

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 110⁰ C and 40⁰ 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, $\phi=6.7$ hours
Decrement factor, $\lambda = 0.455$
Mean value of excess sol-air temperature, $\theta_{em}=19.1$
Mean sol-air temperature, $t_{em} = 44.1^{\circ}C$
Maximum sol-air temperature at 12 noon $=t_{e\ max} =48.3^{\circ}C$
Overall heat transfer coefficient for the wall, $U= 2.833\ W/m^2\ ^{\circ}C$

- 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 \times 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 34⁰ C will be sufficient. Take 'ε' (for ceiling) = 0.85, room design temperature=20⁰C. Mean radiant temperature=16⁰C. 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
