



TECHNICAL UNIVERSITY OF MOMBASA

SCHOOL OF ENGINEERING AND TECHNOLOGY
DEPARTMENT OF ARCHITECTURE & BUILT ENVIRONMENT
UNIVERSITY EXAMINATION FOR:
DIPLOMA IN ARCHITECTURE
**EAR 2205: BUILDING ENVIRONMENT SCIENCE - (Lighting
Design)**

END OF SEMESTER EXAMINATION
YEAR TWO SEMESTER TWO

SERIES: MAY 2025

TIME: 2 HOURS

DATE: May, 2025

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt question ONE (Compulsory) and any other TWO questions.

Do not write on the question paper.

QUESTION ONE (30 MARKS) – COMPUSOLRY

- a) Using a labeled sketch describe 'building orientation'. (4 marks)
- b) List FIVE factors to consider when selecting luminaires (5 marks)
- c) Define the following terms used in lighting design
 - a. Photometrics (2 marks)
 - b. Light output ratio (2 marks)
 - c. Efficacy (2 marks)
 - d. Visual acuity (2 marks)
- d) Describe THREE technical properties that influence your choice of a light bulb. (6 marks)
- e) Your client, an assisted living facility has commissioned you to design lighting for its customers. List FIVE ways you would adapt lighting design for the customers. (5 marks)
- f) Explain the difference between Scotopic and Photopic Vision (2 marks)

QUESTION TWO (15 MARKS)

Lamps are the most common form of artificial lighting. Using sketches, describe FIVE different types of lamps and specify the appropriate uses for each in architectural design.

QUESTION THREE (15 MARKS)

- a) Describe FIVE factors you consider when determining the orientation of a building (10 marks)
- b) List FIVE defects to the eye that can interfere with vision (5 marks)

QUESTION FOUR (15 MARKS)

Your client wants to update their 1 bedroom cottage's interior and exterior lighting design. Using labeled sketches, illustrate how you would design interior and exterior spaces to ensure clear and comfortable vision during the day and night on her $\frac{1}{4}$ acre plot. (Garden, walkways, living room, kitchen, corridor, bathroom, bedroom and veranda)

QUESTION FIVE (15 MARKS)

- a) Using illustrations, describe how to achieve the following in an art gallery.
 - a. Direct Lighting (5 marks)
 - b. Indirect Lighting (5 marks)
- b) List FIVE harmful effects of artificial light. (5 marks)