

SULIT



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

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI JUN 2016

DET1013: ELECTRICAL TECHNOLOGY

TARIKH : 22 OKTOBER 2016 (SABTU)

MASA : 2.30 PM – 4.30 PM (2 JAM)

Kertas ini mengandungi **TIGA BELAS (13)** halaman bercetak.

Bahagian A : Objektif (10 soalan)

Bahagian B : Subjektif (4 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

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. State the unit of electric current.

Nyatakan unit bagi arus elektrik.

- A. Joule
- B. Watt
- C. Volt
- D. Ampere

CLO1
C2

2. Refer to the series circuit in Figure A1, find the voltage drop at resistor R3.

Merujuk kepada litar sesiri dalam Rajah A1, dapatkan nilai voltan pada perintang R3.

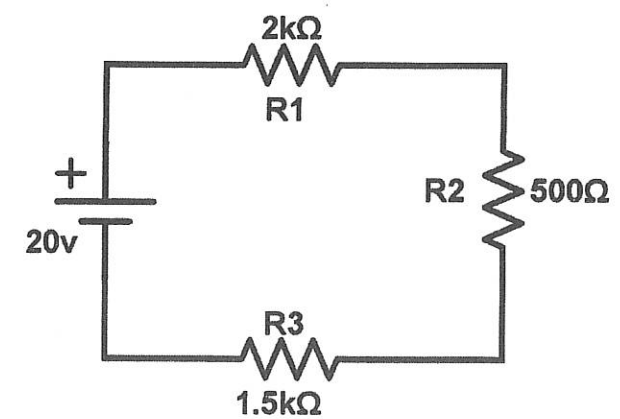


Figure A1 / Rajah A1

- A. 10 V
- B. 2.5 V
- C. 20 V
- D. 7.5 V

CLO1
C1

3. 'The sum of currents entering a junction of a network must equal the sum of the current leaving the same junction.'

The statement above refers to :

'Jumlah arus memasuki simpang dalam suatu rangkaian adalah bersamaan dengan jumlah arus yg keluar dari simpang yang sama'

Pernyataan di atas merujuk kepada:

- A. Ohm's Law
- B. Ohm's Current Law
- C. Kirchoff's Current Law
- D. Kirchoff's Voltage Law

CLO2
C2

4. Based on the circuit given at Figure A2, by using Kirchoff Voltage Law (KVL), calculate the suitable value for E1.

Berdasarkan litar pada Rajah A2, dengan menggunakan Hukum Kirchoff Voltan (HKV), kirakan nilai yang sesuai untuk E1.

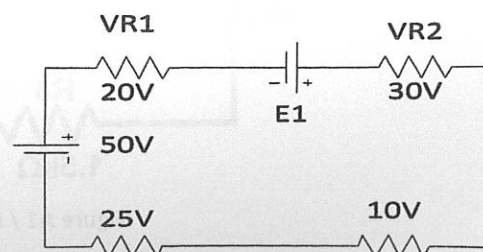


Figure A2/Rajah A2

- A. 45 KV
- B. 35 KV
- C. 35V
- D. 45V

CLO1
C2

5. Calculate the current through load resistor, I_{RL} , if the Thevenin's voltage, $V_{TH} = 25V$, Thevenin's resistance, $R_{TH} = 15.55\Omega$ and load resistance, $R_L = 150\Omega$.

Kirakan arus yang mengalir pada rintangan beban, I_{RL} , jika voltan Thevenin, $V_{TH} = 25V$, rintangan Thevenin, $R_{TH} = 15.55\Omega$ dan rintangan beban, $R_L = 150\Omega$.

- A. 0.151mA
- B. 1.5101mA
- C. 15.101mA
- D. 151.01mA

CLO1
C1

6. The material between two plates of capacitor is known as....

Bahan antara dua plat kapasitor dinamakan sebagai...

- A. Konduktor
Pengalir
- B. Dielectric
Dielektrik
- C. Insulator
Penebat
- D. Inductor
Pearuh

CLO1
C2

7. Based on Figure A3, the value of equivalent capacitance, C_{total} is $0.08 \mu F$. Determine the value of Capacitance, $C2$

Berdasarkan Rajah A3, nilai kemuatan setara, C_{total} adalah $0.08 \mu F$. Tentukan nilai Kemuatan, $C2$

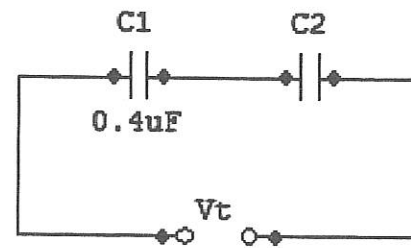


Figure A3/ Rajah A3

- A. $0.02 \mu F$
 B. $0.10 \mu F$
 C. $0.15 \mu F$
 D. $0.25 \mu F$

CLO1
C1

8. A 100 mH inductor is in parallel with 150 mH and 120 mH inductor. How much is the Total Inductance of the inductor, L_{total} ?

Induktor 100 mH disambung selari dengan 150 mH dan 120 mH pearuh. Berapakah Jumlah Kearuhan bagi pearuh, L_{total} ?

- A. 40 mH
 B. 80 mH
 C. 370 mH
 D. 400 mH

CLO1
C2

9. For a wire wound core, an increase in current through the coil will

Bagi satu teras belitan wayar, peningkatan arus melalui gelung akan

- A. reverse the flux lines
membalikkan garisan fluks
 B. decrease the flux density
mengurangkan ketumpatan fluks
 C. increase the flux density
meningkatkan ketumpatan fluks
 D. causes no change in flux density
menyebabkan tiada perubahan ketumpatan fluks

CLO2
C2

10. A coil with 200 mA of current has an mmf of 80 DC . Determine number of turns of the coil.

Satu gegelung dengan 200 mA arus mempunyai mmf 80 AT . Tentukan bilangan lilitan gegelung.

- A. 4000 turns.
 4000 lilitan
 B. 400 turns
 400 lilitan
 C. 40 turns.
 40 lilitan
 D. 16 turns.
 16 lilitan

SECTION B : 60 MARKS
BAHAGIAN B : 60 MARKAH

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

CLO1
C1

- (a) List **THREE (3)** advantages of secondary cell.

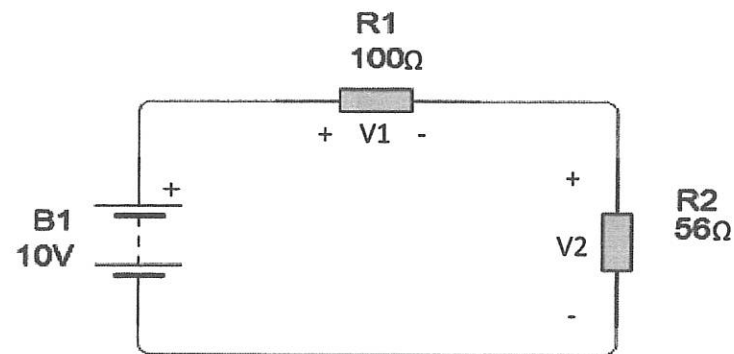
Senaraikan TIGA (3) kebaikan sel sekunder.

[3 marks]
[3 markah]

CLO1
C2

- (b) By applying Voltage Divider Law, calculate the voltage drop through each resistor in the circuit below.

Dengan menggunakan Hukum Pembahagi Voltan, kirakan susut voltan pada setiap perintang di dalam litar di bawah.

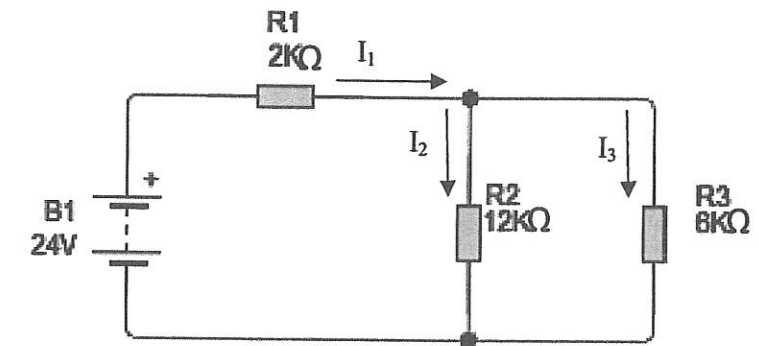


[5 marks]
[5 markah]

CLO2
C3

- (c) Calculate the total resistance and current through each resistor by referring to the circuit below.

Kirakan jumlah rintangan dan arus yang melalui setiap perintang pada rajah di bawah



[7 marks]
[7 markah]

QUESTION 2

SOALAN 2

CLO1
C1

- (a) Define Superposition Theorem.

Definisikan Teorem Tindihan.

[3 marks]
[3 markah]

CLO1
C2

- (b) Calculate the maximum power transfer of the basic Thevenin equivalent circuit is

$$V_{TH} = 12V \text{ and } R_{TH} = 3.6\Omega.$$

Kirakan pemindahan kuasa maksimum bagi litar asas setara Thevenin adalah $V_{TH} = 12V$ dan $R_{TH} = 3.6\Omega$.

[5 marks]
[5 markah]

- CLO2 C3 (c) Referring to Figure B2(c), calculate the value of current I_1 , I_2 and I_3 using Kirchoff's Voltage Law and Kirchoff's Current Law methods.

Merujuk Rajah B2(c), kirakan nilai arus I_1 , I_2 dan I_3 menggunakan kaedah Hukum Kirchoff Voltan dan Hukum Kirchoff Arus.

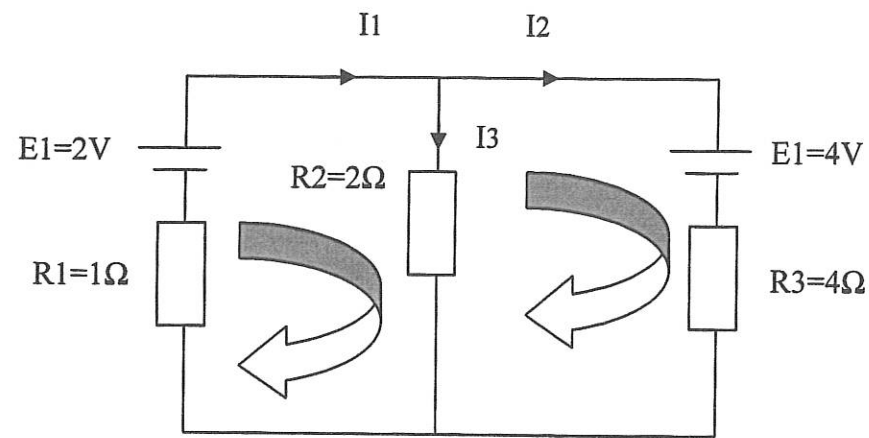


Figure B2 (c) / Rajah B2 (c)

[7 marks]
[7 markah]

QUESTION 3

SOALAN 3

- CLO1 C2 (a) Referring to Figure B3 (a1) and B3(a2), determine the formula of total inductance.

Merujuk kepada Rajah B3(a1) dan B3(a2), senaraikan formula bagi jumlah kearuhan (L_T)

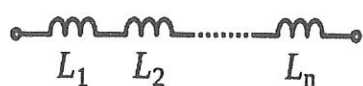


Figure B3(a1) / Rajah B3(a1)

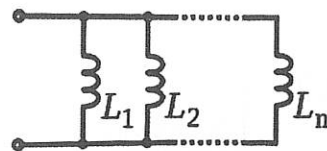


Figure B3(a2) / Rajah B3(a2)

[3 marks]
[3 markah]

- CLO1 C3 (b) By referring to the Figure B3(b), calculate total inductance (L_T) of the circuit between point A and B.

Merujuk Rajah B3(b), kirakan jumlah kearuhan (L_T) antara titik A dan B

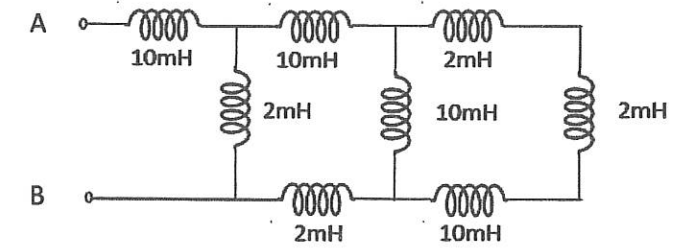


Figure B3(b) / Rajah B3(b)

[6 marks]
[6 marks]

- CLO2 C3 (c) A coil of inductance 20mH and a resistance 10 Ω is connected to a 9V supply. Determine :

Sebuah pearuh 20mH dan perintang 10Ω disambungkan pada bekalan 9V. Tentukan:

- i) The time constant (τ)
Pemalar masa (τ)
- ii) The value of current after 5 ms
Nilai arus selepas masa mencapai 5 ms
- iii) Energy stored in the inductor
Tenaga disimpan dalam induktor

[2 marks]
[2 markah]

[2 marks]
[2 markah]

[2 marks]
[2 markah]

QUESTION 4

SOALAN 4

CLO1
C1

- (a) State
- THREE (3)**
- characteristics of magnetic field / flux lines.

Nyatakan TIGA (3) ciri medan magnet/garisan fluks[3 marks]
[3 markah]CLO1
C2

- (b) A current of 5A is passed through a 1000-turn coil wound on a circular magnetic circuit of radius 120 mm. Calculate the Magnetomotive Force,
- F_m
- and Magnetic Field Strength,
- H
- .

Arus 5A melalui 1000 lilitan gegelung dalam litar magnet bulatan yang berjejari 120 mm. Hitung Daya Gerak Magnet, F_m dan Kekuatan Medan Magnet, H .[5 marks]
[5markah]CLO2
C3

- (c) With a suitable diagram, Describe briefly
- THREE (3)**
- methods to determine direction of magnetic field.

Dengan gambarajah yang sesuai, terangkan TIGA (3) kaedah untuk menentukan arah medan magnet[7 marks]
[7 markah]

SECTION C : 30 MARKS

BAHAGIAN C : 30 MARKAH

INSTRUCTION:

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

ARAHAN:

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

QUESTION 1

SOALAN 1

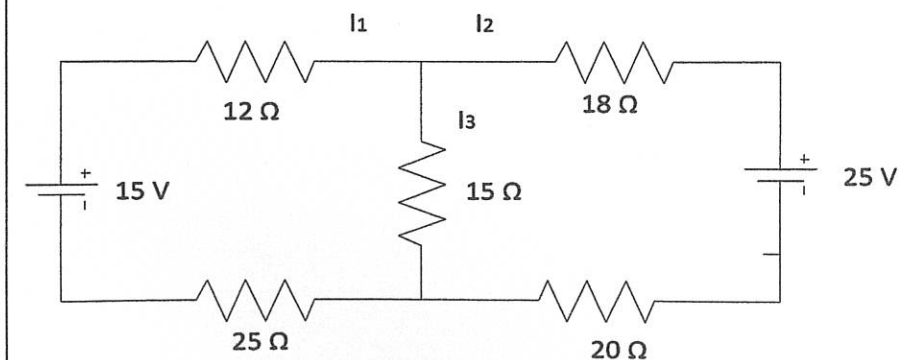
CLO2
C3Unknown current or voltage in DC circuit can be solved by various method such as Kirchoff, Thevenin's Theorem , Norton's Theorem or Superposition Theorem. Given a circuit below, by using Kirchoff Law solve the unknown current I_1 , I_2 and I_3 .*Ketidaktahuan arus atau voltan dalam litar AT boleh diselesaikan dengan menggunakan pelbagai kaedah seperti Hukum Kirchoff, Teorem Thevenin, Teorem Norton atau Teorem Tindihan. Untuk litar yang diberi di bawah, kirakan nilai I_1 , I_2 dan I_3 dengan menggunakan Hukum Kirchoff.*

Figure C1 / Rajah C1

[15 marks]
[15 markah]

QUESTION 2

SOALAN 2

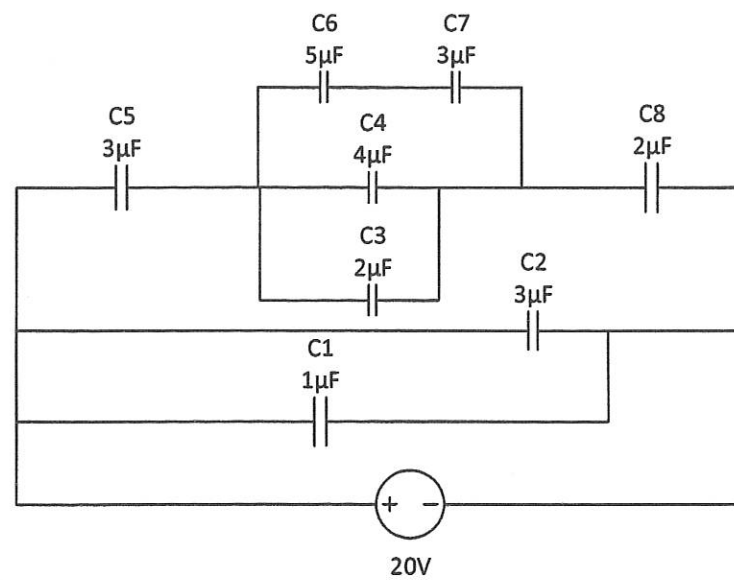
CLO3
C3Based on Figure C2 find the voltage across the capacitor C_8 .Berdasarkan kepada Rajah C2, dapatkan nilai voltan merentangi kapasitor C_8 .

Figure C2 / Rajah C2

[15 marks]
[15 markah]

SOALAN TAMAT