

27. a. Explain the concept of direct and indirect gain passive heating techniques of building with neat sketch. 10 3 2 1,2,7

(OR)

b. Describe the following passive cooling with neat sketch. 3 2 1,2,7
(i) Evaporative method 5
(ii) Dehumidification method 5

28. a.i. What is daylight factor and describe the benefits of daylighted building? 5 3 3 1,7

ii. What are all the basic tool plan building shape for utilizing day lighting? 5 3 3 1,7

(OR)

b. Explain about electric lighting control for the day lighted building and illumination requirement. 10 3 3 1,7

29. a. Explain about natural and forced ventilation methods with neat sketch. 10 3 4 1,2

(OR)

b. Determine the overall heat loss coefficient at 150 mm thick RCC roof slab ($K = 0.8W/mK$) insulated with 50 mm thick expanded polystyrene ($K = 0.05W/mK$) and finished with 40 mm thick brick tiles ($K = 1.5W/mK$) on the top and 10 mm thick cement plaster ($K = 0.7W/mK$) on the bottom. Assume convection heat transfer coefficient inside and outside the roof as $6W/m^2K$ and $23W/m^2K$ respectively. 10 4 4 1,2,4

30. a. Explain the features and guiding principles of green buildings. 10 3 5 1,2,7

(OR)

b. Describe the LEED assessment standards and the various steps involved in LEED certification process. 10 3 5 1,2,7

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Reg. No.

B.Tech. DEGREE EXAMINATION, NOVEMBER 2022

Sixth and Seventh Semester

18MEO103T – ENERGY SYSTEMS FOR BUILDINGS

(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:

- (i) Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) Part - B should be answered in answer booklet.

Time: 2½ Hours

Max. Marks: 75

PART – A (25 × 1 = 25 Marks)

Answer ALL Questions

- | | Marks | BL | CO | PO |
|---|-------|----|----|----|
| 1. Energy efficiency building is related to _____.
(A) Global warming reduction (B) Technology improvements with sustainability
(C) Low cost system (D) Building strength | 1 | 1 | 1 | 1 |
| 2. Energy balance equation used to determine the _____.
(A) Load due to occupance (B) Load due to lighting
(C) Load of solar irradiation (D) Installation of heater or cooler | 1 | 1 | 1 | 1 |
| 3. The value of cooling load factor always lies between _____.
(A) 0 to 1 (B) 1 to 10
(C) 10 to 100 (D) 100 to 1000 | 1 | 1 | 1 | 1 |
| 4. Which one of the following is an internal load?
(A) Heat transferred by roof (B) Heat transferred by windows
(C) Heat transferred by lights (D) Heat transferred by doors | 1 | 1 | 1 | 1 |
| 5. In hot day climate, the surface area to volume of the building should be _____.
(A) High (B) Low
(C) Moderate (D) Either high or low | 1 | 1 | 1 | 1 |
| 6. Trombe's wall works based on _____.
(A) Direct heat gain (B) Indirect heat gain
(C) Isolated heat gain (D) No heat transfer | 1 | 1 | 2 | 1 |
| 7. Windows should be kept in _____ direction, in order to get maximum passive effect.
(A) East (B) West
(C) North (D) South | 1 | 2 | 2 | 1 |
| 8. Where people are working, there has to be _____ to cause proper ventilation of the premises
(A) Air change (B) Moisture
(C) Humidity (D) Temperature | 1 | 1 | 2 | 1 |

9. Which is not present in passive solar space heating for building
(A) Direct heat gain (B) Indirect heat grain
(C) Isolated heat gain (D) Electrical heating 1 1 2 1
10. A system that collects, stores and distributes solar energy without use of fans, pumps
(A) Passive solar (B) Active solar
(C) Thermal solar (D) Adsorber material 1 1 2 1
11. The unit of luminous intensity
(A) Lumen (B) Lux
(C) Candela (D) Cd/m² 1 1 3 1
12. Which one of the light source convert minimum amount of heat compare to the conversion of electricity into light
(A) Incandescent (B) CFL
(C) Halogen IR (D) LED 1 2 3 1
13. How many 60 watts incandescent lamps would be required to produce the same amount of light as in clear sky of window of light as in clear sky of window size is 0.9 m×1.5 m.
(A) 5 (B) 50
(C) 100 (D) 1000 1 2 3 1
14. Goal of day lighting in building
(A) Minimize the electrical lighting (B) Maximize the electrical lighting
(C) Minimize the heating (D) Maximize the heating 1 1 3 1
15. In the overcast day calculate illumination indoor will be _____ candila, where 5% of illumination factor and outdoor illumination is 2000 cadila.
(A) 100 (B) 200
(C) 1000 (D) 100000 1 2 3 1
16. The measure of surface's reflecting of solar radiation is called
(A) Radiation (B) Illumination
(C) Irradiance (D) Albedo 1 1 4 1
17. Dry air has only _____.
(A) Sensible heat (B) Latent heat
(C) Humidity (D) Both sensible and latent heat 1 1 4 1
18. The _____, which indicates the resistance to heat flow.
(A) Temperature (B) Pressure
(C) Specific heat (D) Thermal resistance 1 1 4 1
19. _____ ventilation requires, loss energy, capacity and maintenance costs, and contributes less green house gas (GHG) emissions.
(A) Mechanical (B) Natural
(C) Automatic (D) Hybrid 1 1 4 1

20. A building in a climate with a high amount of solar gain and a long cooling season would be best suited for window with _____.
(A) Clear glass (B) Reflective glass
(C) Antireflective coating (D) Decorative blinds 1 1 4 1
21. In sustainable planning, site appraisals evaluate the _____.
(A) Site cleanliness (B) Indoor air quality (IAQ)
(C) Economic value of the load (D) Relationship between the building and its surroundings areas 1 1 5 1
22. What does a LEED rating reflect?
(A) The cost of a building (B) How green building is
(C) The carbon foot-print of a building occupants (D) The location of a building 1 1 5 1
23. LEED points of daylight if the building use 90% of daylight
(A) 9 (B) 8
(C) 2 (D) 1 1 2 5 1
24. LEED rating system certified "LEED GOLD" based on _____ points scored by the building.
(A) 40 – 49 (B) 50 – 59
(C) 60 – 79 (D) 80+ 1 1 5 1
25. Green building practices are not including
(A) Only energy efficiency (B) Only recycled materials
(C) Only environmental protection (D) Only building structure 1 1 5 1

PART – B (5 × 10 = 50 Marks)

Answer ALL Questions

Marks BL CO PO

26. a.i. Explain about the concept of energy efficient building. 5 3 1 1,2
- ii. Describe about the climate and its influence in building design for energy requirement. 5 3 1 1,2
- (OR)
- b.i. What do you mean by zero energy building and write energy balance equation for general building? 5 3 1 1,2
- ii. A building has a U-value of $0.5 \frac{W}{m^2.K}$ and a total exposed surface area of 384m². The building is subjected to an external load (only sensible) of 20 kW and an internal load of 1.25 kW (sensible). If the required internal temperature is 24°C, state whether a cooling system is required or a heating system is required when the external temperature is 5°C. How the results will change, if the U-value of the building is reduced to $0.3W / mK$? 5 4 1 1,2