

B.Arch. Eng. Examination, 2018
(4th Year, 2nd Semester)

ENVIRONMENTAL SYSTEMS

Full Marks: 100

Time: Three Hours

The figures in the margin indicate full marks

Question No.1 is compulsory and to answer any 5 (Five) from the remaining questions

Q1. I. Fill in the Blanks:

10

- i. _____ is the process in which subcutaneous blood vessels expand and increase the skin blood supply, thus the skin temperature, which in turn increases heat dissipation.
- ii. The dry-bulb or 'true air temperature' is a value taken in the shade, the thermometer being mounted inside a louvered wooden box, known as the _____
- iii. 1 Clo is Insulation value of _____ m² °C/W.
- iv. _____ is defined as the non- directional quantity of light.
- v. An average 100 watt light bulb produces _____ lumens.
- vi. For reading and easy office works the Daylight Factor range should be _____%.
- vii. The unit of Luminous intensity is _____.
- viii. If the head height above work plane is 2.1m, the daylight penetration would be _____m.
- ix. The _____ system, is a fixed system, consists of numerous equally spaced, three-sided, reflective louvers placed inside a double glazed unit.
- x. Daylight Factor is the ratio of _____.

II. i. Explain a Psychrometric chart showing DBT, WBT, RH, Dew point, Absolute Humidity & Vapour Pressure. 03

ii. Explain the Passive design concepts for the 4 thermal comfort conditions when the Temperature and Humidity data of any area is plotted in the shaded zones. 12



Q2.

- i. Define 1 Met in thermal comfort study. 3
- ii. Explain three types of Wind Rose diagram used for architectural design. 6
- iii. Explain the concept of Thermal comfort taking into consideration all the heat exchanges. 6

Q3.

- i. Describe the concept of Passive Downdraft Evaporative cooling with sketches. 3
- ii. What is earth Air Tunnel? Explain its process with sketches ? 3
- iii. What is a Solar Chimney and why is it important in passive design? 3
- iv. Explain Thermal Mass and its importance. 3
- v. Explain Sky view factor and its role in UHI study. 3

Q4.

- i. For a window of size of 1800mm x 1200mm &
For Sun position at 9.00 hrs, Altitude=18.5 Deg., Azimuth=130.5 Deg.
For Sun position at 16.00 hrs, Altitude =21.6 Deg., Azimuth=-134.2 Deg.
Calculate and Design the shadings for the southern façade with the given data. 10
- ii. Explain the concept of Bioclimatic Chart by V.Olgay in sustainable Building Design. 5

Q5.

- i. Define 1(one) candela 2
- ii. Differentiate between Illuminance & Luminance 3
- iii. What are the design strategies to reduce Glare in buildings? Explain with sketches. 10

Q6. Write Short notes on with sketches

- i. Prismatic panels and their importance in Daylighting design? 3
- ii. Anidolic zenithal openings importance in Daylighting design? 3
- iii. Laser-cut panels in Daylighting design 3
- iv. Light Guiding Shades 3
- v. Heliostat for Daylighting 3

Q7.

- i. What do you mean by Daylighting Fixtures? Explain with examples and sketches. 5
- ii. For openings without any shading devices, explain the Daylighting system concepts types for Diffuse light only. 10