



**KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION**

COURSE NAME : ELECTRONICS 1
COURSE CODE : DKE 1073
EXAMINATION : JUNE 2022
DURATION : 2 HOURS 30 MINUTES

**INSTRUCTION TO CANDIDATES/
ARAHAN KEPADA CALON**

1. This examination paper consists of **FIVE (5)** questions. /
Kertas soalan ini mengandungi LIMA (5) 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 **8** printed pages including front page
Kertas soalan ini mengandungi 8 halaman bercetak termasuk muka hadapan

This examination paper consists of **FIVE (5)** questions. Answer **ALL** the questions in an answer booklet.

Kertas soalan ini mengandungi LIMA (5) soalan. Jawab SEMUA soalan dalam buku jawapan.

QUESTION 1/ SOALAN 1

- a) Explain **three (3)** explanation why there is a potential difference across a pn-junction without any external supplies.

(3 marks/ markah)

- b) Define semiconductor and state **three (3)** the differences between conductor and insulator.

(7 marks/ markah)

- c) Determine I , V_{O1} and V_{O2} for the circuit of **Figure Q1(c)**.

(10 marks/ markah)

- a) Terangkan **tiga (3)** penerangan mengapa terdapat beza keupayaan merentasi simpang-pn tanpa sebarang bekalan luar.

- b) Berikan definisi separuh pengalir dan nyatakan **tiga (3)** perbezaan di antara pengalir dan penebat.

- c) Tentukan I , V_{O1} dan V_{O2} bagi litar pada **Rajah Q1(c)**.

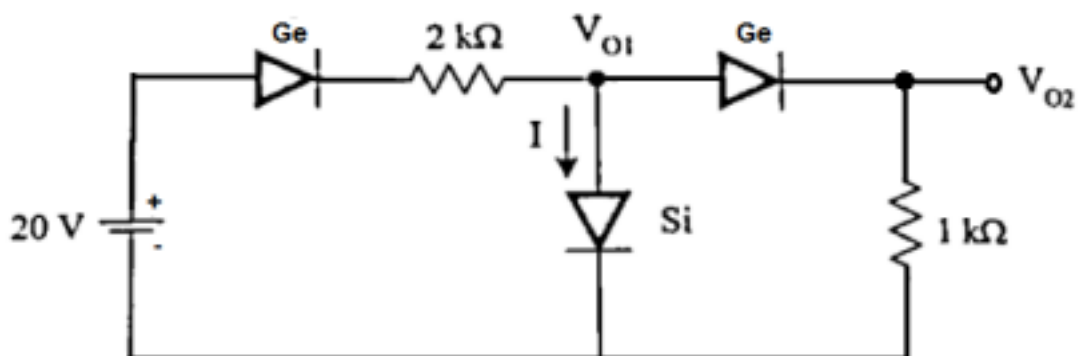


Figure Q1(c) / Rajah Q1(c)

QUESTION 2/ SOALAN 2

- a) Explain how to determine the condition of a semiconductor diode.
(6 marks/ markah)
- b) Explain the condition of the diode in **Figure Q2(b)(i)** and **Figure Q2(b)(ii)**, which is determine whether the diode is forward or reverse bias.
(4 marks/ markah)
- c) Based on **Figure Q2(c)**, sketch and label the output voltage, V_o with reference to the input, V_{in} . Show your analysis.
(10 marks/ markah)

- a) Terangkan bagaimana menentukan keadaan diod separuh pengalir.
- b) Terangkan keadaan diod dalam **Rajah Q2(b)(i)** dan **Q2(b)(ii)**, sama ada diod pincang hadapan atau pincang balikan.

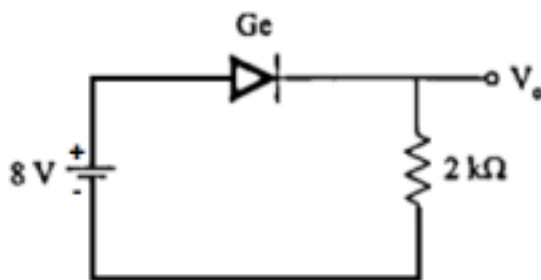


Figure Q2(b)(i) /Rajah Q2(b)(i)

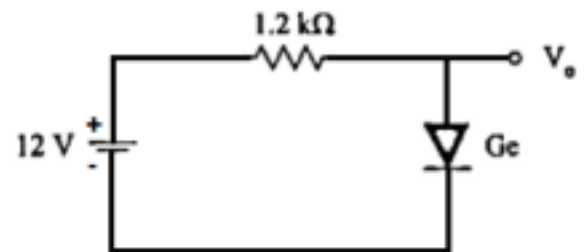


Figure Q2(b)(ii) /Rajah Q2(b)(ii)

- c) Berdasarkan **Rajah Q2(c)**, lakar dan labelkan voltan keluaran, V_o dengan merujuk kepada masukan, V_{in} . Tunjukkan analisis anda.

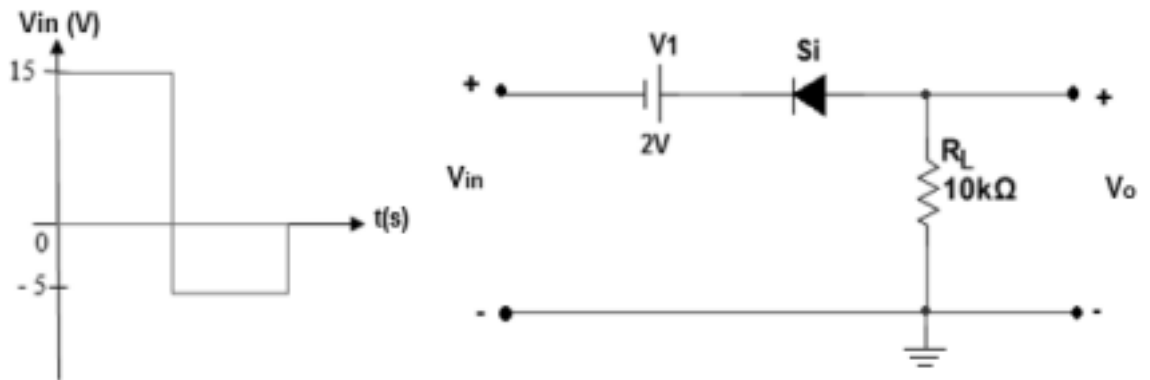


Figure Q2(c) /Rajah Q2(c)

QUESTION 3/ SOALAN 3

a) Given the information appearing in **Figure Q3(a)**, determine :

- i) base current, I_B .
- ii) base resistance, R_B .
- iii) emitter voltage, V_E .
- iv) base voltage, V_B .
- v) collector voltage, V_C .
- vi) collector-emitter voltage, V_{CE} .

(11 marks/ markah)

a) Dengan maklumat yang diberikan dalam **Rajah Q3(a)**, tentukan :

- i) arus tapak, I_B .
- ii) rintangan tapak, R_B .
- iii) voltan pemancar, V_E .
- iv) voltan tapak, V_B .
- v) voltan pemungut, V_C .
- vi) voltan pemungut-pemancar, V_{CE} .

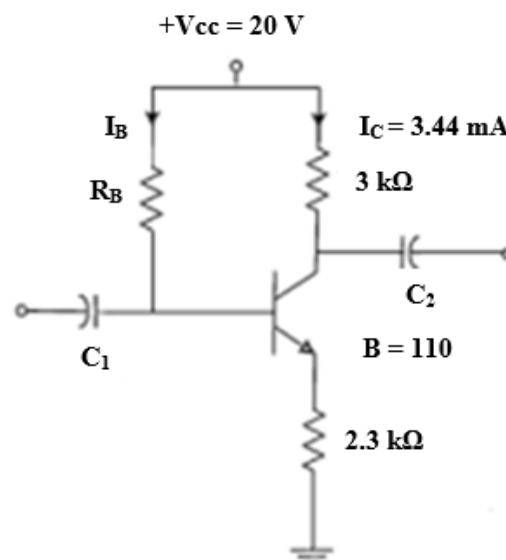


Figure Q3(a) /Rajah Q3(a)

b) Given the information appearing in **Figure Q3(b)**, determine :

- i) base current, I_B .
- ii) collector current, I_C .
- iii) collector-emitter voltage, V_{CE} .
- iv) emitter voltage, V_E .
- v) base voltage, V_B .
- vi) collector voltage, V_C .

(9 marks/ markah)

b) Dengan maklumat yang diberikan dalam litar di **Rajah Q3(b)**, tentukan :

- i) arus tapak, I_B .
- ii) arus pemungut, I_C .
- iii) voltan pemungut-pemancar, V_{CE} .
- iv) voltan pemancar, V_E .
- v) voltan tapak, V_B .
- vi) voltan pemungut, V_C .

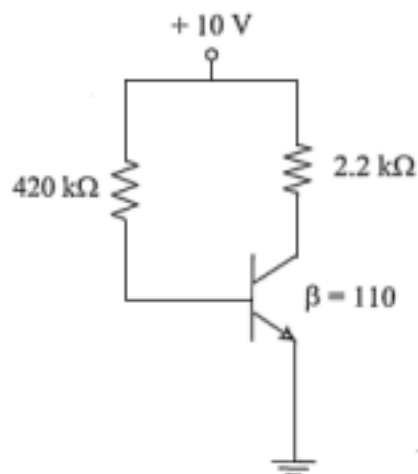


Figure Q3(b) /Rajah Q3(b)

QUESTION 4/ SOALAN 4

Based on **Figure Q4** :

- Sketch AC equivalent circuit using r_e model. Given $r_e = 6.84\Omega$, $\beta = 100$ and $A_{VNL} = -438.6$ with assume $r_o = \infty$.
- Sketch the two-port model.
- Determine A_{VL} , A_{VS} and v_o if $v_i = 17 \sin 7t$ mV using two-port method.

. (20 marks/ markah)

Merujuk kepada **Rajah Q4** :

- Lakarkan litar setara AU dengan menggunakan model r_e . Diberi $r_e = 6.84\Omega$, $\beta = 100$ dan $A_{VNL} = -438.6$ dengan menganggap $r_o = \infty$.
- Lakarkan rangkaian dua-terminal.
- Tentukan A_{VL} , A_{VS} jika $v_i = 17 \sin 7t$ mV dengan menggunakan kaedah dua-terminal.

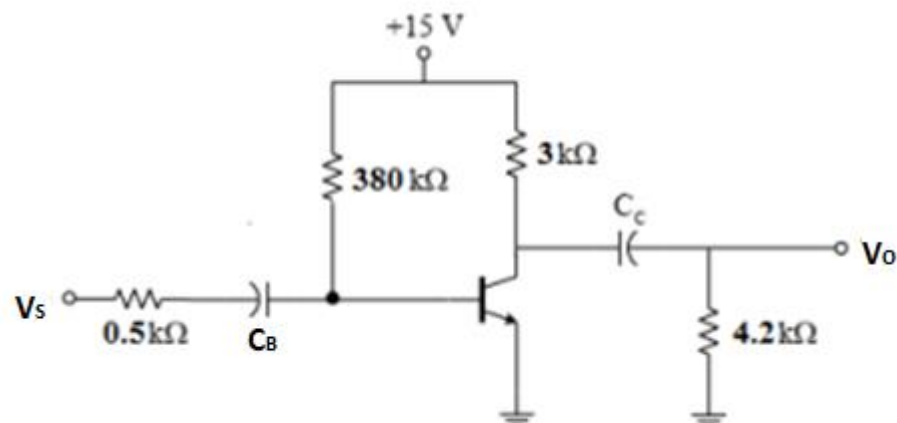


Figure Q4 /Rajah Q4

QUESTION 5/ SOALAN 5

Sketch the circuit and describe their operational principles of each semiconductor diode below by using your own word.

- i) Varactor Diode.
- ii) Photo Diode.
- iii) Light Emitting Diode (LED).
- iv) Zener Diode.

(20 marks/ markah)

Lakarkan litar dan terangkan prinsip pengoperasian bagi setiap diod semikonduktor di bawah dengan menggunakan perkataan anda sendiri.

- i) Diod Varaktor.*
- ii) Diod Foto.*
- iii) Diod Pemancar Cahaya (LED).*
- iv) Diod Zener.*

[100 MARKS/ MARKAH]

END OF QUESTION PAPER/ KERTAS SOALAN TAMAT