

Unit III

5. (a) Define, with neat sketches the Angle of incidence, to establish the sun's position, in relation to the wall surface. **5**
- (b) Explain the applications of Sun Path diagram with examples. **5**
6. Discuss with examples, how the studies are performed, in different types of buildings; for observing, measuring and recording shades. **10**

Unit IV

7. (a) What are the functions of natural ventilation ? Describe stack effect due to thermal forces. **5**
- (b) Discuss in detail, factors affecting the indoor air flow. **5**
8. (a) Discuss Design sky concept. **5**
- (b) Discuss the difference between GRIHA and LEED rating systems. **5**

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(Third Semester)

(B. Scheme) (Main & Re-appear)

(Arch.)

AR-209-B

BUILDING SERVICES-III

Time : 3 Hours]

[Maximum Marks : 50

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks. Missing data, if any, may suitably be assumed and stated,

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properly. Supplement your answers with suitable proportionately drawn neat sketches, wherever required.

Unit I

1. Explain various climatic factors, which are responsible for constituting the climate of any place. How is each of these measured ? **10**
2. (a) What is thermal comfort ? Describe its different factors. **5**
(b) Discuss Bioclimatic Chart. **5**

Unit II

3. Define and discuss the difference between :
(a) Temperature and Heat **2**
(b) Specific Heat and Latent Heat. **3**
(c) Thermal Conductivity and U-value of building materials. **5**

4. A $6\text{ m} \times 4\text{ m}$ and 3 m high office is located on an intermediate floor of a large building, therefore it has only one exposed wall, which is facing south, all other walls adjoin rooms kept at the same temperature : $T_i = 23^\circ\text{C}$. The ventilation rate is 2.5 air changes per hour. Ten 40W lamps are in continuous use to light the rear part of the room, which is being used by 6 clerical workers. The exposed $6\text{ m} \times 3\text{ m}$ wall consists of a single glazed window $1.6\text{ m} \times 6\text{ m}$ with U value $= 4.48\text{ W/m}^2\text{ deg.C}$ and the wall $1.4\text{ m} \times 6\text{ m}$ has U value $= 1.35\text{ W/m}^2\text{ deg.C}$. Calculate the wattage of the heating/cooling appliance, to maintain the temperature of 23°C , inside the room. The outside ambient temperature is 28°C and incident radiation is 600 W/m^2 .
Absorbance of the wall surface $a = 0.4$
Surface Conductance $f_0 = 10\text{ W/m}^2\text{ deg.C}$
Solar Gain Factor of Window $\theta = 0.75$. **10**