Code No: OR220353 **OR**

II B.Tech II Semester Supplementary Examinations, April/May 2005
THERMAL ENGINEERING-I
(Common to Mechanical Engineering,Mechatronics and Production Engineering)

Time: 3 hours **Max Marks: 70**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Classify the boilers and discuss the importance of each type.
   (b) Briefly discuss the different types of draughts used in steam power plant.
2. (a) What is the function of nozzle? What are the applications of nozzle?
   (b) Briefly explain the effect of the following on the nozzle efficienty:
      i. Critical pressure ratio
      ii. Super saturated flow
      iii. Nozzle shape
3. (a) Discuss with the help of neat sketch the working principle of steam condenser.
   (b) Discuss the following terms used in steam condensers:
      i. Vacuum efficiency
      ii. Condenser efficiency
      iii. Air leakage
4. (a) Enumerate the advantages and disadvantages of velocity compounded impulse turbines.
   (b) Explain with the aid of neat sketches the various methods adopted to reduce rotor speed of a steam turbine.
5. The outlet angle of the blade of a Parsons Reaction turbine is 20^0 and the axial velocity of flow of steam is 0.5 times the mean velocity of the blade. Draw the velocity diagram for a stage consisting of one fixed and one moving row of the blades given that the mean diameter is 70cm and that speed of rotation is 3000 rpm. Find the inlet angles of the blades if steam enters without shock.
6. (a) Explain with a neat sketch the working of a reciprocating compressor.
   (b) Determine the work required to compress 1 kg of air at 30^0C and 120kPa to 12MPa pressure if the compression process is
      i. adiabatic and
      ii. polytropic with n=1.35.
7. (a) Draw the neat sketch of an axial flow compressor and explain the details of mechanical elements.

(b) Enumerate the differences between axial flow compressors and centrifugal compressors.

8. (a) Describe the principle and working of vapor compression refrigeration system.
   (b) Discuss the different types of air conditioning systems.

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