CBCS SCHEME

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Third Semester B.Arch. Degree Examination, Dec.2024/Jan.2025
Climatology

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Outline the major climatic zones in India and discuss how they influence design. **(04 Marks)**

b. Illustrate with examples of traditional or contemporary buildings in different climatic regions of India. **(16 Marks)**

OR

2 a. Explain the concept of thermal balance in the human body. How does the human body interact with its thermal environment? **(10 Marks)**

b. What factors contribute to thermal comfort? Illustrate with example how design can enhance thermal comfort. **(10 Marks)**

Module-2

3 a. Explain the importance of solar geometry in architectural design. How can architects use sun-path diagrams to optimize building orientation for solar gain and day lighting? **(10 Marks)**

b. Provide examples of buildings that effectively incorporate solar geometry principles into their design. **(10 Marks)**

OR

4 a. Compare the thermal properties and performance of different building materials such as mud, wood, bamboo, RCC, steel, glass, GI, tin etc. How do these materials influence the thermal comfort of indoor spaces? **(10 Marks)**

b. Discuss the assessment of passive cooling possibilities and the impact of natural night-sky radiation on roofing materials, including the use of retrofitted radiant barrier materials. **(10 Marks)**

Module-3

5 a. Explain the concepts of steady-state and periodic heat flow in the context of conduction, convection, and radiation. **(10 Marks)**

b. How do these heat transfer mechanisms contribute to thermal heat gain or loss in buildings? Provide examples illustrating how each mechanism affects the overall thermal performance of a structure. **(10 Marks)**

OR

6 a. Discuss construction techniques that effectively improve the thermal performance of walls and roofs. **(08 Marks)**

b. How does the choice of materials, density, insulation, and cavity design influences heat gain or loss in buildings? **(04 Marks)**

c. Provide examples of successful construction projects that have implemented these techniques for enhanced energy efficiency. **(08 Marks)**

Module-4

7 a. Explain the functions of natural ventilation in buildings. Discuss the phenomenon of stack effect due to thermal force and its impact on natural ventilation. **(05 Marks)**

b. How does wind velocity influence air movements around buildings? **(05 Marks)**

c. What are the design considerations for optimizing natural ventilation? Explore the effects of openings and external features on internal airflow, including the concept of wind shadows. **(10 Marks)**

OR

8 a. Provide an introduction to passive cooling techniques such as evaporative cooling, earth tubing, wind scoops, roof ponds and shaded courtyards. **(10 Marks)**

b. Using the psychrometric chart, access the cooling potential of evaporative cooling in various climatic zones. Discuss the principles behind each passive cooling technique and how architects can integrate them into building design for enhanced thermal comfort. **(10 Marks)**

Module-5

9 Elaborate on relevant traditional and contemporary building examples that showcase effective climatic design. Analyze how these buildings respond to their climatic context and incorporate sustainable design principles. Discuss key strategies employed in these examples and their applicability in different regions. **(20 Marks)**

OR

10 a. In the context of the rapidly changing climatic scenario, discuss how design tools can aid in the creation of climate friendly and resilient designs. **(06 Marks)**

b. Explore the role of simulation software, climate data analysis, and other technological tools in informing sustainable design practices. **(06 Marks)**

c. Provide examples of projects where such tools have been effectively utilized. **(08 Marks)**

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