

**SULIT**



**BAHAGIAN PEPERIKSAAN DAN PENILAIAN  
JABATAN PENDIDIKAN POLITEKNIK  
KEMENTERIAN PENDIDIKAN TINGGI**

**JABATAN KEJURUTERAAN AWAM**

**PEPERIKSAAN AKHIR  
SESI DISEMBER 2017**

**DCB2062 : ELECTRICAL SERVICES 1**

**TARIKH : 05 APRIL 2018  
MASA : 8.30 PAGI - 10.30 PAGI (2 JAM)**

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Kertas ini mengandungi **LAPAN(8)** halaman bercetak.

Bahagian A: Struktur (2 soalan)  
Bahagian B: Struktur (4 soalan)

Dokumen sokongan yang disertakan : Tiada

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**JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN**

(CLO yang tertera hanya sebagai rujukan)

**SULIT**

**SECTION A : 50 MARKS****BAHAGIAN A : 50 MARKAH****INSTRUCTION:**

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

**ARAHAN:**

*Bahagian ini mengandungi DUA (2) soalan struktur. Jawab SEMUA soalan.*

**QUESTION 1****SOALAN 1**

CLO 1  
C1

- a) List **FIVE (5)** types of power generator.  
*Senaraikan LIMA (5) jenis sistem janakuasa.*

[5 marks]  
[5 markah]

CLO 1  
C2

- b) Describe the function of the following components:  
*Terangkan fungsi komponen-komponen berikut :*

- i. Main fuse  
*Fius utama*
- ii. kWh meter  
*Meter kWj*
- iii. Main switch  
*Suis utama*
- iv. Electrical circuit breaker  
*Pemutus litar elektrik*

[8 marks]  
[8 markah]

CLO 2  
C3

c) Given, is a list of load installation for a residential:

*Diberi adalah senarai pemasangan beban untuk sebuah kediaman*

10 units x 100 W filament lamp/ *lampu filamen*

4 units x 40 W fluorescent lamp/ *lampu kalimantang*

2 units x 20 A radial circuit socket outlet 13 A/ *soket alur keluar sistem jejari*

1 unit x 3 kw water heater (instantaneous type)/ *pemanas air (jenis segera)*

1 unit x 4 kw cooker / *pemasak*

Calculate current maximum demand of the installation.

*Kirakan arus permintaan maksimum pemasangan tersebut.*

[12 marks]

[12 markah]

## QUESTION 2

### SOALAN 2

CLO 1  
C1

a) Define fuse.  
*Takrifkan fius.*

[5 marks]

[5 markah]

CLO 1  
C2

b) Differentiate between fuse and circuit breaker.  
*Bezakan antara fius dengan pemutus litar.*

[8 marks]

[8 markah]

CLO 1  
C3

c) Sketch and label the installation of lightning protection.  
*Lakar dan labelkan pemasangan perangkap kilat*

[12 marks]

[12 markah]

**SECTION B : 50 MARKS****BAHAGIAN B : 50 MARKAH****INSTRUCTION:**

This section consists of **FOUR (4)** structural/essay questions.  
Answer **TWO (2)** questions only.

**ARAHAN:**

*Bahagian ini mengandungi EMPAT (4) soalan struktur/esei.  
Jawab DUA(2) soalan sahaja.*

**QUESTION 1****SOALAN 1**

CLO 1  
C1

- a) Define conductors.  
*Takrifkan pengalir.*

[3 marks]  
[3 markah]

CLO 1  
C2

- b) i. Identify the colour codes of the following cables :  
*Kenalpasti kod warna kabel berikut :*

Cables	Colour Code
Phase Conductor (Life)/ <i>Kabel fasa ( Hidup)</i>	
Neutral/ <i>Neutral</i>	
Earth/ <i>Bumi</i>	

[3 marks]  
[3 markah]

- ii. Identify **FOUR (4)** characteristics of an insulator.  
*Kenalpasti EMPAT (4) sifat penebat.*

[4 marks]  
[4 markah]

CLO 1  
C3

- c) Johan wants to check whether the kettle is functioning properly. He decided to test the kettle by using an insulator resistance test. Sketch the procedure of the test.

*Johan ingin memeriksa samada cerek berfungsi atau tidak. Beliau memutuskan untuk memeriksa menggunakan ujian penebatan rintangan. Lakarkan prosedur ujian tersebut.*

[15 marks]

[15 markah]

**QUESTION 2**  
**SOALAN 2**CLO 1  
C1

- a) Define final circuit.  
*Takrifkan litar akhir.*

[3 marks]

[3 markah]

CLO1  
C2

- b) Describe the following circuits with a suitable diagram:  
*Terangkan litar-litar berikut dengan gambarajah yang sesuai:*
- Ring circuit / *litar gelang*
  - Radial circuit / *litar jejari*

[7 marks]

[7 markah]

CLO1  
C3

- c) Illustrate the procedures to conduct an insulation resistance test.  
*Ilustrasikan langkah-langkah melaksanakan ujian rintangan penebatan.*

[15 marks]

[15 markah]

## QUESTION 3

## SOALAN 3

CLO 1  
C1

- a) List **THREE (3)** factors that need to be considered in the selection of an electrical wiring system.

*Senaraikan TIGA (3) faktor yang perlu dipertimbangkan dalam pemilihan sistem pendawaian elektrik.*

[3 marks]

[3 markah]

CLO1  
C2

- b) Describe the following wiring types:

*Jelaskan jenis-jenis pendawaian berikut.*

- i. Concealed wiring / *Pendawaian tersembunyi*
- ii. Conduit wiring / *Pendawaian kondiut*

[7 marks]

[7 markah]

CLO1  
C3

- c) With the aid of a diagram, illustrate the procedures of conducting continuity test.

*Dengan bantuan gambarajah, ilustrasikan langkah menjalankan ujian keterusan.*

[15 marks]

[15 markah]

## QUESTION 4

## SOALAN 4

CLO 1  
C1

a) Define earthing.

*Takrifkan pbumian.*[3 marks]  
[3 markah]CLO 1  
C2

b) i. Identify TWO (2) types of earth electrodes.

*Kenalpasti DUA (2) jenis elektrod bumi.*[2 marks]  
[2 markah]

ii. Describe FIVE (5) methods to reduce the ground resistance.

*Jelaskan LIMA (5) kaedah untuk mengurangkan rintangan bumi.*[5 marks]  
[5 markah]CLO 2  
C3

c) The table shows a list of loads to be installed in a shop lot.

*Daripada jadual yang diberi, terdapat senarai beban untuk dipasang dalam sebuah lot kedai.*

<p>1 unit x 4.5 kw and 6 units x 3 kw heating and power/ pemanas dan kuasa</p> <p>1 unit x 6 kw and 1unit x 4 kw cooker/ pemasak</p> <p>2 units x 3 kw water heaters (instantaneous type)/ pemanas air (jenis segera)</p> <p>4 kw total discharge lamp 240V / lampu nyah cas</p> <p>3units x 30 A ring circuit socket outlet/ soket alur keluar system gelang</p>
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Calculate the current demand for the shop lot by considering the diversity factor (Refer Table)

*Kirakan permintaan arus untuk lot kedai tersebut dengan mengambilkira faktor kepelbagaian (Rujuk Jadual)*[15 marks]  
[15 markah]

## SOALAN TAMAT

**APPENDIX A / LAMPIRAN A**

Purpose of final circuit fed from conductors or switchgear to which diversity applies	Types of premises		
	Individual household installations, including individual dwellings of a block	Small shops, stores, offices and business premises	Small hotels, boarding house, guest house, etc
1. Lighting	66 % of total current demand	90 % of total current demand	75 % of total current demand
2. Heating and power (but see 3 – 8 below)	100 % of total current demand up to 10 A + 50 % of any current demand in excess of 10 A	100 % f.l of largest appliances + 75 % of remaining appliances	100 % f.l of largest appliances + 80 % f.l second largest appliances + 60 % of remaining appliances
3. Cooking appliances	10 A + 30 % f.l of connected cooking appliances in excess of 10 A + 5 A if socket outlet incorporate in unit	100 % f.l of largest appliances + 80 % f.l second largest appliances + 60 % of remaining appliances	100 % f.l of largest appliances + 80 % f.l second largest appliances + 60 % of remaining appliances
4. Motors ( other than lift motors which are subject to special consideration )		100 % f.l of largest appliances + 80 % f.l second largest appliances + 60 % of remaining appliances	100 % f.l of largest appliances + 50 % of remaining appliances
5. Water heater (instantaneous type)*	100 % f.l of largest appliances + 100 % of second largest appliances + 25 % f.l of remaining appliances	100 % f.l of largest appliances + 100 % of second largest appliances + 25 % f.l of remaining appliances	100 % f.l of largest appliances + 100 % of second largest appliances + 25 % f.l of remaining appliances
6. Water heater (thermostatically controlled)	NO DIVERSITY ALLOWABLE		
7. Floor warming installations	NO DIVERSITY ALLOWABLE		
8. Thermal storage space heating installations	NO DIVERSITY ALLOWABLE		
9. Standard arrangements of final circuits in accordance with IEE Appendix 5	100 % of current demand + 40 % of current demand of every other circuit	100 % of current demand + 50 % of current demand of every other circuit	
10. Socket outlet other than those included in 9 above and stationary equipment other than those listed above	100 % of current demand of largest point of utilisation + 40 % of current demand of every other point of utilisation	100 % of current demand of largest point of utilisation +75 % of current demand of every other point of utilisation	100 % of current demand of largest point of utilisation +75 % of current demand of every point in main rooms (dining rooms, etc) +40 % of current demand of every other point of utilisation
<p>* For the purpose of this table an instantaneous water heater is deemed to be a water heater of any loading which heats water only while the tap is turned on and therefore uses electricity intermittently. It is important to ensure that the distribution boards are of sufficient rating to take the total load connected to them without the application of any diversity.</p>			