

NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF THE BUILT OF ENVIRONMENT

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURE (HONOURS) DEGREE

PART II – END OF FIRST SEMESTER EXAMINATIONS – JANUARY 2008
BAR 2104 – ENVIRONMENTAL DESIGN I

Instructions

Time: 3 hours

Answer question I and three other questions only (Include relevant sketches).

Question 1

- a) According to G. Atkinson's classification, the tropical regions of the earth are divided into major climatic zones with subgroups. Describe and explain the principal characteristics of zones giving the problems they may pose to the designer of the building envelope in the respective regions. (15)
- b) It is important to classify climates using feasible approaches. Explain why it is important to classify climates giving the applicable feasible approaches? (10)

Question 2

In order to design for a site the climatic data of the region, locality and site should be considered in detail. Briefly describe how climatic elements are measured, recorded and used in the design of buildings. (17)

Describe theories behind the origin and movement of the ITCZ, trade and polar winds and their effects on Building design. (8)

Question 3

- a) What is meant by orientation of a building and how can it influence the responsiveness of a building to climate. (5)
- b) A site in the urban area is likely to experience deviation from the local climate. What urban characteristics are instrumental in causing deviation from the localized climate and how does this affect architectural design? (20)

Question 4

- a) What are the factors that influence thermal comfort? (5)
- b) Describe four methods that were used in the search of a single comfort scale and their use in building design. Indicate equipment/materials used and limitations of each method. (20)

Question 5

The choice of building materials, especially for the external building envelope, greatly affects the flow of heat into the Buildings. This is so because materials vary in their properties that determine heat flow. As such, building materials have to be chosen for the particular climatic environment.

- a) List the thermo physical properties of building materials that are important to their thermal performance in buildings. (5)
- b) Discuss the significance of climate in relation to the correct use of building materials. (20)

Question 6

What are the principal functions of ventilation? (5)

In what ways can an architect ensure sufficient ventilation to all parts of a building and at the same time? Exclude unwanted climate elements such as rain, dust and excessive solar radiation. (20)