  
c) What steps are essential for plant safety and making earthquake resistant structures?
  3. a) What is the Logarithmic Mean Temperature Difference (LMTD) approach applied in the designing of condensers?  
b) A vacuum of 705mm of Hg was recorded in a condenser when the barometer reads 755mm of Hg. The temperature of the condensate was 26°C. Calculate
    - i) The pressure of steam and air in the condenser
    - ii) Mass of air present in the condenser and
    - iii) Vacuum efficiency

4. a) Discuss the practical Regenerative-Rankine vapour power cycle with the help of neat schematic flow diagram having single feed water heater utilized in steam power plants. Plot its various processes on Temperature-entropy and enthalpy-entropy diagram.
  - b) A Reheat-Rankine cycle operates between the pressure limits of 26 bar and 0.04 bar. The steam entering the HP turbine and LP turbine has a temperature of 400°C. The steam leaves the HP turbine as dry and saturated. Draw the temperature-entropy diagram of this cycle and determine its thermal efficiency. Neglect the pump work.
5. a) What is the need and importance of thermal power plant instrumentation? Explain the working of pneumatic and electro-mechanical transducers and controllers with neat sketches.
  - b) Explain the critical thickness of insulation in steam pipings and the costs incurred on such installations.
6. a) Discuss the performance checks and acceptance test for various components of steam thermal power plant.
  - b) What are the solid, liquid and gaseous pollutants in thermal plants? What are the steps to control the pollutants in flue gases discharged through chimney and the control of fly ash pollutants?
7. a) What are the different impurities in feed water, if not treated before the entry into the boiler? What are the effects of such impurities?
  - b) Discuss Sodium Carbonate treatment and Phosphate treatment of boiler feed water.

8. Write short notes on any four of the following : ✧
- a) Performance curves for steam based thermal power plant
- b) Fluidized bed combustion
- c) Purchase and contract for fuel supplies
- d) Piping and its flexibility analysis
- e) Heat balance of items and entire thermal power plant
- f) Ash handling

\*\*\*\*\*