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## Assignment - I

A. J. Modi

- 1) Determine the Rankine efficiency for a cycle working between pressure limits of 20 bar and 0.5 bar, when steam is (a) wet and dryness fraction 0.78 (b) dry and saturated (c) superheated and temperature of superheated steam being  $300^{\circ}\text{C}$ .
- 2) A steam power plant operates on simple Rankine cycle. The dry saturated steam is supplied to the turbine at pressure 20 bar. The steam exhausts from turbine at pressure 0.1 bar. Calculate cycle efficiency by using (a) Steam tables and (b) Mollier chart. Neglect pump work.

3) A steam power plant working between boiler pressure 50 bar and Condenser pressure 0.1 bar. At inlet of turbine steam is dry saturated. Mass flow rate of steam is 10,000 kg/hr. Calculate (i) Power output of turbine (ii) Heat supplied to boiler (iii) Heat rejected to the condenser. (iv) mass flow rate of cooling water circulating in the condenser. Assume inlet and outlet cooling water temperature are  $20^{\circ}\text{C}$  and  $31^{\circ}\text{C}$  respectively.

4) A steam power plant working on Rankine cycle has range of operation from 50 bar to 0.07 bar. The steam temperature at inlet of turbine is  $300^{\circ}\text{C}$ . Calculate (i) work ratio (ii) cycle efficiency, and (iii) specific steam consumption.

5) A steam power plant working on Rankine cycle. Boiler and Condenser pressures are 30 bar and 0.05 bar resp. At inlet of turbine steam is wet with  $x=0.9$ . Calculate (i) dryness fraction of steam at outlet of turbine, (ii) mass flow rate of steam when power developed by plant is 150 MW and (iii) thermal efficiency of cycle.