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 TWO

QUESTION ONE

(a)State three qualities of a well designed lighting scheme.　　　　**(3marks)**

(b) (i) Define solid angle.

　　(ii)Draw a suitable sketch showing a solid angle.　　　　**(4marks)**

(c)Explain the following classification of lighting schemes.

(i)Direct lighting system

(ii)Indirect lighting system

(iii)General diffusing system　　　　**(6marks)**

Describe the importance of space to height ratio for obtaining uniform illumination on a working place　　　　**(5marks)**

QUESTION TWO

(a) (i)State THREE purpose of flood lighting in buildings　　　　**(3marks)**

(ii)Explain the meaning of floodlighting　　　　**(2marks)**

(b)State:-

(i) Five properties for an ideal material for the filament of an incandescent lamp.

　　　　(5marks)

(ii) The reason why the filament of an incandescent lamp is enclosed in an evacuated glass bulb.

　　　　(2marks)

(c)For a given building it is desired to flood light the front of the building 42m wide and 16m high. Projectors of 30degrees beam spread and 1000 waH lamps giving 20lumea/waH are available. If the desired level of illumination is 45lm/m2 and if the projectors are to be located at the ground level 17m away. Design and show the suitable scheme
Assume:

Coefficient of utilization= 0.4

Depreciation factor　　=1.3 and

Waste light factor　　= 1.2　　　　**(8marks)**

QUESTION THREE

(a) State:-
   (i)   Three factors affecting the value of utilization factor   **(3marks)**
   (ii)   The disadvantages of single filament in a lamp over the coiled coil filament.
                                                                            (4marks)

(b) State the expected efficiency of the following clamps.
   (i)   Tungsten filament lamp
   (ii)   Tungsten filament lamp with argon gas.   **(3marks)**

(c) define the following terms
   (i)   flicker
   (ii)   glare
   (iii) maintenance factor
   (iv)   luminous intensity   **(4marks)**

(d) (i) Explain how discharge lamps work.
    (ii)Describe a semi indirect lighting   **(6marks)**

QUESTION FOUR

(a) State (i) the **TWO** laws of illumination   **(2marks)**
   (iii) Four lamps which are commonly used for interior lighting today
                                                                           (4marks)

(b) Define :
   (i)   Shadow
   (ii)   Lux
   (iii) Solid angle
   (iv)   Coefficient of utilization   **(4marks)**

   (c) A living room is 30m by 10 and requires 300lnx to be produced by 400watt filament lamps which have a utilization factor of 0.4 and depreciation factor of 0.9.

The luminous efficiency of each lamp is 14 lumen/watt. Calculate the number of lamps required to illuminate the living room and show the layout.   **(10marks)**

QUESTION FIVE

(a) A school laboratory 15m long and 10m wide requires an illumination level of 400lnx on the working plane. If is proposed to use 65w fluorescent light fittings with a rated output of 4300 lumen each. Assuming a maintenance factor of 0.8 and a utilization factor of 0.5. Calculate the number of light fittings required.
                                                                           (**10marks)**

(b) An office 10m long by 3m wide is illuminated with fluorescent lamp to a level of 224 lumen/m2. The maintenance factor is 0.8 and the coefficient of utilization is 0.6. Calculate the total power required given a lamp efficiency of 35lumen/watt.

                                                                           (10marks)