NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY

FACULTY OF THE BUILT ENVIRONMENT

DEPARTMENT OF ARCHITECTURE

ENVIRONMENTAL DESIGN

AAR 2104

Supplementary Examination Paper

July 2016

This examination paper consists of 3 pages

Time Allowed: 3 hours

Total Marks: 100

Special Requirements:

Examiner's Name: B. NCUBE

INSTRUCTIONS

1. Answer ALL questions

MARK ALLOCATION

QUESTION	MARKS
1.	**25**
2.	**25**
3.	**25**
4.	**25**
TOTAL	**100**

Question 1

The choice of building materials, especially for the external building envelope, greatly affects the flow of heat into and out of 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 workshop is 12m by 6m by 6m high and has workbenches 1m high. Discharge lamps, each with an output of 3700lm, are to be fitted in aluminum industrial reflectors at ceiling level. The surfaces have reflectances of 0.7 for the ceiling and 0.5 for the walls. The light loss factor is 0.7, and the illuminance requirement on workbenches is 400lx.

a) Find the utilization Factor for the room. (10)

b) Calculate the number of lamps required and distribute them on a sketch. (15)

Question 3

a) Explain the following, as used in architectural acoustics:
   I. Sound insulation
   II. Reverberation Time (5)

b) Discuss the principle and uses of different types of absorbers (20)

Question 4

Sick Building Syndrome is common problem in buildings, it has been suggested that up to 30% of new and refurbished buildings have given rise to complaints of sick building illness;

a) Describe the physical, chemical and microbial causes of sick buildings. (15)

b) Discuss the impacts that the above mentioned causes have on human beings. (10)