

TECHNICAL UNIVERSITY OF MOMBASA
FACULTY OF ENGINEERING & TECHNOLOGY
DEPARTMENT OF BUILDING & CIVIL ENGINEERING
UNIVERSITY EXAMINATIONS
SEPT. 2017 SERIES
DIPLOMA IN ARCHITECTURE
DA.14.S 17no YR II SEM II
SPECIAL SUPPLEMENTARY EXAMINATIONS

EAR 2205 BUILDING ENVIRONMENTAL SCIENCE II: LIGHTING DESIGN

2 HOURS

INSTRUCTIONS

- (i) You should have the following for this examination:
 - Answer booklet
 - Blue or black pen, pencil
 - Non programmable scientific calculator
- (ii) This paper consists of five questions
- (ii) Answer any three questions
- (iii) All question carry equal marks, i.e 20 each
- (iv) Maximum marks for each part of a question are shown
- (v) Use neat, large and well labeled diagrams
- (vi) Do not write on the question paper

This paper consists of 2 printed pages. Candidates should check the question paper to ascertain that all pages are printed and no questions are missing.

QUESTIONS

1. Discuss the following sub-titles:

- a) Reflection (10 marks)
- b) Coloured light (5 marks)
- c) Munsell system (5 marks)
2. A room measures 20 x 9m and the light fittings are mounted on the ceiling 2.9m above the working plane. The required illuminance is 300 lux with an mf of 0.8 .
Calculate:
- i) Room index (5 marks)
- ii) U.F. (5 marks)
- iii) Number of light fittings (5 marks)
- iv) Whether spacing to mounting height is acceptable use of; (5 marks)
- B24 luminaire with maximum spacing to mounting height.
 - Lighting design lumens (ϕ) for lamps = 6134 lm, 1 lamp per luminaire.
 - Lower flux utilisation = 0.88
- $UF_u = 0.42$
- $DLOR = 50\%$
- $ULOR = 20\%$
3. a) State the two types of lighting and their corresponding purposes. (2 marks)
- b) Enumerate two properties of the objects that we see. (2 marks)
- c) Vision is the most important channel between man and his environment, light being a requisite. Briefly outline the sources of light. (5 marks)
- d) Explain the nature of light. (5 marks)
- e) Describe the transmission of light. (6 marks)
4. a) Describe the inverse square law as used in the determination of the direct component of illuminance. (10 marks)
- b) A uniform source gives out 25133 lm is placed 3m directly above point A on a working plane. Point B is on the same plane but 4m away from point A. Evaluate direct illuminance at each point using the cosine law of illuminance. (10 marks)
5. Sight is a function of light and the eye. Discuss. (20 marks)

END