b) Differentiate between Room sensible Heat and gravel sensible Heat. Explain the procedure of drawing GSHF line on a psychrometric chart.

OR

10. The design data of a summer air conditioning of a building out side design condition = 42°C DBT, 28°C WBT

Inside design condition = 24°C DBTs' 50% kH

Room sensible Heat gain = 82000 kJ/h

Room latest Heat gain = 18000 kJ/h

By pass factor of cooling coil = 0.2

The return air from the room is mixed outside air before entry to cooling coil in the ratio of 4:1 by mass. Determine.

i) ADP of coil.

ii) Entry and exit condition of air for cooling coil.

iii) Fresh air mass flow rate.

iv) Refrigeration load on cooling coil.

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Roll No .....

AU/ME - 803

B.E. VIII Semester

Examination, June 2015

Refrigeration and Air Conditioning

Time : Three Hours

Maximum Marks : 70

Note : i) Attempt one question from each unit.
ii) All questions carry equal marks.
iii) Use of standard refrigerant property tables and psychromatic chart is permitted.

Unit - I

1. a) Define Refrigeration and one Ton of Refrigeration.

b) Determine the mass of Ice produced from water per day for the following conditions.

Water temperature = 22°C.

Tonnage of unit = 150 tons

Operating temperature = –5°C and 28°C

Latent heat of Ice = 330 / kj / kg. Also

Determine the power required to drive the unit.

OR

2. An Air refrigerator working on Bell - Coleman cycle takes air into compressor at 1 ata and –5°C. It is compressed in the compressor to 5 ata and cooled to 25°C at the same pressure. It is further expanded to 1 ata and discharged to take the cooling load.

   The Isentropic efficiency of compressor = 85%

   The isentropic efficiency of expander = 90%

   Find the refrigeration capacity of the system of air circulation is 40 Kg /mm and M.P required to run the compressor.

Unit - II

3. A food storage requires a refrigeration system of 12 tons capacity at an evaporator temperature of 10°C and condenser temperature of 25°C. The refrigerant NH_3 is subcooled by 5°C before passing through the throttle valve. The vapour leaving the evaporator coil is 0.97 dry. Find the C.O.P and power consumption of the food storage plant.

OR

4. a) Explain the effect of change in evaporator and condenser pressure on C.O.P of refrigeration system.

   b) What is dry Ice? Explain it's production.

Unit - III

5. a) Compare advantage and disadvantage of vapour absorption system to vapour compression system.

   b) Mention the function of each fluid in a three fluid vapour absorption system.

OR

6. State the principle of steam jet refrigeration system. Describe the working of a steam jet refrigeration system with a neat sketch.

Unit IV

7. a) List three psychrometric process and explain them on psychrometric chart.

   b) 150 m^3 of air per minute is passed through an adiabatic humidifier. The condition of air at inlet is 40° DBT and 15% RH. The outlet condition is 25° DBT and 20° WBT. Find the dew point temperature and amount of water vapour added to air per minute.

OR

8. Air at 32°C DBT and 20°C WBT is passed through a cooling coil maintained at 5°C . The heat extracted by the cooling coil from air is 14 kW and airflow rate is 42.5 m^3/min. Determine DBT and WBT of air leaving the coil and coil by pass factor.

Unit - V

9. a) Explain summer air conditioning cycle with the help of a neat sketch.