



**KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION**

COURSE NAME : CIRCUIT THEORY
COURSE CODE : DKE 1053
EXAMINATION : JUNE 2022
DURATION : 2 HOURS 30 MINUTES

**INSTRUCTION TO CANDIDATES/
ARAHAN KEPADA CALON**

1. This examination paper consists of **SIX (6)** questions. /
Kertas soalan ini mengandungi ENAM (6) soalan.
2. Students are allowed to refer to resources such as lecture notes, books, internet or any other relevant resources. /
Pelajar dibenarkan merujuk kepada sumber seperti nota kuliah, buku, internet atau mana-mana sumber yang berkaitan.
3. Answer ALL questions in the answer sheet which is A4 size paper (or other paper with the consent of the relevant lecturer). /
Jawab SEMUA soalan di dalam kertas jawapan iaitu kertas bersaiz A4 (atau lain-lain kertas dengan persetujuan pensyarah berkaitan).
4. Write your details as follows in the upper left corner for each answer sheet: /
Tulis butiran anda sepertimana berikut di penjuru atas kiri bagi setiap kertas jawapan:
 - i. Student Full Name. / *Nama Penuh Pelajar.*
 - ii. Identification Card (I/C) No. / *No. Kad Pengenalan.*
 - iii. Class Section. / *Seksyen Kelas.*
 - iv. Course Code. / *Kod Kursus.*
 - v. Course Name. / *Nama Kursus.*
 - vi. Lecturer Name. / *Nama Pensyarah.*
5. Each answer sheet must have a page number written at the bottom right corner. /
Setiap helai kertas jawapan mesti ditulis nombor muka surat di penjuru bawah kanan.
6. Answer should be handwritten, neat and clear. /
Jawapan hendaklah ditulis tangan, kemas dan jelas.

**DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO /
JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU**

This examination paper consists of 7 printed pages including front page
Kertas soalan ini mengandungi 7 halaman bercetak termasuk muka hadapan

This examination paper consists of **SIX (6)** questions. Answer **ALL** the questions in an answer booklet.

*Kertas soalan ini mengandungi **ENAM (6)** soalan. Jawab **SEMUA** soalan dalam buku jawapan.*

QUESTION 1/ SOALAN 1

Given the daily use of energy as follows:

Two (2) 1200 W air conditioners for 10 hours 35 minutes.

Two (2) 250 W LCD television for 8 hours 45 minutes.

One (1) 480 W iron for 20 minutes.

One (1) 680 W washing machines for 2 hours 30 minutes.

Calculate the total cost of electricity for 30 days at RM 0.25 per kilowatthour.

(12 marks/ markah)

Diberi penggunaan tenaga harian seperti berikut:

Dua (2) 1200 W penghawa dingin untuk 10 jam 35 minit.

Dua (2) 250 W televisyen LCD untuk 8 jam 45 minit.

Satu (1) 480 W seterika untuk 20 minit.

Satu (1) 680 W mesin basuh untuk 2 jam 30 minit.

Kirakan jumlah kos elektrik untuk 30 hari pada kadar RM 0.25 per kilowattjam.

QUESTION 2/ SOALAN 2

Based on **Figure 2**, determine the following values:

- the resistance viewed from the voltage supply.
- supply current, I_s .
- voltage, V_B using voltage divider rule.
- voltage, V_{AB} using Kirchhoff's voltage law.
- current, I_3 using current divider rule.
- current, I_1 using Kirchhoff's current law.

(20 marks / markah)

Berdasarkan kepada **Rajah 2**, tentukan nilai berikut:

- rintangan jumlah dilihat dari bekalan voltan.
- arus bekalan, I_s .
- voltan, V_B menggunakan aturan pembahagi voltan.
- voltan, V_{AB} menggunakan hukum voltan Kirchhoff.
- arus, I_3 menggunakan aturan pembahagi arus.
- arus, I_1 menggunakan hukum arus Kirchhoff.

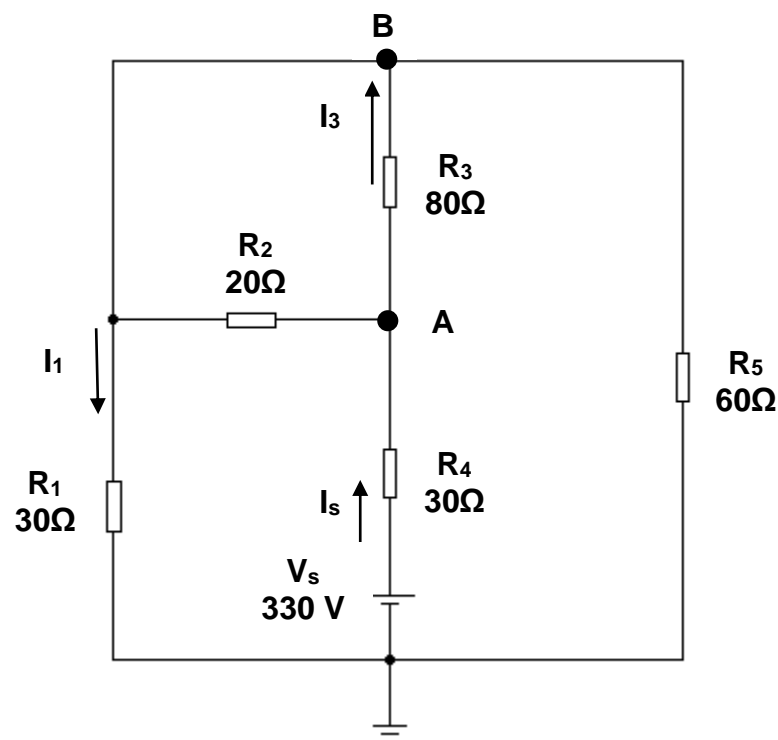


Figure 2 / Rajah 2

QUESTION 3/ SOALAN 3

Based on **Figure 3**, looking from terminal A-B,

- Calculate the Norton's equivalent resistance, R_N .
- Determine the Norton's equivalent current, I_N using superposition theorem.
- Draw the Norton's equivalent circuit.
- Calculate the voltage, V_O across the load resistor, R_L .

(18 marks / markah)

Berdasarkan kepada **Rajah 3**, dilihat dari terminal A-B,

- Kirakan rintangan setara Norton, R_N .
- Tentukan arus setara Norton, I_N dengan menggunakan teorem tindihan.
- Lukiskan litar setara Norton.
- Kirakan voltan, V_O melintang resistor beban R_L .

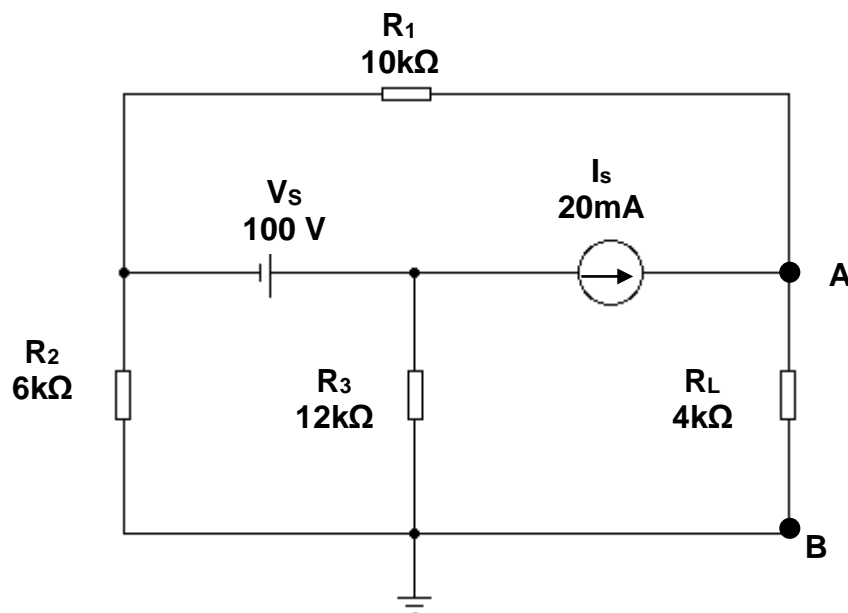


Figure 3 / Rajah 3

QUESTION 4/ SOALAN 4

Given the following sinusoidal wave equations:

$$v_1(t) = 60 \sin (523t + 70^\circ) \text{ V}$$

$$v_2(t) = 120 \sin (523t - 30^\circ) \text{ V}$$

- a) For $v_1(t)$, determine:
 - i) peak value.
 - ii) angular velocity.
 - iii) frequency.
 - iv) period.
 - v) phase angle in radian and millisecond.
 - vi) instantaneous value at $t = 2.0 \text{ ms}$.
- b) Sketch the sinusoidal waveform of $V_1(t)$ and $V_2(t)$ for one cycle on the same axis.
- c) Sketch the phasor diagram for both waveforms on the same axis.
- d) Determine the phase relationship between $V_1(t)$ and $V_2(t)$.

(20 marks/ markah)

Diberi persamaan gelombang sinus berikut:

$$v_1(t) = 60 \sin (523t + 70^\circ) \text{ V}$$

$$v_2(t) = 120 \sin (523t - 30^\circ) \text{ V}$$

- a) *Untuk $v_1(t)$, tentukan:*
 - i) *nilai puncak.*
 - ii) *halaju sudut.*
 - iii) *frekuensi.*
 - iv) *tempoh.*
 - v) *sudut fasa dalam radian dan milisaat.*
 - vi) *Nilai ketika pada $t = 2.0 \text{ ms}$.*
- b) *Lakarkan gelombang sinus bagi $V_1(t)$ dan $V_2(t)$ untuk satu kitar di atas paksi yang sama.*
- c) *Lakarkan gambar rajah pemfasa bagi kedua-dua gelombang di atas paksi yang sama.*
- d) *Tentukan hubungan fasa di antara $V_1(t)$ dan $V_2(t)$.*

QUESTION 5/ SOALAN 5

Determine the voltage I_o in the circuit of **Figure 5** using nodal analysis.

(18 marks/ *markah*)

Tentukan voltan I_o dalam litar **Rajah 5** menggunakan analisis nod.

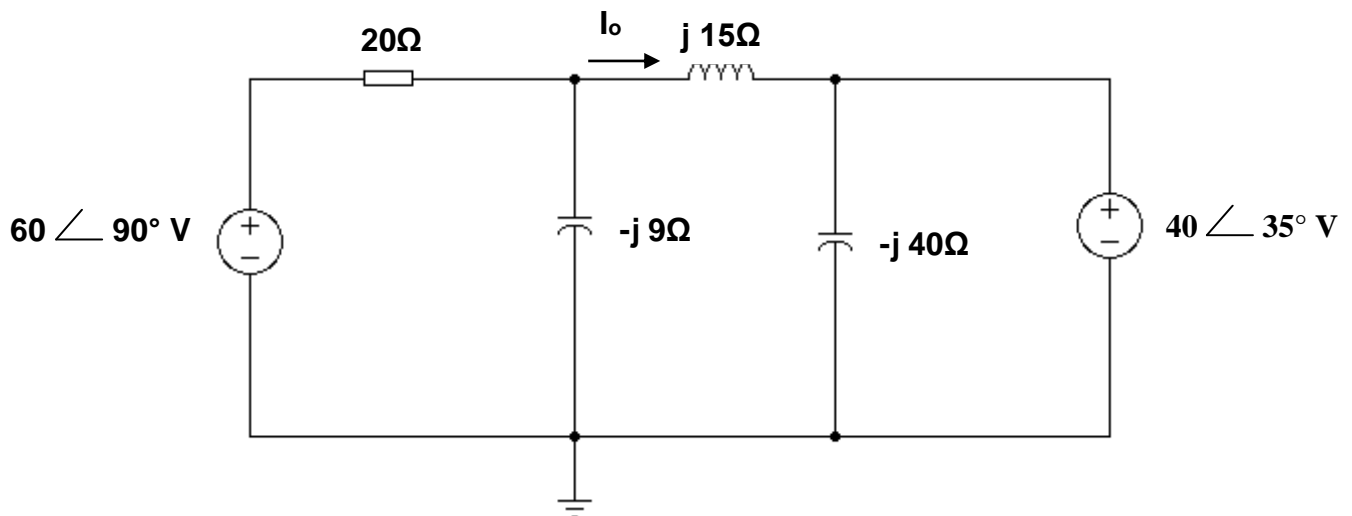


Figure 5/ *Rajah 5*

QUESTION 6/ SOALAN 6

For a load, $v(t) = 120 \cos 377t$ V and $i(t) = 6 \cos (377t - 60^\circ)$ A. Calculate:

- a) the complex power, S .
- b) the apparent power, $|S|$.
- c) the real power, P and reactive power, Q .
- d) the power factor, pf .
- e) the load impedance, Z .

(12 marks/ markah)

Untuk beban, $v(t) = 120 \cos 377t$ V and $i(t) = 6 \cos (377t - 60^\circ)$ A. Kirakan:

- a) kuasa kompleks, S .
- b) kuasa ketara, $|S|$.
- c) kuasa nyata, P dan kuasa reaktif, Q .
- d) faktor kuasa, pf .
- e) galangan beban, Z .

[100 MARKS/ MARKAH]

END OF QUESTION PAPER/ KERTAS SOALAN TAMAT