NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF ARCHITECTURE AND QUANTITY SURVEYING

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURE (HONOURS) DEGREE

PART II – FIRST SEMESTER EXAMINATIONS – DECEMBER 2005
AAR2104 – ENVIRONMENTAL DESIGN I

Instructions *Time: 3 hours*

*Answer question 1 and three other questions only (**Include relevant sketches**)*

Question 1 (Compulsory)

a) The tropical regions of the earth are divided into three major climatic zones and give different problems to the designer (Architect). Briefly explain the principal characteristics of the zones and, with the aid of sketches outline the problems they pose to the designer and give the solutions for the different climates. (20)

b) Of the three climatic zones which one gives most problems to the architect and what are the solutions? (5)

Question 2

a) What is meant by orientation of a building and how can it influence the indoor thermal environment. (5)

b) Describe the characteristics of an urban area that are instrumental in causing deviation from the localized climate. (20)

Question 3

a) What are the factors that influence thermal comfort? (5)

b) Describe the various methods that were used in the search of a comfort scale. Indicate equipment/materials used and limitations of each method. (20)

Question 4

Describe five types of energy conserving principles and environmental design strategies that you have learnt and explain their application to the Tropics. (25)

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 keep out rain, dust and excessive solar radiation. (20)