

SULIT



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

JABATAN KEJURUTERAAN ELEKTRIK

PEPERIKSAAN AKHIR

SESI DISEMBER 2015

EE602 : CIRCUIT ANALYSIS

TARIKH : 10 APRIL 2016

MASA : 2.30PM – 4.30PM (2 JAM)

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

Bahagian A: Struktur (4 soalan)

Bahagian B: Esei (2 soalan)

Dokumen sokongan yang disertakan: Tiada

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIARAHKAN

(CLO yang tertera hanya sebagai rujukan)

SULIT

SECTION A : 60 MARKS

BAHAGIAN A : 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) State **THREE (3)** main steps to solve a circuit using Mesh Analysis method.
Nyatakan TIGA (3) langkah utama untuk menyelesaikan litar elektrik menggunakan kaedah Analisis Mesh.

[3 marks]

[3 markah]

CLO1
C3

- (b) Based on Figure A1(b), calculate the value of I_1 using Mesh Analysis.
Berdasarkan Rajah A1(b), dapatkan nilai I_1 menggunakan Analisis Mesh.

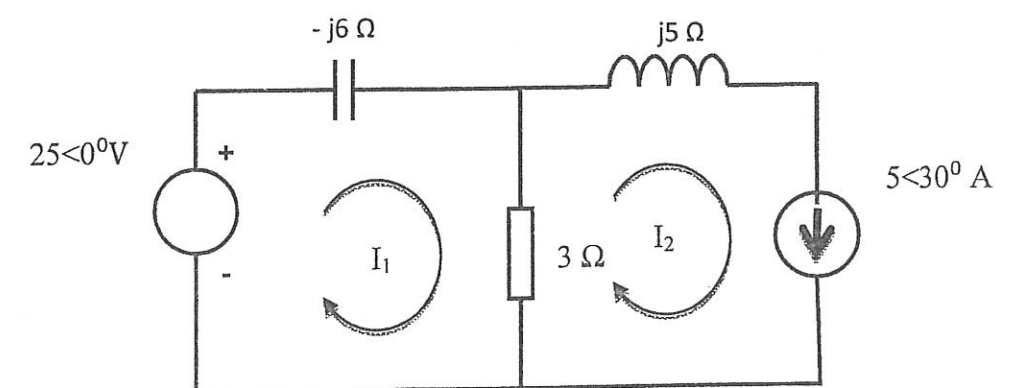


Figure A1(b)/ Rajah A1(b)

[6 marks]

[6 markah]

CLO1
C3

- (c) Refer to Figure A1(c), calculate the value of voltage V using Nodal Analysis.
 Berdasarkan Rajah A1(c), kirakan nilai voltan V dengan menggunakan Analisis Nod.

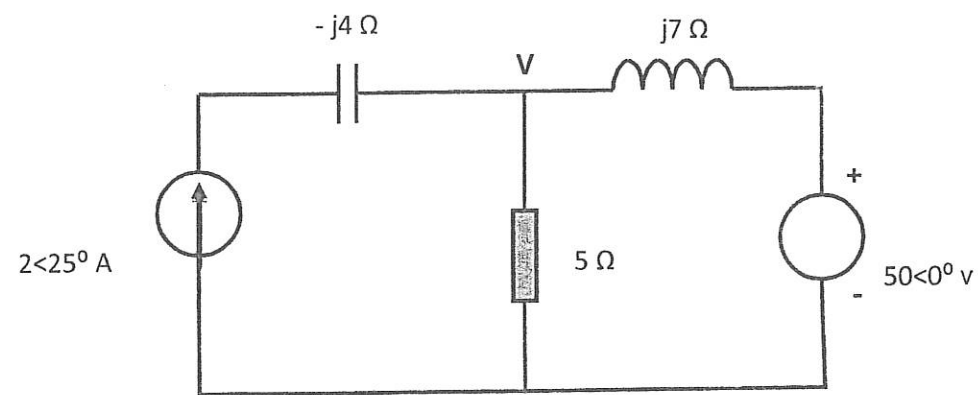


Figure A1(c)/ Rajah A1(c)

[6 marks]
[6 markah]

QUESTION 2
SOALAN 2

CLO1
C1

- a) List **FOUR (4)** important steps in analyzing a circuit using Norton's Theorem.

Senaraikan **EMPAT(4)** langkah penting untuk menganalisa litar menggunakan Teorem Norton.

[4 marks]
[4 markah]

CLO1
C2

- b) Determine the Thevenin impedance, Z_{TH} at the terminal a – b of the circuit in Figure A2(b).

Dapatkan nilai Galangan Thevenin, Z_{TH} pada terminal a – b bagi Rajah A2(b).

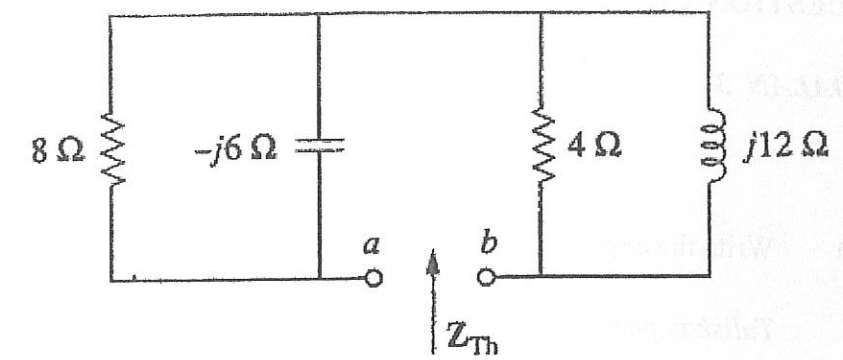


Figure A2(b)/ Rajah A2(b)

[5 marks]
[5 markah]

CLO1
C3

- c) Using Superposition Theorem, calculate the current I when $10∠0°$ V source acting alone in the circuit in Figure A2(c).

Dengan menggunakan Teorem Tindihan, kirakan arus I apabila sumber $10∠0°$ V aktif dalam Rajah A2(c).

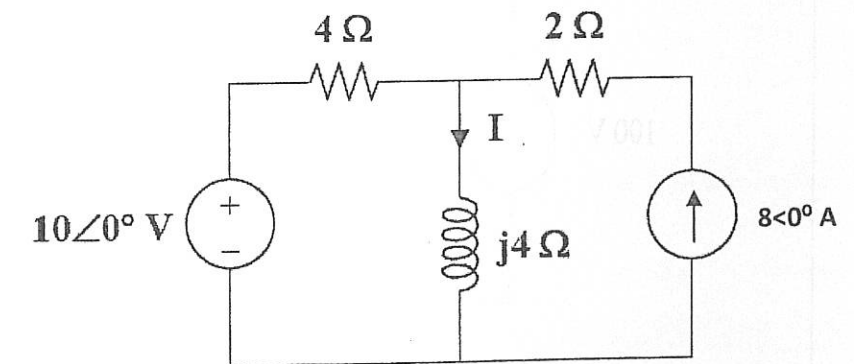


Figure A2(c) /Rajah A2(c)

[6 marks]
[6 markah]

QUESTION 3

SOALAN 3

CLO3
C2

- (a) Write the expression for the instantaneous voltage for a series RLC circuit.

Tuliskan persamaan voltan seketika bagi litar siri RLC.

[3 marks]

[3 markah]

CLO3
C3

- (b) Redraw the circuit in Figure A3(b) in s-domain.

Lukis semula litar dalam Rajah A3(b) dalam domain-s.

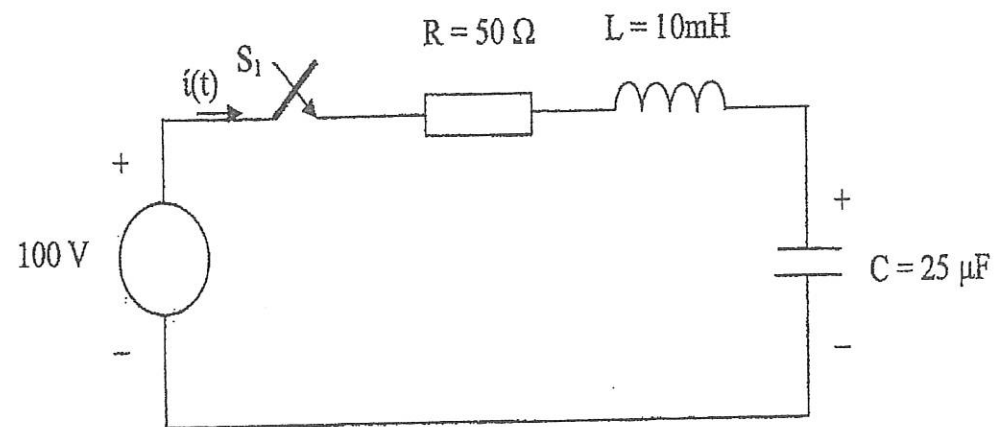


Figure A3(b) /Rajah A3(b)

[5 marks]

[5 markah]

CLO3
C4

- (c) Analyze the circuit in Figure A3(c) and then solve for the steady state current $i(t)$.

Analisa litar pada Rajah A3(c) dan selesaikan keadaan mantap bagi arus $i(t)$.

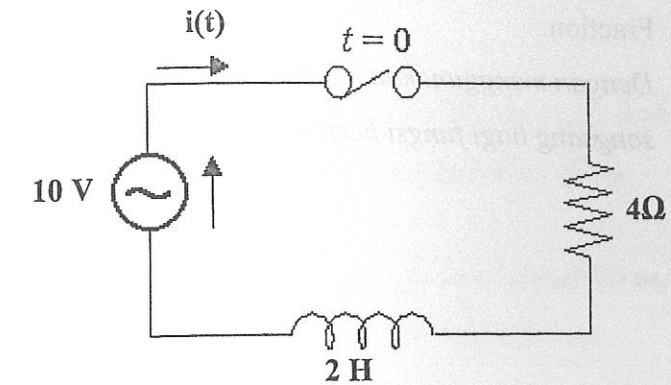


Figure A3(c) /Rajah A3(c)

[7 marks]
[7 markah]

QUESTION 4

SOALAN 4

CLO2
C1

- (a) State the expression for the constant coefficient a_n of the Trigonometric Fourier Series.

Nyatakan pekali pemalar a_n bagi Siri Fourier trigonometri.

[3 marks]

[3 markah]

CLO2
C2

- (b) Solve the Laplace transforms of the function $h(t)$ using Laplace Transform table.

Dapatkan Jelmaan Laplace bagi fungsi $h(t)$ dengan menggunakan Jadual Jelmaan Laplace.

$$h(t) = 3 \sinh 2t - 8 + 2 \cos 6t$$

[6 marks]

[6 markah]

CLO2
C2

- (c) Find the inverse Laplace transform of the following function using Partial Fraction.

Dengan menggunakan kaedah Pecahan Separa, dapatkan Jelmaan Laplace songsang bagi fungsi berikut.

$$F(s) = \frac{2}{s(s-5)}$$

[6 marks]

[6 markah]

SECTION B: 40 MARKS

BAHAGIAN B: 40 MARKAH

INSTRUCTION:

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

ARAHAN:

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

CLO2
C3

QUESTION 1

SOALAN 1

By using Laplace Transform, determine the time domain $y(t)$ for the given function.

Dengan menggunakan kaedah Jelmaan Laplace, dapatkan domain masa $y(t)$ bagi fungsi yang berikut.

$$y'' - 3y' + 2y = 4e^{3t} \text{ when } y(0) = 0 \text{ and } y'(0) = 5$$

[20 marks]

[20 markah]

CLO3
C4

QUESTION 2

SOALAN 2

State the trigonometric Fourier series expression for $f(t)$, a_0 , a_n , b_n and referring to Figure B2, identify the function of $f(t)$ and calculate the value of a_0 .

Nyatakan persamaan asas bagi Siri Fourier Trigonometri untuk $f(t)$ a_0 , a_n , b_n , dan merujuk kepada Rajah B2, kenalpasti fungsi $f(t)$ dan kira nilai a_0 .

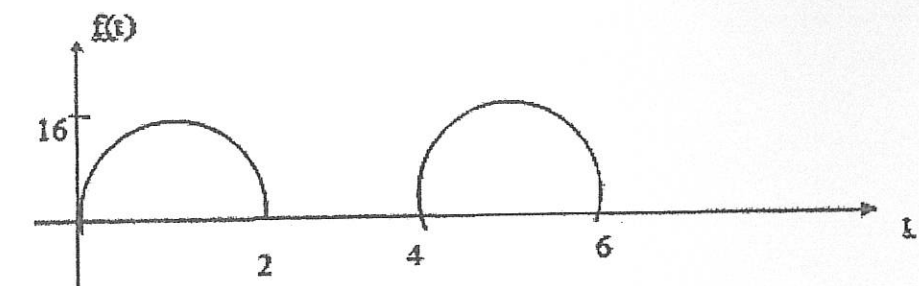


Figure B2/ Rajah B2

[20 marks]

[20 markah]

SOALAN TAMAT