



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

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

EAR 2205: BUILDING ENVIRONMENTAL SCIENCE II (LIGHTING DESIGN)

END OF SEMESTER EXAMINATION
SERIES: DECEMBER 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 of the **FIVE** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

Use neat, large and well labeled diagrams
This paper consists of **TWO** printed pages

Question One

- a) Illustrate the human organ through which we appreciate light as a stimulus. **(10 marks)**
- b) Describe the process of sight as it occurs in the organ in (a) above **(10 marks)**

Question Two

- a) Define the following photometric terms:
- (i) Lumen
 - (ii) Luminance
 - (iii) Steradian
 - (iv) Candela
 - (v) Illuminance **(10 marks)**
- b) Adaptation is the process by which the eye adjusts itself to different luminances. Discuss **(10 marks)**

Question Three

- a) (i) State THREE colour concepts in the Munsell system **(1 ½ marks)**
(ii) Explain the THREE colour concepts in (i) above **(4 ½ marks)**
- b) State TWO types of glare and discuss how each can be reduced. **(14 marks)**

Question Four

- a) Give an account for each of the following lighting techniques:
- (i) Down lighting **(4 marks)**
 - (ii) Accent lighting **(4 marks)**
 - (iii) Moonlighting **(4 marks)**
 - (iv) Silhouetting **(4 marks)**
 - (v) Grazing light **(4 marks)**

Question Five

- a) State the principle of sun-shading **(1 mark)**
- b) List (i) THREE constraints to sun-shading **(3 marks)**
(ii) FOUR benefits of sun shading **(4 marks)**
- c) Explain the THREE types of sun-shading devices **(12 marks)**