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

DEPARTMENT OF ARCHITECTURE
BACHELOR OF ARCHITECTURE (HONOURS) DEGREE

PART II – SUPPLEMENTARY EXAMINATIONS – DECEMBER 2005
AAR2104 – ENVIRONMENTAL DESIGN I

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

QUESTION 1

Among the environmental design strategies used for thermal control in buildings, Sitting, Building orientation, and Building morphology could significantly reduce the impact of solar heating on buildings. Discuss the application of these strategies in environmental design. (25)

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 the main factors that influence the effectiveness of a building against them. (20)

QUESTION 3

Explain the following terms used in lighting studies

a) i) Daylight factor
ii) Luminous intensity
iii) Color temperature
iv) Gaseous discharge lamp
v) CIE sky
vi) Inverse square law (10)

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%) (15)

QUESTION 4

Write short notes on the following and include sketches:
i) Shading devices
ii) Factors that affect thermal comfort
iii) Earth-Sun relationship
iv) Microclimate and Site climate
v) Bioclimatic chart (25)

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)