R09

Code No: 09A60303

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year II Semester Examinations, June - 2014
REFRIGERATION AND AIR CONDITIONING
(Mechanical Engineering)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1. The data refer to a reduced ambient refrigeration system are: ambient pressure =0.8 bar, pressure of ram air = 1.1 bar, temperature of ram air = 200^0C, pressure at the end of main compression = 3.3 bar, efficiency of main compressor = 80%, heat exchanger effectiveness = 80%, pressure at the exit of the auxiliary turbine = 0.8 bar, efficiency of auxiliary turbine = 85%, temperature of air leaving the cabin = 250^0C, pressure in the cabin = 1.013 bar, flow rate of air through cabin = 60kg/min. Find:
   a) The capacity of cooling system required.
   b) Power needed to operate the system.
   c) COP of the system.

2. The motive steam to a ash water plant is supplied at 6.5 bar dry and saturated, make up water is at 280^0C and condenser pressure is 3.5cm Hg absolute. The ash chamber water is at 80^0C. Assuming nozzle efficiency 84%, entrainment efficiency 64% and diffuser efficiency 79%, quality of steam and vapour mixture at inlet to diffuser as 0.88, Determine:
   a) Steam required per hr. per ton of refrigeration.
   b) Steam required per kg of flashed vapour.

3.a) With the help of a schematic diagram, explain the function of Evaporators used in refrigeration.
  b) Compare the performance of reciprocating and centrifugal compressors.

4.a) Explain the working of vapour absorption refrigeration system with neat sketch.
  b) Explain the working of three fluid refrigeration systems.

5.a) What is the situation under which the steam jet refrigeration system is recommended? What are its limitations? Can it be used for obtaining sub zero temperatures?
  b) Explain the various components of steam jet refrigeration system and clearly discuss the function of each component.

6.a) What is fog? Show on the psychrometric chart when two air streams yield fogged sate of air.
  b) The air at 45^0C DBT and 38% R.H is passed through adiabatic humidifier and it comes out with 28^0C DBT and fully saturated. Find the quantity of water vapour added per kg of dry air. Assume air pressure =1.03 bar. Use psychrometric formulae.