

SULIT



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

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI JUN 2015

DET1013: ELECTRICAL TECHNOLOGY

TARIKH : 05 NOVEMBER 2015

TEMPOH : 2.30 PM – 4.30 PM (2 JAM)

Kertas ini mengandungi **EMPAT BELAS (14)** halaman bercetak.

Bahagian A: Objektif (10 soalan)

Bahagian B: Struktur (4 soalan)

Bahagian C :Esei (2 soalan)

Dokumen sokongan yang disertakan : ~~Kertas Graf, Formula dsb/~~ Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A : 10 MARKS**BAHAGIAN A : 10 MARKAH****INSTRUCTION:**

This section consists of **TEN (10)** objective questions. Mark your answers in the OMR form provided.

ARAHAN :

*Bahagian ini mengandungi **SEPULUH (10)** soalan objektif. Tandakan jawapan anda di dalam borang OMR yang disediakan.*

CLO1
C1

1. What is the basic unit of potential difference?

Apakah unit asas beza keupayaan?

A. Ohm

Ohm

B. Volt

Volt

C. Watt

Watt

D. Ampere

Ampere

CLO1
C2

2. Determine the total voltage of terminal AB of the following circuit in Figure A2.
Tentukan jumlah voltan terminal AB pada litar Rajah A2.

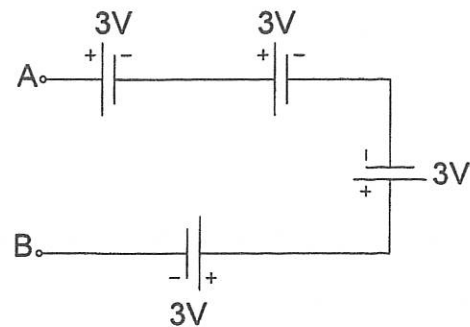


Figure A2 / Rajah A2

- A. 3V
B. 6V
C. 9V
D. 12V

CLO1
C1

3. Which electrical law does the statement represent?
Hukum elektrik yang manakah mewakili kenyataan di bawah?

$$\sum I_{IN} = \sum I_{OUT}$$

- A. Lenz's Law
Hukum Lenz's
B. Ohm's Law
Hukum Ohm's
C. Kirchoff's Current Law
Hukum Kirchoff's Arus
D. Kirchoff's Voltage Law
Hukum Kirchoff's Voltan

CLO2
C2

4. Referring to Figure A4, calculate the current value of I_1 at Node X and I_2 at node Y.
Merujuk kepada Rajah A4, kirakan nilai arus I_1 pada nod X dan I_2 pada nod Y.

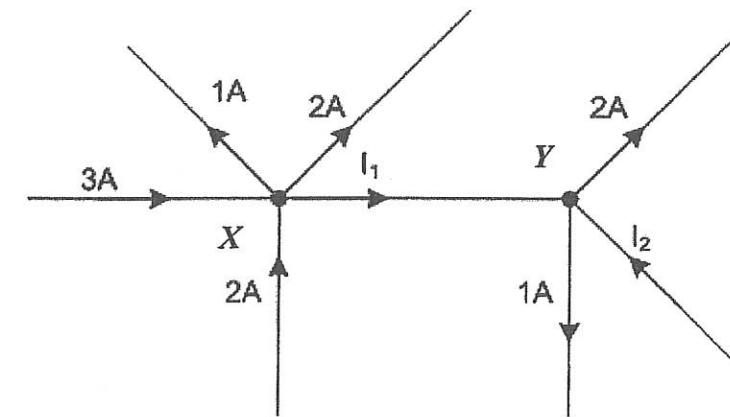


Figure A4 / Rajah A4

- A. $I_1 = 1A, I_2 = 2A$
B. $I_1 = 2A, I_2 = 1A$
C. $I_1 = 2A, I_2 = 2A$
D. $I_1 = 3A, I_2 = 3A$

CLO1
C2

5. Equivalent circuit of Thevenin's theorem consists of ;
Litar setara Teorem Thevenin terdiri daripada ;

- A. a current source and a series resistance
satu sumber arus dan satu rintangan sesiri
B. a voltage source and a parallel resistance
satu sumber voltan dan satu rintangan selari
C. a voltage source and a series resistance
satu sumber voltan dan satu rintangan sesiri
D. a current source and a parallel resistance
satu sumber arus dan satu rintangan selari

CLO1
C1

6. Which of the following is NOT a type of fixed capacitor.
Yang manakah BUKAN jenis kapasitor tetap.

- A. Plastic Film Capacitor
Kapasitor Filem Plastik
- B. Tantalum Capacitor
Kapasitor Tantulum
- C. Trimmer Variable Capacitor
Kapasitor Boleh Laras Trimmer
- D. Ceramic Capacitor
Kapasitor Seramik

CLO1
C2

7. Determine the total capacitance if three $17 \mu\text{F}$ capacitors are connected in series.
Tentukan jumlah kemuatan jika tiga pemuat $17 \mu\text{F}$ disambung secara sesiri.

- A. $1.77 \mu\text{F}$
- B. $17.7 \mu\text{F}$
- C. $5.67 \mu\text{F}$
- D. $56.7 \mu\text{F}$

CLO1
C1

8. An inductor is fully charged when the time constant is equal to
Suatu pearuh akan mencapai cas penuh apabila pemalar masa bersamaan dengan

- A. L/R
- B. $2L/R$
- C. $5L/R$
- D. $7L/R$

CLO1
C2

9. Identify the meaning of Faraday's Law ?
Apakah yang dimaksudkan dengan Hukum Faraday?

- A. The amount of voltage induced in a coil is directly proportional to the rate of change of the magnetic field with respect to the coil.
Nilai voltan teraruh dalam gegelung adalah berkadar terus dengan perubahan cas pada medan magnet.
- B. The polarity of the induced voltage is such that it always opposed the charge in current.
Polariti voltan teraruh sentiasa berlawanan dengan cas pada arus.
- C. The right hand is held with the thumb, first finger, and second finger mutually perpendicular to each other.
Tangan kanan terdiri daripada ibu jari, jari pertama dan jari kedua saling berkaitan secara menegak diantara satu sama lain.
- D. Voltage is only induced when the conductor cuts magnetic line/flux.
Voltan akan teraruh apabila pengalir memotong garisan/fluk magnet.

CLO2
C2

10. If the flux density in a magnetic circuit is 1.2 T and the cross sectional area of the circuit is 12 cm^2 , the total flux is
Sekiranya ketumpatan fluks dalam litar magnet adalah 1.2 T dan luas keratan rentas litar adalah 12 cm^2 , jumlah fluks adalah

- A. 0.14 mWb
- B. 1.44 mWb
- C. 14.4 mWb
- D. 144.0 mWb

SECTION B: 60 MARKS

BAHAGIAN B: 60 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN:

Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **SEMUA** soalan.

QUESTION 1

SOALAN 1

- (a) Explain the definition of Ohm's Law.

Terangkan definisi bagi Hukum Ohm.

[3 marks]
[3 markah]

- (b) Determine the value of R_1 , R_2 and R_3 in Figure B1 (b).

Tentukan nilai R_1 , R_2 dan R_3 seperti di dalam rajah B1 (b).

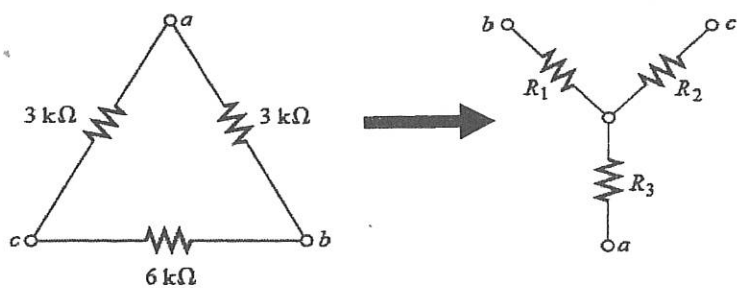


Figure B1 (b)/Rajah B1 (b)

[5 marks]
[5 markah]

CLO2
C3

- (c) i. Referring to Figure B1 (c), calculate the value of the current flow through the 6Ω resistor when the voltmeter shows 18 V.

Merujuk kepada Rajah B1 (c), kirakan nilai arus yang mengalir menerusi rintangan 6Ω apabila bacaan meter voltan menunjukkan 18 V.

- ii. Refer to Figure B1 (c), explain what happens to the power dissipated by the 6Ω resistor if the voltage across it doubles.

Terangkan apa yang berlaku kepada kuasa lesapan rintangan 6Ω sekiranya voltan merintanginya digandakan.

[7 marks]
[7 markah]

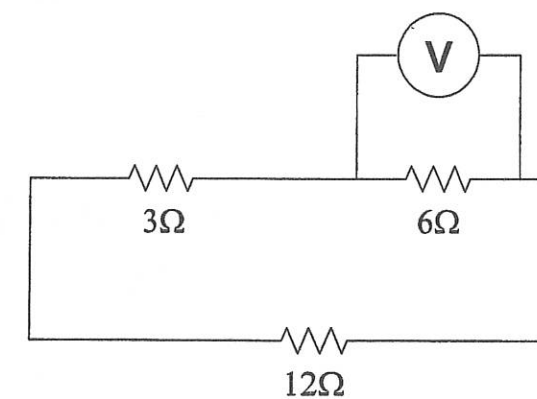


Figure B1 (c) / Rajah B1 (c)

QUESTION 2

SOALAN 2

- (a) State **TWO (2)** principles of Kirchoff's Laws that apply to DC circuits networks.
Nyatakan kan **DUA (2)** prinsip asas Hukum Kirchoff yang digunakan dalam rangkaian litar AT.

[3 marks]
[3 markah]

- (b) Referring to Figure B2(b), find the current equation flowing into node X and the voltage equation rises around of loop 1 and loop 2 using Kirchoff's Law.
Merujuk kepada Rajah B2(b), dapatkan persamaan bagi arus yang mengalir memasuki nod X dan persamaan bagi voltan yang terhasil dalam gelung 1 dan gelung 2 menggunakan Hukum Kirchoff.

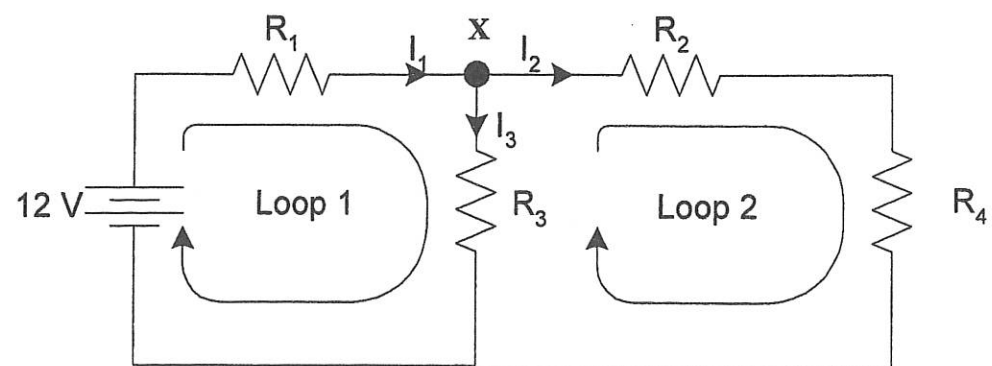


Figure B2 (b) / Rajah B2 (b)

[5 marks]
[5 markah]

CLO2
C3

- (c) Referring to Figure B2 (c), find the short circuit current between point A and B of the circuit.

Merujuk Rajah B2 (c), dapatkan arus litar pintas di antara titik A dan B bagi litar tersebut.

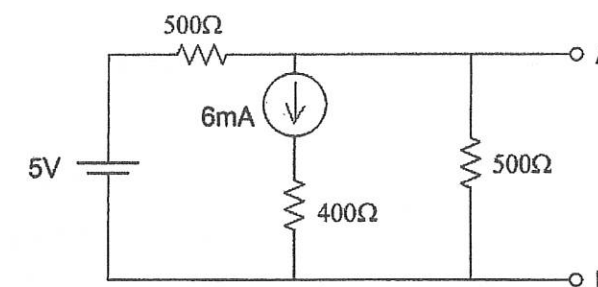


Figure B2 (c) / Rajah B2 (c)

[7 marks]
[7 markah]

QUESTION 3

SOALAN 3

- (a) State **THREE (3)** functions of inductor.
Nyatakan **TIGA (3)** fungsi peparuh.

[3 marks]
[3 markah]

- (b) Referring to Figure B3(b), write Kirchoff's voltage rule for the circuit. Sketch a graph of I versus t. Shows the current when $t = \tau$ and 5τ .

Merujuk Rajah B3(b), tuliskan persamaan Hukum Kirchoff voltan bagi litar tersebut. Lakarkan graf I lawan t yang diperolehi. Tunjukkan arus apabila $t = \tau$ dan 5τ .

CLO1
C2

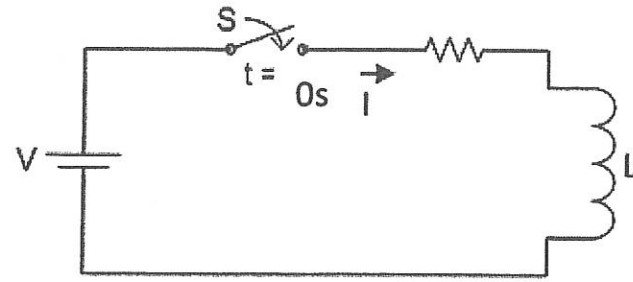


Figure B3(b)/ Rajah B3(b)

[5 marks]

[5 markah]

CLO2
C3

- (c) An 0.5 H inductor is connected in series with a $20\ \Omega$ resistor and a placed across a DC voltage of 120 V. Determine the time constant and energy that is stored in the inductor at time 0.025 s

Satu induktor 0.5 H yang disambung bersiri dengan perintang $20\ \Omega$ dan diletakkan voltan AT merentangi 120 V voltan AT. Tentukan pemalar masa dan tenaga yang disimpan dalam induktor pada masa 0.025 s

[7 marks]

[7 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- (a) State **TWO (2)** methods of determining magnetic field direction.
Nyatakan DUA (2) kaedah bagi menentukan arah medan magnet.

[3 marks]

[3 markah]

CLO1
C2

- (b) Sketch the magnetic lines of two fields between parallel conductors in following condition :
Lakarkan garisan urat daya yang terbentuk diantara dua pengalir selari dalam keadaan berikut:

i) $\begin{matrix} \text{A} & \text{B} \\ \otimes & \otimes \end{matrix}$ ii) $\begin{matrix} \text{A} & \text{B} \\ \otimes & \odot \end{matrix}$ iii) $\begin{matrix} \text{A} & \text{B} \\ \odot & \odot \end{matrix}$

[5 marks]

[5 markah]

CLO2
C3

- (c) When a conductor is moved across a magnetic field, there is a relative motion between the conductor and the magnetic field. Likewise, when a magnetic field is moved past a stationary conductor, there is also relative motion. This principle is known as electromagnetic induction and the resulting voltage is an induced voltage. Referring to statement above, with the help of a suitable diagram explain **TWO (2)** observations stated by Faraday's law.

Apabila digerakkan konduktor melintasi sesuatu medan magnet, akan terhasil pergerakan relatif di antara konduktor tersebut dengan medan magnet tadi. Sebaliknya, juga apabila medan magnet digerakkan menerusi konduktor yang berada dalam keadaan statik, pergerakan relatif juga terhasil. Inilah dinamakan prinsip aruhan elektromagnetik dan voltan yang terhasil dipanggil voltan teraruh.

Berdasarkan pernyataan di atas, dengan bantuan gambarajah yang sesuai terangkan DUA (2) pemerhatian yang telah dinyatakan oleh Hukum Faraday.

[7 marks]

[7 markah]

SECTION C: 30 MARKS
BAHAGIAN C: 30 MARKAH

INSTRUCTION:

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

ARAHAN:

Bahagian ini mengandungi **TWO (2)** soalan esei. Jawab semua soalan.

QUESTION 1**SOALAN 1**

CLO2
C3

Calculate the current I_L in Figure C1 by using Thevenin's Theorem.

Kirakan nilai arus I_L di Rajah C1 di bawah menggunakan Teorem Thevenin.

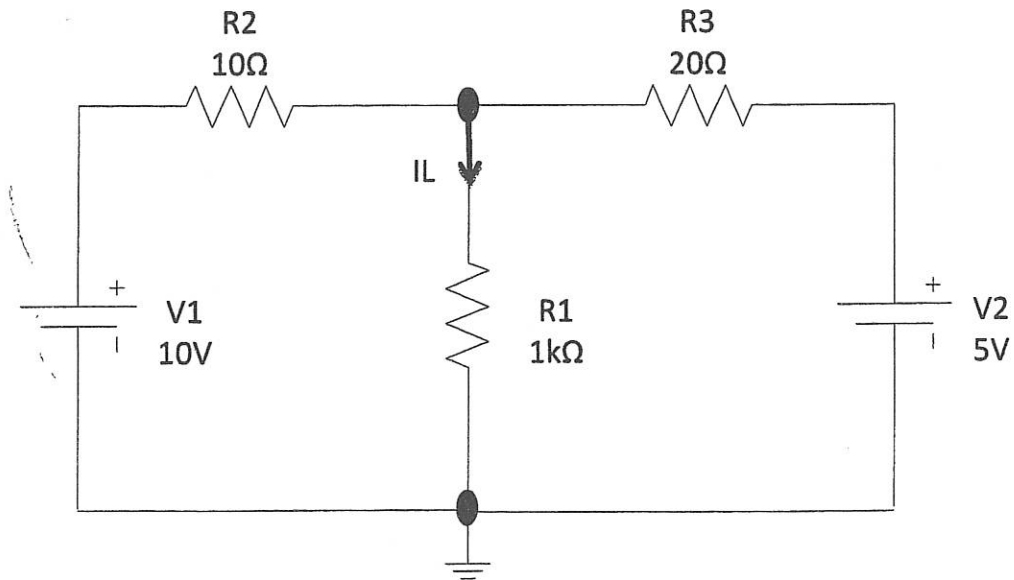


Figure C1 / Rajah C1

[15 marks]
[15 markah]

CLO2
C3

QUESTION 2**SOALAN 2**

A capacitor with a capacitance of $20 \mu\text{F}$ which is connected in series to a $200 \text{ k}\Omega$ resistor is being placed a 250 VDC voltage supply. Calculate the initial current, initial potential different across capacitor, the time constant during charging, the time taken to be fully charge and the energy stored in the capacitor.

Suatu pemuat $20 \mu\text{F}$ disambung sesiri dengan perintang $200 \text{ k}\Omega$ dan ditempatkan merentasi bekalan voltan AT 250 V . Kirakan arus permulaan, beza keupayaan permulaan merentasi pemuat, pemalar masa semasa mengecas, masa yang diambil untuk cas sepenuhnya dan tenaga yang disimpan dalam pemuat.

[15 marks]
[15 markah]

SOALAN TAMAT

SULIT



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PEPERIKSAAN AKHIR

SESI JUN 2015

EP302: TELEPHONY

TARIKH : 27 OKTOBER 2015

MASA : 2.30 PM – 4.30 PM (2 JAM)

Kertas ini mengandungi **SEPULUH (16)** halaman bercetak.

Bahagian A: Objektif (20 soalan)

Bahagian B: Struktur (10 soalan)

Bahagian C: Esei (2 soalan)

Dokumen sokongan yang disertakan : Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT