



B.E / B.Tech. (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2012

MECHANICAL ENGINEERING BRANCH

85

FIFTH SEMESTER

ME 9302 – THERMAL ENGINEERING II

(REGULATIONS 2008)

Time: 3 hr

Max Mar: 100

Instructions: 1. Use of steam table, Refrigeration table and Psychrometric chart permitted

2. Draw necessary process diagrams and schematic while solving problems

Answer ALL Questions

PART – A (10 x 2 = 20 Marks)

1. What is the function of fusible plug?
2. Distinguish between Babcock Wilcox (straight tube) and Bent tube boiler.
3. What is meant by critical pressure ratio?
4. What is the function of steam nozzle?
5. What are the different losses that occur in a steam turbine?
6. Define the term degree of reaction.
7. Define the term cogeneration.
8. List down the applications of cogeneration.
9. What are the advantages and disadvantages of air refrigeration system?
10. What should be the properties of ideal refrigerant?

PART – B (5 x 16 = 80 Marks)

- 11 a. A and Steam turbine operating on Rankine Cycle receives steam from boiler at 3.5 MPa and 300°C. It is exhausted to condenser at 10 kPa Calculate: (8)
- (i) The energy supplied per kg of steam generated (including the super heater)
  - (ii) Dryness fraction of steam entering the condenser
  - (iii) Rankine efficiency including pump work.
- (ii) Explain the function of Economiser in a steam boiler installation with neat sketch. Discuss its location. (8)
- 12 a. Dry saturated steam with an initial pressure of 11 bar is expanded in a group of convergent divergent nozzles at the rate of 5 kg/s. The back pressure is 1.5 bar. The nozzle efficiency is 90% and approximate throat section of each nozzle is estimated to be 1 cm<sup>2</sup>. Design the suitable number of nozzles and exact throat and exit areas. Take the index of expansion a 1.119. (16)