KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION

COURSE NAME	**:**	**CIRCUIT THEORY**
COURSE CODE	**:**	**DKE 1053**
EXAMINATION	**:**	**NOVEMBER 2020**
DURATION	**:**	**6 HOURS**

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:

Three (3) 171 W personal computers for 8 hours.
Five (5) 31 W bladeless fans for 10 hours.
One (1) 10 W internet modem for 24 hours.
Three (3) 7W phone charges for 5.5 hours.

Calculate the total cost of electricity for the month of March if the cost of electricity for the first 200 kWh is RM 0.218 per kWh and the subsequent kWh RM 0.303 per kWh. (Use the month of March is equals 31 days).

Diberi penggunaan tenaga harian seperti berikut:

***Tiga (3)** 171 W komputer peribadi untuk 8 jam.*
***Lima (5)** 31 W kipas tanpa bilah untuk 10 jam.*
***Satu (1)** 10 W modem internet untuk 24 jam.*
***Tiga (3)** 7 W pengecas telefon untuk 5.5 jam.*

Kirakan jumlah kos elektrik untuk bulan Mac jika kos tenaga elektrik bagi 200 kWj yang pertama adalah RM 0.218 per kWj dan kWj yang seterusnya adalah RM 0.303 per kWj. (Guna 1 bulan Mac sama dengan 31 hari).

(*12 marks/ *markah)

QUESTION 2/ *SOALAN 2*

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

a) the total resistance viewed from the voltage supply.
b) the supply current, Is.
c) the voltage, V_{AB} using voltage divider rule.
d) the voltage, V_5 using Kirchhoff's voltage law.
e) the current, I_4 using current divider rule.
f) the current, I_X using Kirchhoff's current law.

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

a) jumlah rintangan dilihat dari bekalan voltan.
b) arus bekalan, Is.
c) voltan, V_{AB} menggunakan aturan pembahagi voltan.
d) voltan, V_5 menggunakan hukum voltan Kirchhoff.
e) arus, I_4 menggunakan aturan pembahagi arus.
f) arus, I_X menggunakan hukum arus Kirchhoff.

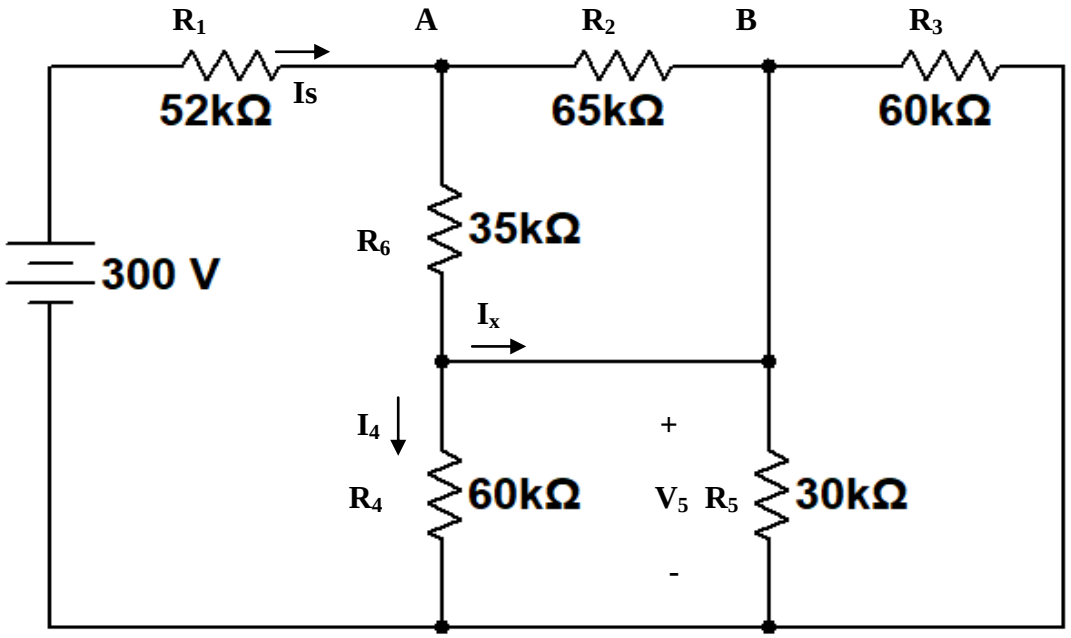

Figure 2 / *Rajah 2*

(20 marks / *markah*)

QUESTION 3/ *SOALAN 3*

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

a) Calculate the Norton's equivalent resistance, R_N.

b) Determine the Norton's equivalent current, I_N using superposition analysis.

c) Draw the Norton's equivalent circuit.

d) Calculate the current flow through the load resistor, R_L.

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

a) Kirakan rintangan setara Norton, R_N.

b) Tentukan voltan setara Norton, I_N dengan menggunakan teorem tindihan.

c) Lukiskan litar setara Norton.

d) Kirakan arus melalui perintang beban, R_L.

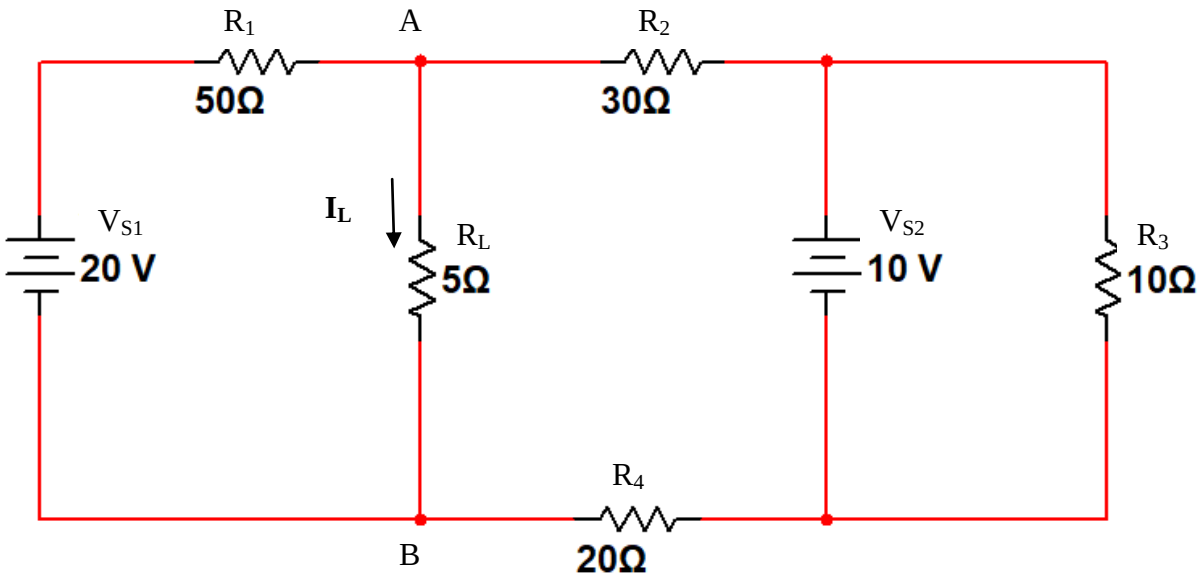

Figure 3 / *Rajah 3*

(18 marks / *markah*)

QUESTION 4/ *SOALAN 4*

Referring to **Figure 4**, given the supply voltage, $v_S(t)$ = 20 sine (200t - 70°) V.

a) Draw the phasor circuit.
b) Calculate the total impedance, Z_T and draw the impedance triangle.
c) Determine the current, I.
d) Determine the current, $i_L(t)$.
e) Determine the voltage, $v_C(t)$.
f) Sketch the phasor diagram of V_S and I. Show their phase relationship.

*Merujuk kepada **Rajah 4**, diberi voltan bekalan, $v_S(t)$ = 20 sin (200t - 70°) V.*

a) Lukis litar pemfasa.
b) Kirakan jumlah galangan, Z_T dan lukis segitiga galangan.
c) Tentukan arus, I.
d) Tentukan arus, $i_L(t)$.
e) Tentukan voltan, $v_C(t)$.
f) Lakar gambar rajah pemfasa bagi V_S dan I. Tunjuk perkaitan fasa antara keduanya.

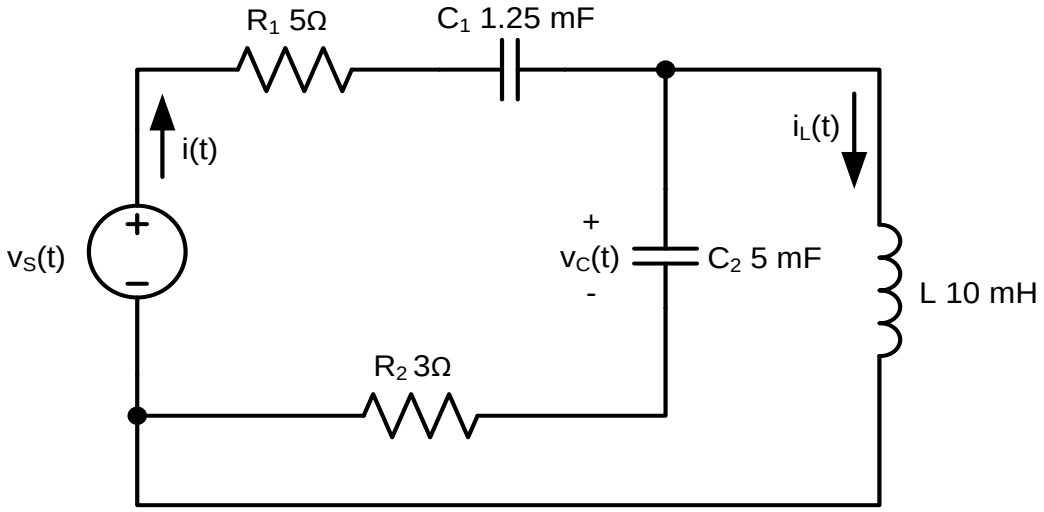

Figure 4/ *Rajah 4*

(*20 marks/ *markah)

QUESTION 5/ *SOALAN 5*

Determine the voltage $v_O(t)$ in the circuit of **Figure 5** using superposition theorem.

*Tentukan voltan $v_O(t)$ dalam litar **Rajah 5** menggunakan teorem tindihan.*

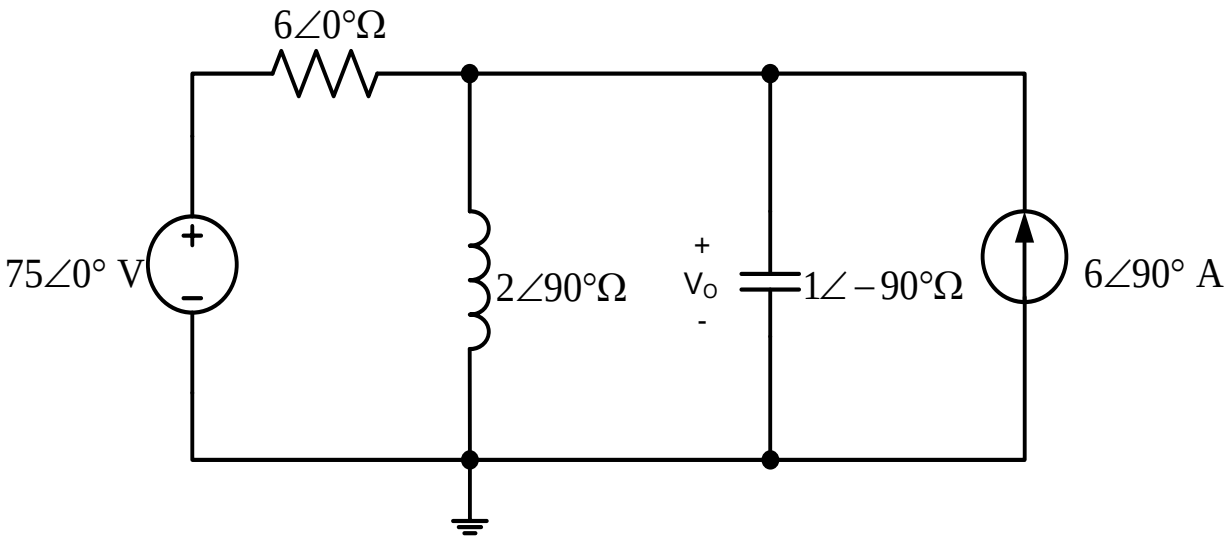

Figure 5/ *Rajah 5*

(*18 marks/ *markah)

QUESTION 6/ *SOALAN 6*

For a load, v(t) = 160 cos 377t V and i(t) = 4 cos (377t +45°) 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.

Untuk beban, v(t) = 160 cos 377t V and i(t) = 4 cos (377t +45°) A. Kirakan:

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

(*12 marks/ *markah)

[100 MARKS/ *MARKAH*]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*