

UNIVERSITY COLLEGE LONDON

University of London

EXAMINATION FOR INTERNAL STUDENTS

For The Following Qualification:–

M.Sc.

ESGL6: Lighting: Applied Calculations

COURSE CODE : ENVSGL06

DATE : 16-MAY-05

TIME : 10.00

TIME ALLOWED : 2 Hours

UNIVERSITY OF LONDON

MSc DEGREE IN BUILT ENVIRONMENT 2005
for Internal Students of University College London

ESGL6: Lighting: applied calculations

Answer **TWO** questions.

All questions carry equal marks. Use annotated sketches.

1. With reference to BS 5489 - 1:2003 and BS EN 13201 - 2, explain key requirements for the lighting of major and minor roads?

2. One type of monochromator incorporates a filter wheel, a diffraction grating and a detector. Explain the principles underlying their function when measuring the spectral output of lamps. Show how the CIE chromaticity co-ordinates x , y and the Correlated Colour Temperature, CCT can be derived from the true spectral output data of a lamp.

3.
 - a) It can be instructive to undertake a photometric survey of the initial lighting conditions achieved by an installation on completion. Outline the precautions taken in terms of record-keeping and stability of the installation to ensure accurate, repeatable measurements.

 - b) Describe the procedure for undertaking the following measurements of an installation:
 - i) average illuminance
 - ii) uniformity
 - iii) diversity
 - iv) luminance.

TURN OVER

ESGL6: Lighting applied calculations *continued*

4. a) Define *disability glare* and *discomfort glare*.

b) A teaching room is 10m long, 6m wide and 4m high. It is lit by a regular array of twin-lamp fluorescent luminaires (36W) with a total flux of 6700lm from each luminaire. The luminaires are suspended 1m below the ceiling and arranged parallel to the length of the room. The standard uncorrected UGR table for the luminaire is shown in Table 1. The average reflectances of the ceiling, walls and floor are 0.7, 0.5 and 0.2 respectively.

i) Calculate the uncorrected UGR for the installation viewed crosswise and endwise. Apply the bare lamp correction term to give the true UGR.

ii) The limiting glare rating for a classroom is 19. How appropriate is the luminaire installation for this application?

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Table 1

Uncorrected UGR Values Calculated at SHR = 1.0											
Reflectances:											
Ceiling	70	70	50	50	30	70	70	50	50	30	
Wall	50	30	50	30	30	50	30	50	30	30	
Floor	20	20	20	20	20	20	20	20	20	20	
Room size		Viewed Crosswise					Viewed Endwise				
2H	2H	8.4	9.9	8.8	10.2	10.5	8.2	9.7	8.6	10.1	10.4
	3H	9.6	11.3	10.0	11.3	11.7	9.5	11.2	9.9	11.2	11.6
	4H	10.2	11.9	10.6	11.8	12.2	10.1	11.8	10.5	11.7	12.1
	6H	10.8	12.6	11.2	12.3	12.7	10.7	12.5	11.1	12.2	12.6
	8H	11.0	12.7	11.4	12.5	12.9	10.9	12.6	11.3	12.4	12.8
	12H	11.1	12.8	11.6	12.6	13.0	11.0	12.7	11.4	12.5	12.9
4H	2H	8.5	10.2	8.9	10.1	10.5	8.3	10.1	8.7	10.0	10.3
	3H	9.9	11.5	10.3	11.4	11.8	9.8	11.4	10.2	11.3	11.7
	4H	10.7	12.2	11.1	12.1	12.5	10.6	12.1	11.0	12.0	12.4
	6H	11.5	12.4	11.9	12.7	13.2	11.4	12.3	11.8	12.7	13.1
	8H	11.8	12.6	12.3	13.0	13.5	11.7	12.5	12.2	12.9	13.4
	12H	12.1	12.8	12.6	13.3	13.8	12.0	12.7	12.5	13.2	13.7
8H	4H	10.9	11.7	11.3	12.1	12.6	10.8	11.6	11.3	12.0	12.5
	6H	11.8	12.5	12.3	12.9	13.4	11.7	12.4	12.2	12.8	13.3
	8H	12.3	12.9	12.8	13.4	13.9	12.2	12.8	12.8	13.3	13.8
	12H	12.7	13.2	13.2	13.7	14.2	12.7	13.1	13.2	13.7	14.2
12H	4H	10.9	11.6	11.4	12.1	12.6	10.8	11.6	11.3	12.0	12.5
	6H	11.9	12.5	12.4	13.0	13.5	11.9	12.4	12.4	12.9	13.4
	8H	12.5	12.9	13.0	13.4	14.0	12.4	12.9	12.9	13.4	13.9

SLL Code for Lighting

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