



TECHNICAL UNIVERSITY OF MOMBASA  
**Faculty of Engineering &  
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
**DIPLOMA IN ARCHITECTURE (DA 12M)**

EAR 2205: THERMAL DESIGN

**SPECIAL/SUPPLEMENTARY EXAMINATION**  
**SERIES: OCTOBER 2013**  
**TIME ALLOWED: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- *Answer Booklet*

This paper consists of **FIVE** questions.

Answer any **THREE** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

**Question One**

Explain **FOUR** factors that apply to thermal comfort **(20 marks)**

**Question Two**

Briefly explain:

- a) Thermal properties of buildings
- b) Planning for heat balance **(20 marks)**

**Question Three**

Briefly explain:

- a) Thermal insulation
- b) Heat balance **(20 marks)**

**Question Four**

Calculate U values of the following constructions **(20 marks)**

STONE WALL  
Plastered

**Question Five**

Calculate total heat gain by a house stone wall plastered, mabati roof, facing afternoon sun, by conduction

**(20 marks)**

DATA for Q 4, Q5

Internal surface resistance 0.12

External surface resistance 0.05

|              |                                       |
|--------------|---------------------------------------|
| Conductivity | K for brickwork 0.86w/m°C             |
| Conductivity | K for unventilated ur-space 0.2 w/m°C |
| Conductivity | K for 15mm plaster 0.5m w/m°C         |
| Conductivity | K for 12 mm plaster 0.4m w/m°C        |
| Conductivity | K for 200mm stone 2.0w/m°C            |
| Conductivity | K for 50mm mabati 0.72w/m°C           |