

SULIT



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN
JABATAN PENDIDIKAN POLITEKNIK DAN KOLEJ KOMUNITI
KEMENTERIAN PENGAJIAN TINGGI**

JABATAN KEJURUTERAAN AWAM

**PENILAIAN ALTERNATIF BERIKUTAN
PELAKSANAAN PERINTAH KAWALAN BERSYARAT**

SESI DIS 2020

DCB5152 : LIGHTING

NAMA PENYELARAS KURSUS : AZIZI MURSIDY BIN ZAINOL ABIDIN

KAEDAH PENILAIAN : PEPERIKSAAN ONLINE

JENIS PENILAIAN : SOALAN ESEI (2 SOALAN)

TARIKH PENILAIAN : 15 JULAI 2021

TEMPOH PENILAIAN : 1 JAM

LARANGAN TERHADAP PLAGIARISM (AKTA 174)

**PELAJAR TIDAK BOLEH MEMPLAGIAT APA-APA IDEA, PENULISAN, DATA
ATAU CIPTAAN ORANG LAIN. PLAGIAT ADALAH SALAH SATU
PENYELEWENGAN AKADEMIK. SEKIRANYA PELAJAR DIBUKTIKAN
MELAKUKAN PLAGIARISM, PENILAIAN BAGI KURSUS BERKENAAN AKAN
DIMANSUHKAN DAN DIBERI GRED F DENGAN NILAI MATA 0.**

**(RUJUK BUKU ARAHAN-ARAHAN PEPERIKSAAN DAN KAEDAH PENILAIAN (Diploma) EDISI 6, JUN 2019,
KLAUSA 17.3)**

SECTION A : 50 MARKS
BAHAGIAN A : 50 MARKAH

INSTRUCTION:

This section consists of **TWO (2)** essay questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi DUA (2) soalan esei. Jawab SEMUA soalan.

QUESTION 1

SOALAN 1

-

CLO2
C3

- (a) A standing lamp with a luminous intensity of 720 candela is located at the corner of a room as shown in figure 1. The height of the lamp is 1500mm tall. Nearby the lamp, there is a table with three (3) markings A, B and C on it. By using the configurations provided in the figure, calculate and identify clearly which of these markings records the maximum and the minimum illuminance.

[12 marks]

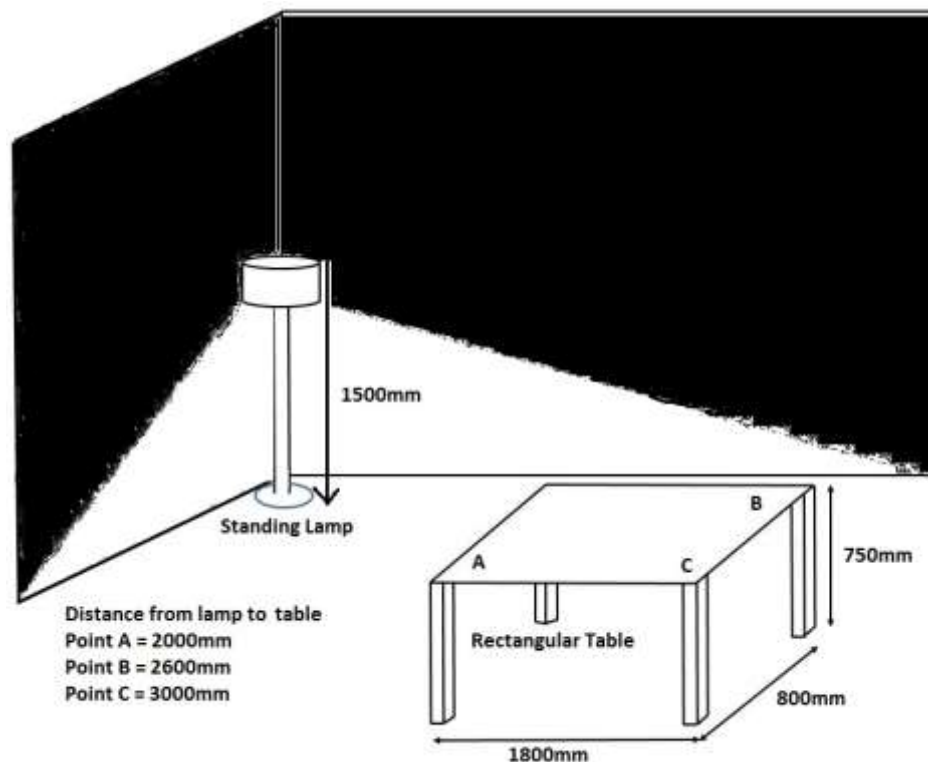


Figure 1 / Rajah 1

Sebuah lampu berdiri dengan nilai keamatan lar sebanyak 720 candela diletakkan pada sudut sebuah bilik seperti yang ditunjukkan dalam rajah 1.

Lampu itu berketinggian 1500mm. Berhampirannya terdapat sebuah meja yang telah ditandakan 3 penandaan iaitu titik A, B dan C. Dengan menggunakan segala konfigurasi yang diberikan, kira dan tentukan dengan jelas penandaan manakah yang merekodkan bacaan penyinaran maksimum dan minimum.

[12 markah]

CLO2
C3

(b) A private office measuring of 3.6m x 3.4m x 3m (High) has a window with a dimension of 1.8m x 1.2m. The reflection factor for the surface of ceiling, wall, floor and glass are 60%, 60%, 25% and 7% respectively. The glass transmission value is 90% and the angle of visible sky is 56°.

(i) Calculate the average daylight factor for the office by assuming the correction factor for dirt is 1.0.

[9 marks]

(ii) Sketch the no-sky line area if the room is blocked by a 7m high building located 8m away. Assuming the window sill is 0.9m from the floor

[4 marks]

Sebuah bilik pejabat persendirian berukuran 3.6m x 3.4m x 3m (tinggi) mempunyai tingkap berukuran 1.8m x 1.2m. Faktor pemantulan bagi permukaan siling, dinding, lantai dan kaca adalah 60%, 60%, 25% dan 7%. Manakala nilai pemancaran kaca adalah 90% dan sudut langit yang kelihatan adalah pada 56°.

(i) *Kira purata faktor cahaya siang bagi pejabat tersebut dengan andaian faktor pembetulan bagi habuk adalah 1.0.*

[9 markah]

(ii) *Lakarkan garisan kawasan tiada langit apabila pandangan bilik dihalang oleh sebuah bangunan setinggi 7m yang terletak sejauh 8m. Andaikan ambang tingkap setinggi 0.9m dari aras lantai.*

[4 markah]

QUESTION 2

SOALAN 2

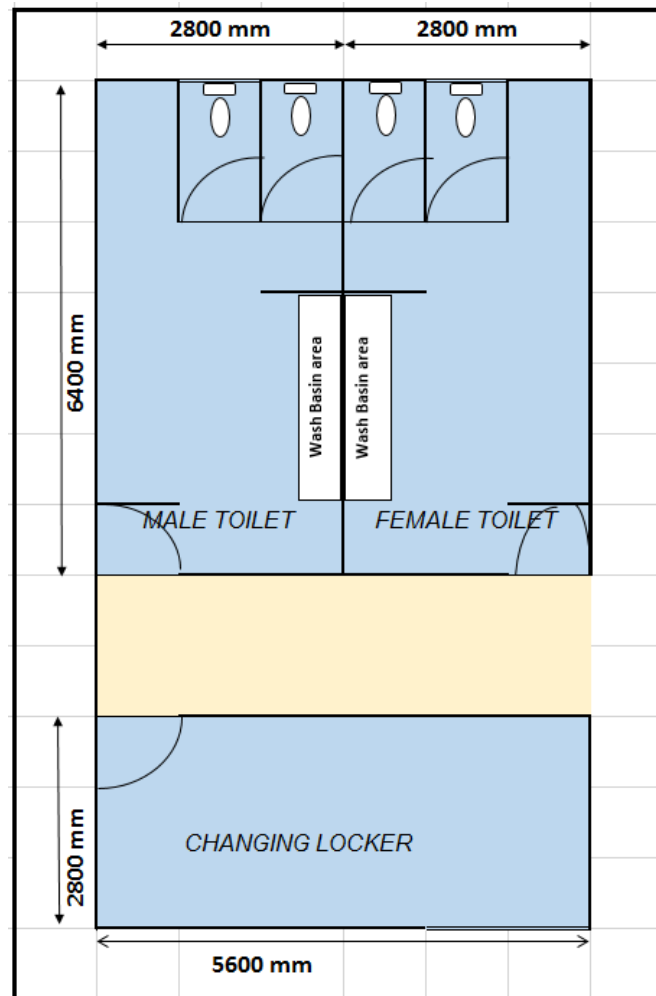


Figure 2/Rajah 2

CLO3
C5

- (a) A restroom area measures 10.8m x 5.6m which include in the Male and Female Toilets and Changing Locker room as shown in Figure 2. The measurement for ceiling to work area height is 3 meters. The area is to be illuminated to a general level of 150 lux for the Toilets and Changing Locker Room using the same triple lamp 18 watt VDT Ceiling Recessed luminaires. Each lamp has an initial output of 1,050 lumens. The lamps are operated for 10,000 hours before being replaced. Lamps and luminaires are cleaned annually and the room is cleaned every two years. Each rooms has a bright interior with room reflectance 70% ceiling, 50% walls and 20% floor.

- i) Find the Room Index for each rooms inside the restroom area. [6 marks]
- ii) Find the utilization factor. [6 marks]

- iii) Find the maintenance factor. [4 marks]
- iv) Calculate the number of luminaires required at each rooms inside the restroom area [9 marks]

Sebuah kawasan rehat berukuran 10.8m x 5.6m didalamnya mengandungi Tandas Lelaki, Tandas Wanita dan Bilik Lokar Pertukaran Pakaian seperti yang ditunjuk pada Rajah 2. Nilai pengukuran diantara siling hingga permukaan kerja adalah 3m. Kawasan ini akan dilengkapi pencahayaan umum dengan nilai penyinaran 150 lux. Setiap ruang-ruang ini akan menggunakan pemasangan lampu jenis terbenam dalam siling yang mana setiap satunya akan dilengkapi tiga biji lampu 18 watt. Setiap lampu akan menghasilkan fluks lar sebanyak 1,050 lumen. Lampu akan mempunyai kadar hayat operasi selama 10,000 jam sebelum ianya ditukar baharu. Lampu dan pemasangan lampu akan dibersihkan sekali dalam setahun dan bilik pula akan dibersihkan sekali dalam masa dua tahun. Faktor pemantulan permukaan bilik adalah 70% untuk siling , 50% untuk dinding dan 20% untuk lantai.

- i) *Cari nilai indeks bilik bagi setiap tandas dan bilik pertukaran pakaian tersebut.* [6 markah]
- ii) *Cari nilai faktor penggunaan.* [6 markah]
- iii) *Cari nilai faktor penyenggaraan* [4 markah]
- iv) *Kira bilangan pemasangan lampu yang diperlukan untuk setiap tandas dan bilik pertukaran pakaian tersebut.* [9 markah]

SOALAN TAMAT

APPENDIX 1: TABLES & FIGURES

Table 1 Utilization Factor

Utilization Factors			LOR = 57.8%			DLOR = 57.8%			ULOR = 0.0%		
Room Reflection			Room Index								
C	W	F	0.75	1	1.25	1.5	2	2.5	3	4	5
0.7	0.5	0.2	0.32	0.38	0.43	0.46	0.50	0.53	0.55	0.58	0.59
	0.3		0.28	0.34	0.38	0.41	0.46	0.50	0.52	0.55	0.57
	0.1		0.24	0.30	0.35	0.38	0.43	0.47	0.49	0.53	0.55

Table 2 Lamp Lumen Maintenance Factor

Typical lumen maintenance and lamp survival data

		Typical values of LLMF and LSF										
		Operation time (1000h)										
		0.1	0.5	1.0	1.5	2.0	4.0	6.0	8.0	10.0	12.0	14.0
Fluorescent multi- and tri-phosphor	LLMF	1	0.98	0.96	0.95	0.94	0.91	0.87	0.86	0.85	0.84	0.83
	LSF	1	1	1	1	1	1	0.99	0.96	0.85	0.75	0.64
Fluorescent halophosphor	LLMF	1	0.97	0.94	0.91	0.89	0.83	0.80	0.78	0.76	0.74	0.72
	LSF	1	1	1	1	1	1	0.99	0.96	0.85	0.75	0.64
Mercury	LLMF	1	0.99	0.97	0.95	0.93	0.87	0.80	0.76	0.72	0.68	0.64
	LSF	1	1	1	1	0.99	0.98	0.97	0.96	0.92	0.88	0.84
High-pressure sodium	LLMF	1	1	0.98	0.97	0.96	0.93	0.91	0.89	0.88	0.87	0.86
	LSF	1	1	1	1	0.99	0.98	0.96	0.94	0.92	0.89	0.85
High-pressure sodium, improved colour	LLMF	1	0.99	0.97	0.95	0.94	0.89	0.84	0.81	0.79	0.78	
	LSF	1	1	1	0.99	0.98	0.96	0.90	0.79	0.65	0.50	

Table 3 Luminaire category

Luminaire reactivity/location categories

Activity	Location	Bare lamp batten	Open ventilated reflector	Dust tight, dust proof or reflector lamp	Open non-ventilated reflector, enclosed diffuser/controller	Open base diffuser or louver	Recessed diffuser or louver, diffusing or louvered luminous ceiling	Indirect cornice
Offices, shops & stores, hospitals, laboratories, schools etc	All air-conditioned buildings	A	A	A	A/B	A/B	A	B
	Clean country area	A/B	A/B	A/B	B	B	A/B	C/D
	City or town outskirts	B	B	B	C	B/C	B	E
	City or town center	B/C	B/C	B/C	C/D	C	B/C	F/G
	Dirty industrial area	C	C	B/C	D	C/D	C	G
Manufacturing areas, machine shops, etc	All air-conditioned buildings	A/B	A	A	C	B/C	B	B/C
	Clean country area	B	A/B	B	C/D	C	B/C	D/E
	City or town outskirts	B/C	B	B	D	C/D	C	F/G
	City or town center	C	B/C	B/C	D/E	D	C/D	G
	Dirty industrial area	C/D	C	C	E	D/E	D	H
Steelworks, foundries, welding shops, etc	Clean country area	C	B/C	B	D/E	D	C/D	
	City or town outskirts	C/D	C	B/C	E	D/E	D	
	City or town center	D	C/D	B/C	E/F	E	D/E	
	Dirty industrial area	D/E	D	C	F	E/F	E	

Figure 3 Luminaire Maintenance factor

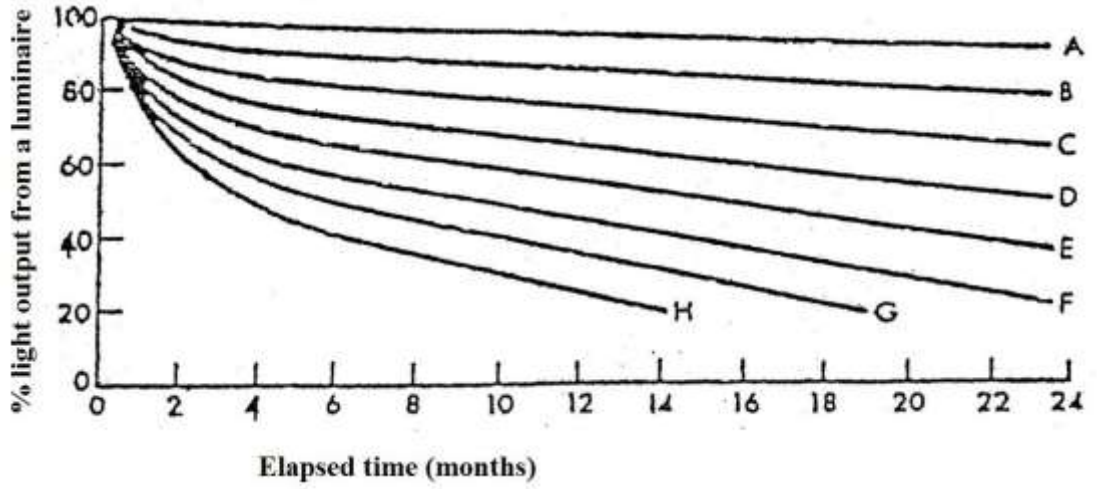
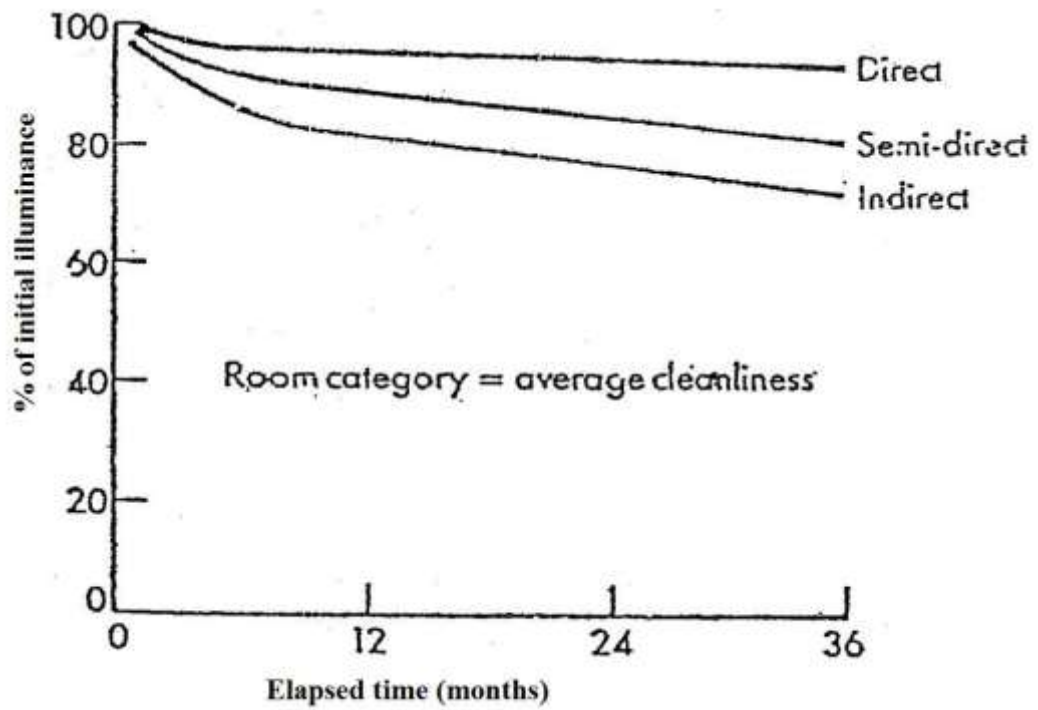


Figure 4 Room Surface Maintenance factor



APPENDIX 2: FORMULAConversion Lumen to Candela

$$I = \frac{F}{2\pi [1 - \cos(60^\circ)]^2}$$

Inverse Square Law

$$E = \frac{I}{d^2}$$

Cosine Lambert Law

$$E = \frac{I (\cos \theta)}{H^2}$$

OR

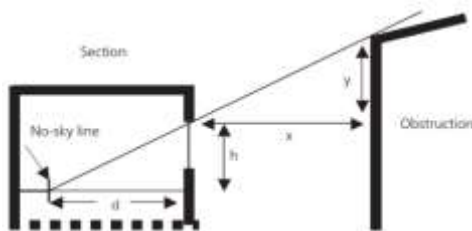
$$E = \frac{I (\cos^3 \theta)}{d^2}$$

Average Daylight Factor

$$DF_{avg} = \frac{T(W)(\theta)}{A (1-R^2)} \%$$

No-Sky Line Boundary

$$d = \frac{x(h)}{y}$$

Lighting Design

$$\text{Room Index, } K = \frac{A}{H_m (\text{Length} + \text{Width})}$$

$$N = \frac{E(A)}{n (F)(UF)(MF)}$$