B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

AGRICULTURAL AND IRRIGATION ENGINEERING

VI SEMESTER

ME 9037 REFRIGERATION AND AIR-CONDITIONING

(Regulations 2008.)

Time: 3 Hours   Answer ALL Questions   Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. Define Ton of Refrigeration.
2. Mention TWO desirable characteristics for a refrigerant.
3. Distinguish between Cascade and Multi-pressure Refrigeration systems
4. Define Approach in Cooling Tower and what is the lowest possible temperature achievable for cooling water in a cooling tower?
5. Define Psychrometry.
6. What do you mean by super heat horn in vapour compression cycles?
7. In a Skeleton Psychrometric chart, compare the following processes.
    (1) Simple cooing and humidification.   (2) Adiabatic Saturation
8. Distinguish between Ductable Split and Centralised AC systems.
9. Distinguish between RSHF and GSHF.
10. What is the refrigerant used in Li-Br and Aqua Ammonia Vapor absorption systems?

PART – B   **(5 x 16 = 80)**

11. An ammonia refrigerating machine has working temperatures of 35°C in the condenser and –15°C in the evaporator. Assume simple saturated cycle find
    (i)   the theoretical piston displacement per ton of refrigeration,
    (ii)   the theoretical horsepower per ton of refrigeration
    (iii)   the coefficient of performance.
    (iv)   Heat rejected in the condenser

12. a) With a neat sketch explain the working of rotary compressor and compare the same with a reciprocating compressor.

(or)

b) Explain the influence of suction and discharge pressure variations on the COP of a Vapor compression Refrigeration system.

13. a) Explain the working of an Air Washer and explain the different processes achievable in a Air washer.

(or)

b) Air at 50% RH and 22°C WBT flows over a cooler coil and leaves at a state of 10°C DBT and 7.95 gm of water vapour / kg of dry air. If the air is required to offset sensible heat gain of 2.5 kW and latent heat gain of 0.35 kW in a room being air conditioned , Calculate the mass of dry air which must be supplied to the room in order to maintain a DBT of 23.5°C inside. What will be the RH of the room? If the sensible heat gain alone is diminished by 1.75kW what will be the supply air condition?

14 a) Enumerate the various components of Cooling Load for Summer Air conditioning and explain how it is estimated.

b) A duct system shown in fig below has 450 mpm velocity at section 'A'. The dynamic loss coefficient for elbow is 0.22 and the static regain factor in each fitting is 0.75. static pressure at each outlet is 1 mm H_2O.
Determine the duct sizes of all sections and the fan total pressure by Equal friction method for the full system if the frictional loss is 0.1mm H_2O / m length.
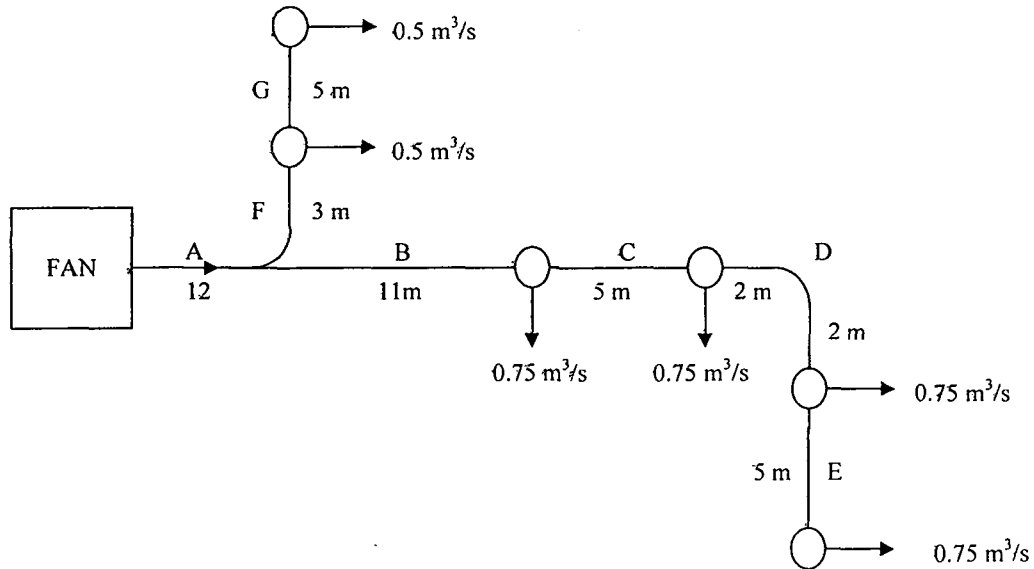
15 a) Explain with suitable sketches the working of a Steam Jet Refrigerator .

OR

b) Write short notes on i) Ice plant ii) Milk chilling plants