Code: 9D17104

M.Tech I Semester Supplementary Examinations August 2016

AIR-CONDITIONING – I

(Refrigeration & Air Conditioning)

(For students admitted in 2012, 2013, 2014 & 2015 only)

Time: 3 hours Max. Marks: 60

Answer any FIVE questions

All questions carry equal marks

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1 (a) What is psychrometry and explain the psychrometric processes in air-conditioning equipment.

(b) $120m^3$ of air/min at 35^0 DBT and 50% R.H is cooled at 20^0C DBT passing through a cooling coil. Determine the following: (i) R.H and WBT of outgoing air. (ii) Capacity of the cooling coil in TOR. (iii) Amount of water vapour removed from air.

2 The room sensible and latent heat loads for an air conditioned space are 25 KW and 5 KW respectively. The room condition is 25^0C dry bulb temperature and 50% relative humidity. The outdoor condition is 40^0C dry bulb temperature and 50% relative humidity. The ventilation requirement is such that on mass flow rate basis 20% of fresh air is introduced and 80% of supply air is re-circulated. The by-pass factor of the cooling coil is 0.15. Determine:

(a) Supply air-flow rate.
(b) Outside air sensible heat.
(c) Outside air latent heat.
(d) Grand total heat.
(e) Effective room sensible heat factor.

3 Explain with a neat schematic diagram, the working principle of year round air conditioning system and describe the functions of different components in the circuit.

4 (a) Explain working principle of air washer with a neat sketch.

(b) One kg of air at 40^0C dry bulb temperature and 50% relative humidity is mixed with 2 kg of air at 20^0C dry bulb temperature and 20^0C dew point temperature. Calculate temperature and humidity of mixture.

5 (a) Explain in brief about how the human body reacts to changes in temperature of environment. Also explain the effect of activities on the heat load calculation for comfort application.

(b) What is effective temperature? What factors governs optimum effective temperature?

6 (a) What are the different methods used to remove the odors from the air?

(b) Describe briefly three general types of temperature sensitive mechanisms used in thermostat.

7 (a) Explain the necessity of automatic controls in refrigeration and air conditioning system.

(b) Describe the different methods of humidity control.

8 (a) Explain the working of a linked air cycle heat pump.

(b) Explain briefly solar energy collectors.

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