



**NATIONAL UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**FACULTY OF THE BUILT ENVIRONMENT**

**DEPARTMENT OF ARCHITECTURE**

**ENVIRONMENTAL DESIGN I**

**AAR 2104**

**Examination Paper**

**December 2014**

This examination paper consists of 4 pages

**Time Allowed: 3 hours**

**Total Marks: 100**

**Special Requirements: NONE**

**Examiner's Name: Mr. T. Nyamande**

**INSTRUCTIONS**

1. Answer Question 1 and any four (4) questions
2. Where appropriate, use illustrations to support your answer

**MARK ALLOCATION**

| <b>QUESTION</b> | <b>MARKS</b> |
|-----------------|--------------|
| 1.              | 20           |
| 2.              | 20           |
| 3.              | 20           |
| 4.              | 20           |
| 5.              | 20           |
| 6.              | 20           |
| 7.              | 20           |
| <b>TOTAL</b>    | <b>100</b>   |

### **Question 1(Compulsory)**

Attached (Figure I) is a climatic graph for a tropical city.

- a. What climate zone does the graph represent?
- b. Describe the principal characteristics of the zone and with the aid of sketches give the problems that they pose to the design of the building envelope in the respective region. (20)

### **Question 2**

- a. Define thermal comfort and describe the factors that influence it. (10)
- b. Explain how thermal control can be achieved and maintained in the buildings designed for our local context. (10)

### **Question 3**

- a. Outline the principal functions of ventilation in buildings? (5)
- b. With the aid of diagrams, evaluate the factors that are critical for sufficient ventilation in buildings. (15)

### **Question 4**

- a. Compare and contrast airborne and structure borne noise in buildings, highlighting potential sources of these. (10)
- b. In building design one has to consider wanted and unwanted sound. Describe the means of control of internal and external noise. (10)

### **Question 5**

Environmental design is one of three technological systems that apply in all buildings. Describe and explain the principal objectives of all environmental design systems. (20)

### Question 6

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

### Question 7

- a. Explain the following terms used in lighting studies (5)
  - i. Daylight factor
  - ii. PSALI & PAL
- b. Evaluate the benefits of day lighting in buildings? (5)
- c. Apart from quantity of lighting, the quality of light in a building is also important. As a designer, how can you ensure sufficient (good) levels of daylight to all parts of a building? (10)

