

**SULIT**



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

**JABATAN KEJURUTERAAN ELEKTRIK**

**PEPERIKSAAN AKHIR**

**SESI JUN 2017**

**DET1013 : ELECTRICAL TECHNOLOGY**

**TARIKH : 01 NOVEMBER 2017**

**MASA : 11.15 PAGI - 1.15 PETANG (2 JAM)**

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

Bahagian A: Objektif (10 soalan)

Bahagian B: Struktur (4 soalan)

Bahagian C: Esei (2 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: 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. Define the basic unit of power.

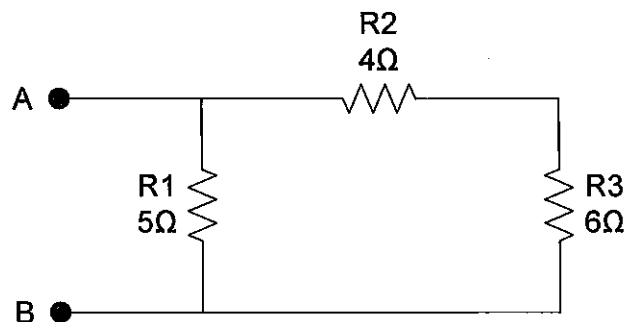
*Nyatakan unit asas bagi kuasa.*

- A. Ohm  
*Ohm*
- B. Volt  
*Volt*
- C. Watt  
*Watt*
- D. Ampere  
*Ampere*

CLO1  
C2

2. Determine the total resistance of the following circuit in **Figure A2**.

*Tentukan jumlah rintangan pada litar dalam **Rajah A2**.*



**Figure A2 / Rajah A2**

- A.  $3.33\Omega$   
 B.  $33.3\Omega$   
 C.  $0.33\Omega$   
 D.  $0.03\Omega$

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

CLO1  
C1

3.

Identify the electrical law referring to the statement above .

*Nyatakan Hukum Elektrik berdasarkan pernyataan di atas.*

- 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 Voltage*

CLO1  
C2

4. Referring to figure A4, determine the Norton equivalent circuit for this thevenin circuit.

*Merujuk kepada Rajah A4, tentukan litar Norton setara bagi litar thevenin tersebut.*

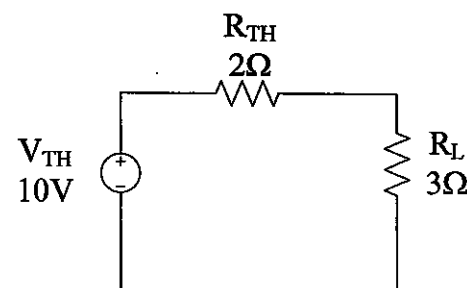
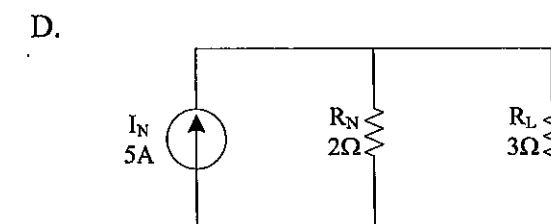
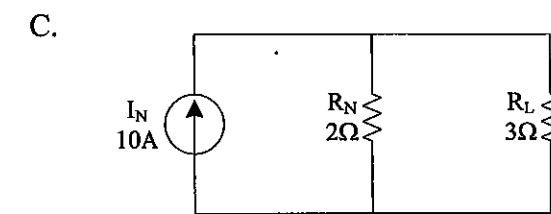
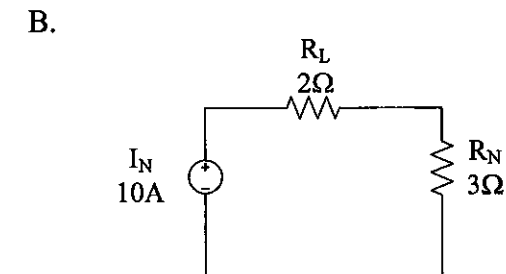
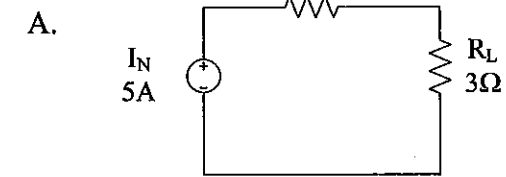


Figure A4 / Rajah A4



CLO1  
C2

5. Calculate the current through load resistor,  $I_{RL}$ , if the Thevenin's voltage,  $V_{TH} = 10V$ , Thevenin's resistance,  $R_{TH} = 15\Omega$  and load resistance,  $R_L = 100\Omega$ .

*Kirakan arus yang mengalir pada rintangan beban,  $I_{RL}$ , jika voltan Thevenin,  $V_{TH} = 10V$ , rintangan Thevenin,  $R_{TH} = 15\Omega$  rintangan beban,  $R_L = 100\Omega$ .*

- A.  $0.086mA$   
 B.  $8.696mA$   
 C.  $86.96mA$   
 D.  $869.6mA$

CLO1  
C1

6. State the material between two plates of capacitor.

*Nyatakan bahan antara dua plat kapasitor.*

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

CLO1  
C2

7. Identify the right equation for total capacitance of the following circuit in Figure A7.

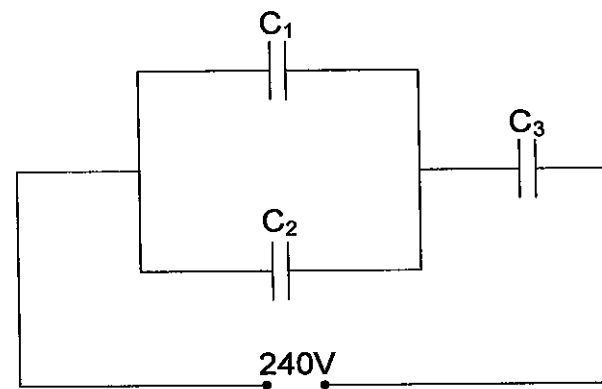
*Nyatakan persamaan yang betul bagi jumlah kapasitan pada litar dalam Rajah A7.*

Figure A7 / Rajah A7

- A.  $\frac{(C_1 + C_2)(C_3)}{C_1 + C_2 + C_3}$
- B.  $\frac{(C_1)(C_2 + C_3)}{C_1 + C_2 + C_3}$
- C.  $\frac{(C_1 + C_2) + (C_3)}{C_1 + C_2 + C_3}$
- D.  $\frac{(C_1 C_2) + C_3}{C_1 + C_2 + C_3}$

CLO1  
C18. State the formula of time constant for the inductance.  
*Nyatakan formula untuk pemalar masa bagi pearuh.*

- A.  $\tau = LR$
- B.  $\tau = L/R$
- C.  $\tau = CL$
- D.  $\tau = C/L$

CLO1  
C2

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

*Bagi satu teras belitan wayar, peningkatan arus melalui gelung akan..*

Determine the CAUSE for the statement above.  
*Nyatakan SEBAB bagi pernyataan di atas.*

- 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  
C210. A coil has 500 turns and current flow is 0.5A. Calculate the magnetomotive force,  $F_m$ .*Satu gegelung mempunyai 500 lilitan dan aliran arus ialah 0.5A. Kirakan daya gerak magnet,  $F_m$ .*

- A. 25AT
- B. 250AT
- C. 100 AT
- D. 1000AT

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

CLO1  
C1

(a) Define the characteristic of voltage and current for series circuit.

*Nyatakan ciri-ciri voltan dan arus untuk litar siri.*

[3 marks]

[3 markah]

CLO1  
C2

(b) Given total resistance in Figure B1 (b) is  $3\Omega$ . Calculate the value of resistor  $R_1$  and current through resistor  $R_1$  by using current divider rule.

*Diberi jumlah rintangan dalam Rajah B1 (b) adalah  $3\Omega$ . Kira nilai perintang  $R_1$  dan arus yang melalui perintang  $R_1$  dengan menggunakan hukum pembahagi arus.*

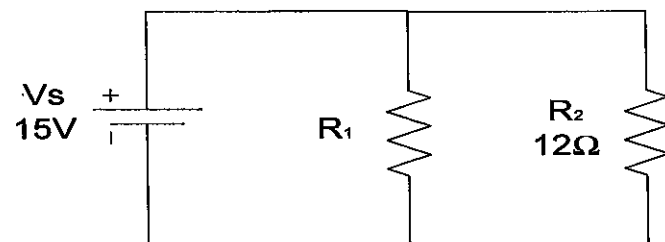


Figure B1(b) / Rajah B1(b)

[5 marks]

[5 markah]

CLO2  
C3

(c) By applying Delta to Star Transformation, calculate the Total Resistance,  $R_T$  of the circuit in Figure B1(c).

*Dengan menggunakan Transformasi Delta kepada Star, kirakan Jumlah Rintangan,  $R_T$  pada litar dalam Rajah B1(c).*

[7 marks]

[7 markah]

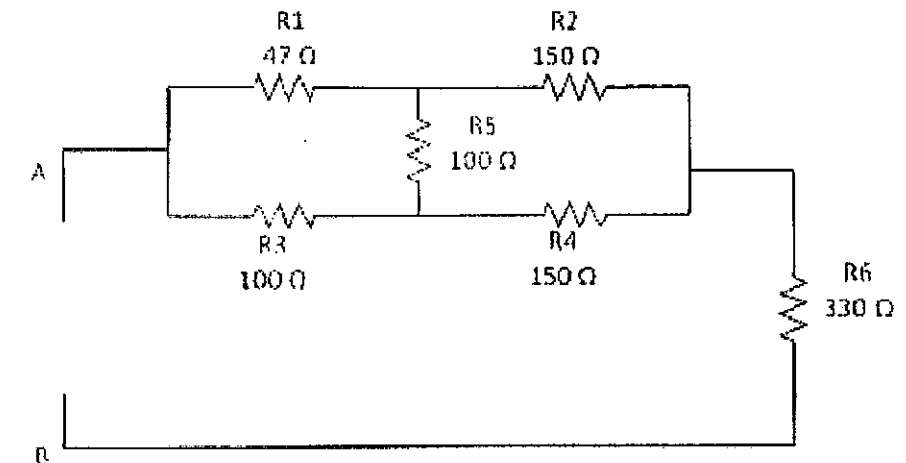


Figure B1(c) / Rajah B1(c)

QUESTION 2

SOALAN 2

CLO1  
C1

(a) Define Kirchoff's Voltage Law in circuit analysis.

*Takrifkan Hukum Voltan Kirchoff dalam analisis litar.*

[3 marks]

[3 markah]

CLO1  
C2

(b) Referring to Figure B2 (b), calculate  $I_1, I_2, I_3, I_4$  and  $I_5$  by using Kirchoff's Current Law at each node.

*Merujuk kepada Rajah B2 (b), kira  $I_1, I_2, I_3, I_4$  dan  $I_5$  menggunakan Hukum Kirchoff's Arus pada setiap nod.*

[5 marks]

[5 markah]

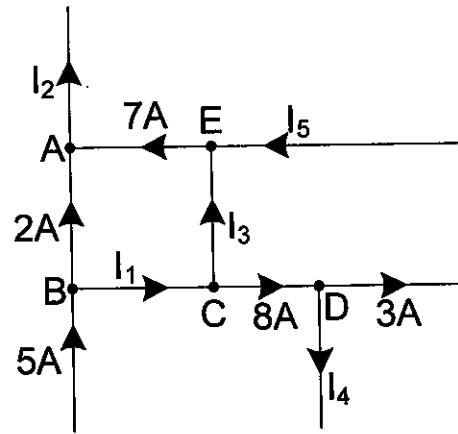


Figure B2 (b) / Rajah B2 (b)

CLO2  
C3

(c) Based on Figure B2 (c), calculate current flow through resistors  $R_1$ ,  $R_2$  and  $R_3$  using Kirchoff's Law.

Berdasarkan Rajah B2(c), kira arus yang mengalir melalui perintang  $R_1$ ,  $R_2$  dan  $R_3$  menggunakan Hukum Kirchoff's.

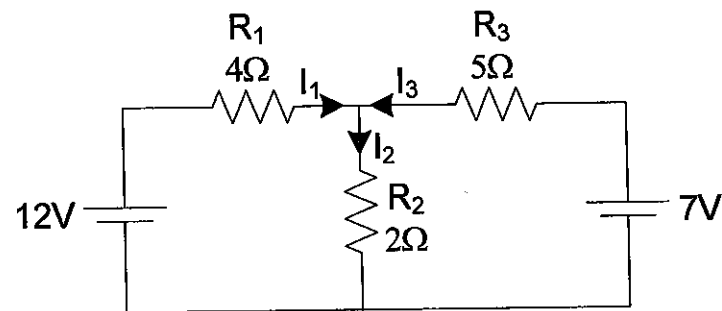


Figure B2(c) / Rajah B2(c)

[7 marks]

[7 markah]

QUESTION 3

SOALAN 3

CLO1  
C2

(a) Explain first Faraday's law by using suitable diagram.

Terangkan Hukum Faraday yang pertama dengan bantuan gambarajah yang sesuai.

[3 marks]

[3 markah]

CLO1  
C3

(b) Calculate the equivalent inductance,  $L_T$  between terminal A and B as shown in Figure B3(b).

Kirakan aruhan setara,  $L_T$  antara terminal A dan B seperti yang ditunjukkan dalam

Rajah B3(b).

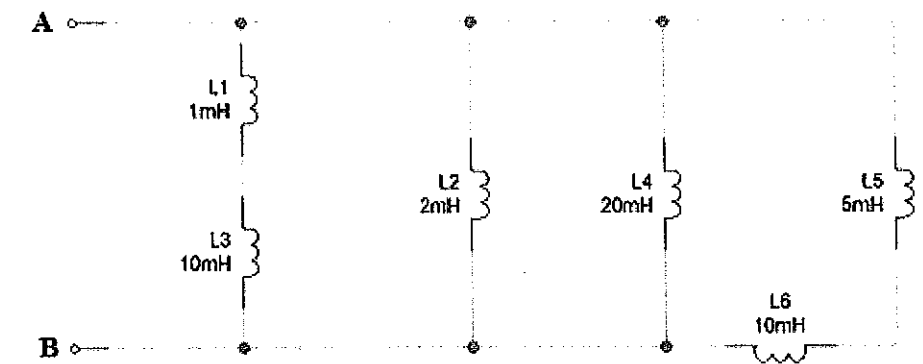


Figure B3(b) / Rajah B3(b)

[6 marks]

[6 markah]

CLO2  
C3

- (c) Referring to **Figure B3(c)**, calculate the current of inductor after the switch is closed for 25  $\mu$ s.  
 Dengan merujuk kepada **Rajah B3(c)**, kirakan arus yang melalui pearuh selepas 25  $\mu$ s suis ditutup.

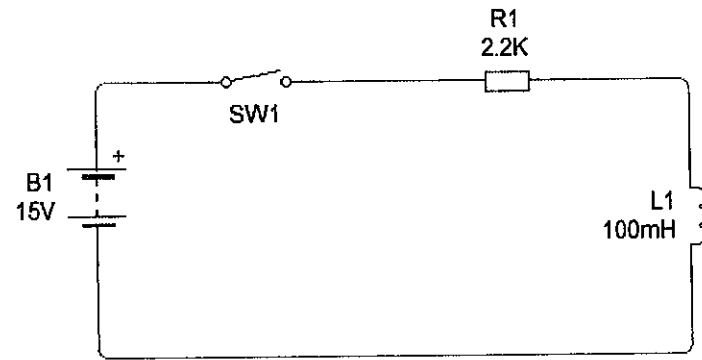


Figure B3(c) / Rajah B3(c)

[6 marks]

[6 markah]

**QUESTION 4**

**SOALAN 4**

CLO1  
C1

- (a) Define Magnetism.  
 Nyatakan Kemagnetan.

[3 marks]

[3 markah]

CLO1  
C2

- (b) Explain **TWO (2)** methods to determine magnetic field direction by using suitable diagram.  
 Nyatakan dengan bantuan gambarajah **DUA (2)** kaedah menentukan arah medan magnet.

[5 marks]

[5 markah]

CLO2  
C3

- (c) A coil has 150 turns and 1.5A current. If the length of coil is 200mm, calculate its magnetomotive force and magnetic field strength.  
 Satu gegelung mempunyai 150 lilitan dan membawa arus 1.5A. Jika panjang gegelung ialah 200mm, kirakan daya gerak magnet dan kekuatan medan magnet.

[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 **DUA (2)** soalan esei. Jawab **SEMUA** soalan .

**QUESTION 1**

**SOALAN 1**

CLO2  
C3

Calculate the current flow through 50 $\Omega$  resistor in **Figure C1** by using Superposition Theorem.

Kirakan arus yang mengalir melalui perintang 50 $\Omega$  dalam **Rajah C1** dengan menggunakan Teorem Tindihan.

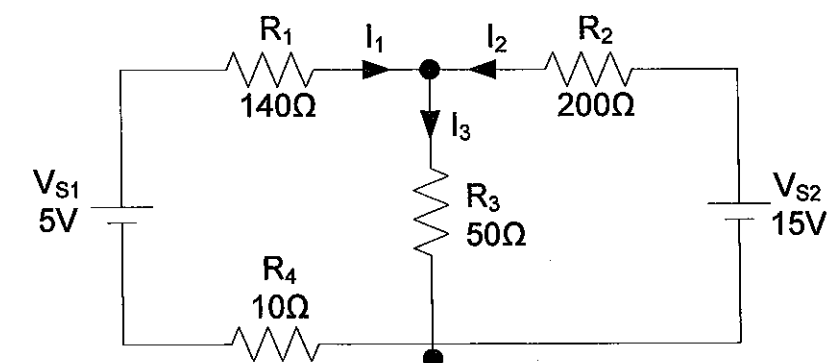


Figure C1 / Rajah C1

[15 marks]

[15 markah]

## QUESTION 2

## SOALAN 2

CLO2  
C3

Figure C2 shows a  $25\mu\text{F}$  capacitor is connected in series with a  $200\text{k}\Omega$  resistor and a  $300\text{Vdc}$  supply. When the switch is turned ON, determine the initial voltage and current across the capacitor. After that, calculate the capacitor current and voltage when the capacitor is charged for  $20\text{s}$ .

Rajah C2 menunjukkan kapasitor  $25\mu\text{F}$  disambungkan secara sesiri dengan perintang  $200\text{k}\Omega$  dan bekalan  $300\text{Vat}$ . Apabila suis dihidupkan, tentukan voltan dan arus permulaan yang merentasi kapasitor tersebut. Selepas itu, kirakan arus dan voltan bagi kapasitor apabila kapasitor discas selama  $20\text{s}$ .

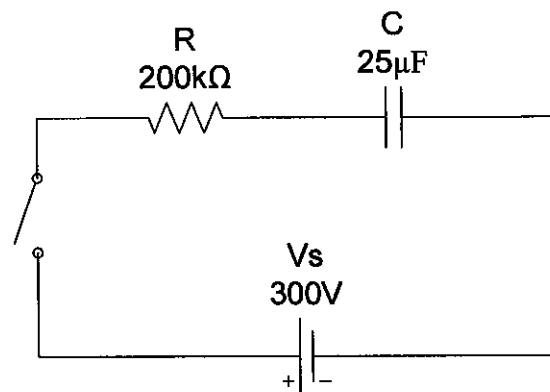


Figure C2 / Rajah C2

[15 marks]

[15 markah]

SOALAN TAMAT