Roll No .....

MMTP - 204

M.E./M.Tech., II Semester

Examination, December 2015

Steam and Gas Turbine

Time : Three Hours

Maximum Marks : 70

Note : Attempt any five questions. All questions carry equal marks. Draw neat diagrams wherever required.

1. a) State the principle of working of steam turbine. State its classifications.
   b) Explain various energy losses in steam turbines with their calculation formula.

2. a) What do you understand by the term optimum feed water temperature in steam turbine? Explain the role of surface heaters.
   b) Explain the regenerative feed heating cycle and their representation of T-s and h-s diagram.

3. a) Explain the advantages and disadvantages of reheating in steam turbines.
   b) Explain the recent trends in turbine sizes and specifications used in newly commissioned steam turbine plants.

4. a) Briefly discuss heat accumulators.
   b) Compare low pressure turbines and mixed pressure turbines.

5. a) What do you mean by Jet Propulsion? Discuss turbo-jet and turbo propulsion systems.
   b) Compare constant pressure and constant volume gas turbine cycles.

6. Calculate the principal dimensions of the nozzles and blading of a turbine given the following specifications:

Power delivered at the shaft coupling	5000kW
Revolutions per minute	2400 rpm
Maximum blade speed	570 ft/s
Initial steam pressure	150 psia
Initial steam temperature	540°F
Condenser pressure	1 in Hg

Constant mean blade diameter for all stages

7. Consider a two-shaft gas turbine with a regenerative air heater. The compressor pressure ratio is 6, and the compressor and gas generator turbine inlet temperatures are 520°R and 1860°R, respectively. The compressor, gasifier turbine and power turbine isentropic efficiencies are 0.86, 0.89 and 0.89 respectively. The regenerator effectiveness is 75% and a 4% pressure loss is shared by the high-pressure air side of the regenerator and the combustor. Determine the pressure ratios of the two turbines, and the network, thermal efficiency, and work ratio of the engine.

8. Write short note on the following (Any Two)
   a) Construction and components of steam turbines
   b) Gas turbine efficiency
   c) Pressure losses in gas turbines

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