Code No.: 9A03604/R09

Set-1

B.Tech III Year II Semester Regular & Supplementary Examinations

April/May - 2013

REFRIGERATION AND AIR CONDITIONING

(Mechanical Engineering)

Time: 3 Hours Max. Marks: 70

*Answer any **FIVE** Questions*

***All** Questions carry **equal** marks*

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1. (a) Differentiate engine, refrigeration and heat pump. How their performances are measured?

   (b) Describe the working of vacuum refrigeration system.

2. (a) Differentiate between dry and wet compression. What are the advantages of one over the other?

   (b) A simple NH_3 vapour compression system has compressor with piston displacement of 2 m^3/min, a condenser pressure of 15 bar and evaporator pressure of 2.5 bar. The liquid is sub cooled to 20°C. The vapour entering the compressor is dry and saturated. The compression is isentropic, η_{vol} = 80%. Calculate,

   (i) C.O.P

   (ii) Mass flow rate kg/min

   (iii) Compressor power

   (iv) Plant capacity.

3. (a) Which refrigerants require centrifugal compressor? Where these refrigerants are in practice? Give four examples.

   (b) What is secondary refrigerant? Where it is used?

4. (a) Why purging is required in Li-Br system? With a neat sketch describe purge unit used in Li-Br system.

   (b) What are the four basic components of an absorber machine?

5. (a) List out the merits and demerits of vortex tube over other refrigeration system.

   (b) What are the fields of applications of vortex tube?

6. On a particular day, the atmospheric air was found to have a dry bulb temperature of 30°C and a wet bulb temperature of 18°C. The barometric pressure was observed to be 756 mm of Hg. Using the tables of psychrometric properties of air, determine the relative humidity, the specific humidity, the dew point temperature, the enthalpy of air per kg of dry air and volume of mixture per kg of dry air.

7. (a) What are the different methods used to remove odour from the air? Explain any one of them in detail.

   (b) Using a suitable diagram describe a refrigerator and a heat pump.

8. (a) Explain schematically on the psychrometric chart and by schematic diagram, summer air conditioning system and winter air conditioning system.

   (b) Explain the concept of effective sensible heat factor for room to be air conditioned. How is it useful to find the ADP for fixed room design condition?