R09

Code No: C9103

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

M.Tech I - Semester Examinations, March/April-2011

HEATING SYSTEM

(HEATING VENTILATION AND AIR CONDITIONING)

Time: 3hours **Max. Marks: 60**

Answer any five questions

All questions carry equal marks

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1.a) Explain how a closed space gains heat through glass.

b) Discuss the effects of air space between the wall materials in the construction of structures. [6+6]

2.a) Explain the indirect gain principle by a mass Trombe Wall.

b) Estimate the thermal resistance of a brick of a wall of length 5m , height 4 m and thickness 0.25m , if the temperature of wall surfaces are maintained at 110^0 C and 40^0 C respectively. Take 'k' for brick wall equal to 0.70 W/m K. [6+6]

3.a) Sketch and explain the typical variation of solar radiation and outside air temperature on a hot summer day.

b) Calculate the instantaneous sol-air temperature for a wall with the following conditions:
Total of direct and diffuse solar radiation = 260 W/m^2
Absorptivity of surface = 0.9
Outside surface heat-transfer coefficient = $23W/m^2$ K
Outside air temperature = 35^0C. [6+6]

4.a) Explain the various types of heat losses for a building space.

b) Explain the various components in calculating winter heating load. [6+6]

5.a) Write the classification of air heating system.

b) Explain with a neat sketch the working of any one of warm air heating system. [6+6]

6.a) Explain the air humidification process using warm-air furnaces.

b) Write about Floor furnaces and wall furnaces. [6+6]

7.a) A room having a heat loss of 4.46 kW has a ceiling of 7.6m * 4.2 m in size. If the room is to be heated by pipe coils embedded in the ceiling, determine whether a surface temperature of 34^0 C will be sufficient. Take 'ε' (for ceiling) = 0.85, room design temperature=20^0C. Mean radiant temperature=16^0C heat lost by the ceiling by convection, $Q_c = 1.3\ A\ (\Delta T)^{1.25}$.

b) What is the difference between contaminated air and polluted air? [6+6]

8. Write short notes on the following

a) Passive heating and cooling of Buildings

b) Infiltration, stack effect and wind effect

c) Problems and remedies of warm air heating system. [12]

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