

**W1-2-60-1-6**

**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

**UNIVERSITY EXAMINATIONS 20141/2015**

**YEAR 3 SEMESTER II EXAMINATIONS FOR THE DEGREE OF BACHELOR OF ARCHITECTURE**

**ABA 2309: BUILDING ENVIRONMENT SCIENCE II (LIGHTING)**

**DATE: April 2015 TIME: 2 HOURS**

**INSTRUCTIONS:**

**Answer question ONE (COMPULSORY) and any other TWO questions**

**QUESTION ONE (30 MARKS)**

1. Define any three photometric quantities of light. (3marks)
2. What is your understanding of the following principles of light? (6marks)
3. Light spectrum
4. Colour mixing
5. Colour temperature
6. Explain glare in relation to visual acuity and contrast sensitivity (4marks)
7. What is your understanding of equivalent sphere illuminance? (2marks)
8. The daylight factor and the light inside a room are made up of three separate components. Explain. (5marks)
9. What are the basic factors that affect performance of visual tasks? (6marks)
10. List any four artificial light sources (4marks)

**QUESTION TWO (20 MARKS)**

1. Explain the determinants/variables involved for day lighting in peripheral and core zones of a building (12marks)
2. List three sources of natural light (3marks)
3. Outline three principles of PSALI (5marks)

**QUESTION THREE (20 MARKS)**

1. Describe any three common types of luminaires (8marks)
2. You have been appointed to design additional architecture studio building for NIT students. Discuss the energy efficient lighting strategies you are likely to recommend considering that the studio has a 24 hour work life (12marks)

**QUESTION FOUR (20 MARKS)**

1. Calculate the number of luminaires for a college seminar room such that the average illuminance is 500 lux on the horizontal working plane, using the data listed below

 Room dimension (12X8X3.2) m (14marks)

Reflection factors:

 - Ceiling =70%

 - Wall = 50%

 - Working plane =30%

Average initial lumen per lamp =5800

Each luminaire has 2 lamps

*Assumption: The room is cleaned every day*

1. Using sketches illustrate the following
2. Light scoop
3. Light tube (6marks)