

M.E DEGREE EXAMINATIONS: JUNE 2013

Second Semester

ENERGY ENGINEERING

EEG559: Energy Conservation In Buildings And HVAC

(Use of Refrigeration tables and Psychrometric Charts are permitted)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 2 = 20 Marks)

1. State Dalton's law.
2. Define WBT, DBT and Dew point temperature.
3. Define the term R.H and degree of saturation.
4. What is meant by time constant?.
5. Define luminous flux and lumen.
6. Define luminance and illuminance.
7. Write short notes on thermal insulation.
8. Differentiate between fans and blowers.
9. What is meant by Ballast?
10. Mention the general sources of light.

PART B (5 x 16 = 80 Marks)

11. a) (i) Air at 20°C, 40% RH is mixed adiabatically with air at 40°C & 40% RH in the ratio of 1 kg of the former with 2 kg of later. Find condition of air. Draw the process in chart also as diagram. (12)
- (ii) Explain the factors that affect thermal comfort. (4)

(OR)

- b) An air conditioning system is designed under the following conditions

Outdoor conditions - 30°C dbt ,75% R.H

Required indoor conditions - 22°C dbt ,70% R.H

Amount of free air circulated – 3.33 m³/sec

Coil dew point temperature - 14°C

The required condition is achieved first by cooling and dehumidification and then by heating. Estimate

- i. The capacity of the cooling coil

- ii. The capacity of the heating coil in kW.
- iii. Amount of water vapour removed in kg/s

12. a) i) Explain thermal network method with neat sketches (8)
ii) Derive an expression for RC network and time constant (8)

(OR)

- b) Explain in detail about Heat balance in HVAC buildings.

13. a) i) Explain in detail energy efficient lighting system with neat sketches. (8)
ii) Explain day lighting and mention the factors that facilitate day lighting. (8)

(OR)

- b) i) Explain lighting economics and aesthetics. (8)
ii) Describe the impacts of lighting efficiency (8)

14. a) Explain parameters affecting ventilation and air quality and also give the requirements for air conditioning

(OR)

- b) Explain the importance of energy audit for buildings and energy management options in commercial buildings

15. a) Explain in detail about vapour absorption refrigeration cycle with neat sketches.

(OR)

- b) Explain the energy conservation opportunities in
- i) Fans and blowers. (8)
 - ii) Energy Efficient Motors(EEM) (8)
