R09

Code No: C9103

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.TECH I - SEMESTER EXAMINATIONS, APRIL/MAY 2012
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) Discuss the effect of heat gain of a space through Glass with Venetian Blinds shading

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 is equal to 0.70 W/m K.

2.a) What are the various factors affecting the solar heat gain through ordinary glass?

b) Calculate the maximum heat gain of a room at 5 p.m. per unit area of a wall, using time lag and decrement factor approach for the following conditions:
Time lag, ϕ=6.7 hours
Decrement factor, λ = 0.455
Mean value of excess sol-air temperature, θ_{em}=19.1
Mean sol-air temperature, $t_{em} = 44.1^0$ C
Maximum sol-air temperature at 12 noon =$t_{e\ max}$ =48.3^0C
Overall heat transfer coefficient for the wall, U= 2.833 W/m^2 ^{0}C

3.a) Discus various measures adopted for energy conservation in heating of building space.

b) Define Infiltration, stack effect and wind effect.

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

b) Explain the various components in calculating winter heating load.

5.a) Explain the working of gravity warm air heating systems.

b) Write the common problems and remedies of warm air heating system.

6a) Write the classification of hot water heating system.

b) Explain the two pipe gravity hot water heating system.

7. 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, $Q_c = 1.3\ A\ (\Delta T)^{1.25}$

8. Write short notes on the following
a) Passive heating and cooling of Buildings
b) Difference between contaminated air and polluted air
c) Floor furnaces and wall furnaces

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