NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY
FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURE (HONOURS) DEGREE

PART II – SUPPLEMENTARY EXAMINATIONS – SEPTEMBER 2007
AAR2104 – ENVIRONMENTAL DESIGN I

Instructions   *Time: 3 hours*
Answer question I and any other three

QUESTION 1

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 2

a)   Explain the following terms used in sound insulation and acoustics

        i)   Decibel scale
        ii)   Reverberation time
        iii)   Sound absorption coefficient
        iv)   Helmholtz absorber   (5)

b)   Compare and contrast air-borne and structure-borne sound insulation in buildings, giving solutions/details that can be introduced in a building to compact them.
                                                                                                  (20)

QUESTION 3

Explain the following terms used in lighting studies

a)   i)   Daylight factor

ii)   Photometric quantities.
iii)   Color temperature
iv)   CIE sky
v)   Inverse square law   (20)

b)   Sketch, and comment on the use of different types of light fittings (luminaries) in architecture with the following utilization factors.

        i)   High utilization factor (90 – 100%)
        ii)   Medium utilization factor (35 – 65%)
        iii)   Low utilization factor (less than 15%)   (5)

QUESTION 4

Describe the types of shading devices you have learnt and their effect considering the different positions of the sun in relation to the rotating earth. (15)

Explain the following with respect to climate. Local Climate, Microclimate, Site Climate (5)

v) Explain thermal comfort influencing factors using the Bioclimatic chart (5)

QUESTION 5

Describe five methods that were used in search of the comfort scale that you have learnt. Indicate limitations of the methods and equipment that was used.   (25)