

UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For the following qualifications :-

M. Sc.

ESGL1: Lighting Fundamentals

COURSE CODE : **ENVSGL01**

DATE : **07-MAY-02**

TIME : **14.30**

TIME ALLOWED : **2 hours**

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UNIVERSITY OF LONDON

MSc DEGREE IN BUILT ENVIRONMENT 2002
for Internal Students of University College London

ESGL1: Lighting fundamentals

Answer **TWO** questions.

All questions carry equal marks. Use annotated sketches.

1. Define the following terms:-

1. luminous flux
2. luminous intensity
3. illuminance
4. luminance.

A circular downlighter, 250mm in diameter, is mounted in the ceiling of a hotel corridor at a height of 2.5m above the floor as shown in Figure 1. The luminance of the luminaire in the direction of point P on the floor is 6470cdm^{-2} . Find its intensity in the direction of P and the horizontal illuminance on the floor at P.

2. Define *maintained illuminance* on the working plane within an interior taking particular care in your description of the components of maintenance factor. Outline the circumstances in which maintained illuminance may be (a) increased and (b) decreased.

Further recommendations exist concerning *uniformity* and *diversity*. Define these terms and indicate the application of these concepts to real interior spaces.

3. An international bank has a trading floor which accommodates around 100 dealers. Each desk is equipped with 2 flat screen terminals (vertical screens) and a plasma dealer board (an almost horizontal screen). The occupants are always under pressure and can be intolerant of minor inconveniences.

Assess the variety of visual tasks undertaken in such an environment and comment on the characteristics of the tasks with respect to the following factors:-

1. the size of the task
2. the contrast of the task
3. the luminance of the task
4. the colour of the task
5. the time of exposure of the task.

What are the implications for proposed daylighting and electric lighting design strategies?

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ESGL1: Lighting fundamentals *continued*

4. The two-dimensional colour space on which chromaticity coordinates can be plotted is known as the x, y chromaticity diagram (CIE 1931). Prepare an annotated sketch of this diagram and describe its essential features.

One of the major problems in the original x, y diagram is that equal distances on the diagram do not correspond to equal perceived colour differences. Explain how this is demonstrated by MacAdam's ellipses. What attempts have been made to develop a more uniform system?

END OF PAPER
FIGURE ATTACHED