TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

UNIVERSITY EXAMINATION FOR:

DIPLOMA IN ELECTRICAL ELECTRONICS ENGINEERING (DEEE 6)

ILLUMINATION ENGINEERING

EEP 2306

END OF SEMESTER EXAMINATION

SERIES: MAY 2016

TIME: 2 HOURS

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 any THREE Questions.
Do not write on the question paper.

PAPER ONE

QUESTION ONE

a) State the units for the following terms associated with lighting.
   i. Luminous flux
   ii. Luminous efficiency
   iii. Luminous intensity
   iv. Solid angle **(4 marks)**

b) State
   i. The advantages of coiled coil filament lamps over single coil lamps. **(2 mark)**
   ii. Two types of filaments which were used earlier than the metal filament. **(2 marks)**

c)
i. Define a Luminaire **(2 marks)**
ii. State **THREE** names of gases used in discharge lamps. **(3 marks)**

d) Distinguish between **INCANDESCENT** lamps and **DISCHARGE** lamps. **(4 marks)**

e) Define utilization factor or coefficient of utilization as a ratio and state its purpose. **(3marks)**

QUESTION TWO

a) State
   i. Four lamps which are commonly used for interior lighting today
   ii. Five factors which the lighting designer should consider when selecting lamps. **(9 marks)**

b) Explain the term stroboscopic effect in discharge lamps and using the lead-lag connection of lamps, draw the circuit diagram, to show how it can be reduced. **(5marks)**

c) Two lamps A and B of 300 candelas and 500 candelas respectively are situated 100 meters apart. The heights of A above the ground level is 15M and that of B is 30M, if a photometer is placed at the center of the line joining the two lamps on the ground, calculate the reading of the photometer. **(6 marks)**

QUESTION THREE

a) Define
   i. Illumination
   ii. Brightness
   iii. Reflection factor
   iv. Diffusing lighting **(8marks)**

b) State where the following lamps are mostly applied and why,
   i. Neon lamps
   ii. Low pressure sodium lamps **(4 marks)**

c) Explain why the indirect lighting is most preferred to other lighting system in a professional design. **(4 marks)**

d) Explain what is meant by an incident light. **(4 marks)**

QUESTION FOUR

a) Define
   i. Coefficient of utilization
   ii. Depreciation factor
   iii. Waste high factor
   iv. Flicker **(4 marks)**

b) State four application of flood lighting. **(4 marks)**

c) A yard 30M long and 8M wide is to be illuminated to a level of 300lm/m2. Assuming the average lumen output of a lamp is 40lm/w, the maintenance factor of 0.8 and a utilization factor of 0.5 Calculate the total lamp power and the number of lamps if 50W fluorescent lamps are used.

(12 marks)

QUESTION FIVE

a) State the requirements for a well designed lighting scheme. **(4 marks)**

b) Draw :-

i. A fluorescent lamp circuit, including a p.f. correction capacitor and explain how it works.

ii. A well labeled diagram of a metal halide lamp and explain how it works.

c) A lamp having a luminous intensity of 720cd is fixed 6M above a working plane. Calculate the illumination.

i. At point A vertically bellow the lamp

ii. At a point B, 6M from point A on the same horizontal plane. **(10 marks)**