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**KOLEJ YAYASAN PELAJARAN JOHOR  
ONLINE FINAL EXAMINATION**

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**COURSE NAME : ELECTRONICS 2**  
**COURSE CODE : DKE 2073**  
**EXAMINATION : JUNE 2022**  
**DURATION : 2 HOURS 30 MINUTES**

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**INSTRUCTION TO CANDIDATES/  
ARAHAN KEPADA CALON**

1. This examination paper consists of **FOUR (4)** questions. /  
*Kertas soalan ini mengandungi **EMPAT (4)** soalan.*
2. 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).*
3. 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*
4. 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.*
5. Answer should be **neat and clear in handwritten form.** /  
*Jawapan hendaklah ditulis tangan, kemas dan jelas.*

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

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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 **FOUR (4)** questions. Answer **ALL** the questions in the answer sheet.

*Kertas soalan ini mengandungi EMPAT (4) soalan. Jawab SEMUA soalan di dalam kertas jawapan.*

### QUESTION 1/ SOALAN 1

- a) Referring to **Figure 1(a)**, point out  $I_{DQ}$  and  $V_{GSQ}$  using transfer curve technique. The graph is given in the **Attachment 1**.

**(15 marks/ markah)**

- b) Referring to **Figure 1(a)**, identify the values of  $V_{DS}$ ,  $V_S$ ,  $V_G$  and  $V_D$ .

**(10 marks/ markah)**

- a) Merujuk kepada **Rajah 1(a)**, tunjukkan  $I_{DQ}$  dan  $V_{GSQ}$  menggunakan teknik lengkung pindah. Graf diberi di **Lampiran 1**.

- b) Merujuk pada **Rajah 1(a)**, kenal pasti nilai  $V_{DS}$ ,  $V_S$ ,  $V_G$  dan  $V_D$ .

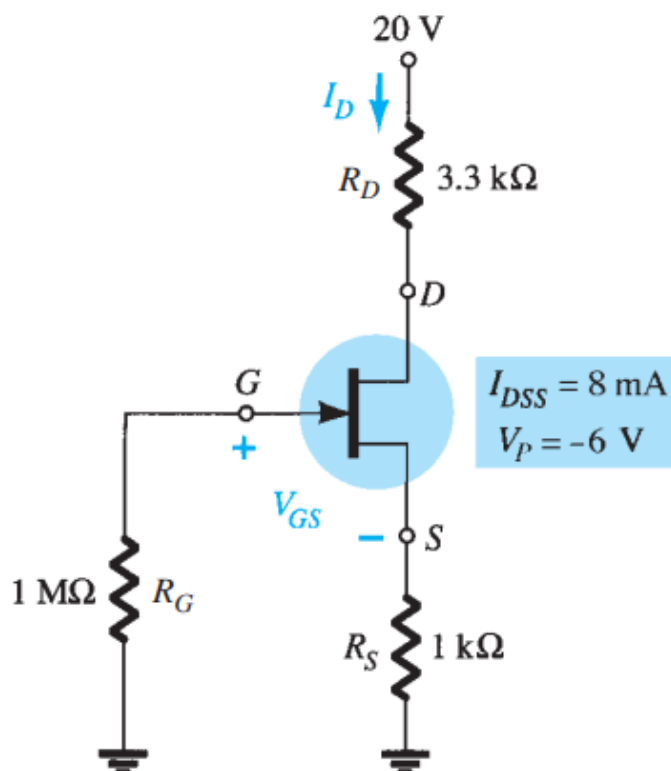


Figure 1(a) / Rajah 1(a)

## QUESTION 2/ SOALAN 2

- a) Calculate transconductance,  $g_m$  at  $V_{GS} = 0V$  for a JFET having device parameters  $I_{DSS} = 8mA$  and  $V_p = -5V$ .

(5 marks/ markah)

- b) Referring to **Figure 2(b)**, determine  $Z_i$ ,  $Z_o$ , and  $A_v$ . Given  $I_{DSS} = 6mA$ ,  $V_p = -6V$ ,  $g_{os} = 40\mu S$  and  $V_{GSQ} = -2V$ .

(20 marks/ markah)

- a) Kirakan transkonduktansi,  $g_m$  pada  $V_{GS} = 0V$  untuk JFET yang mempunyai parameter  $I_{DSS} = 8mA$  dan  $V_p = -5V$ .

- b) Merujuk kepada **Rajah 2(b)**, tentukan  $Z_i$ ,  $Z_o$ , dan  $A_v$ . Given  $I_{DSS} = 6mA$ ,  $V_p = -6V$ ,  $g_{os} = 40\mu S$  dan  $V_{GSQ} = -2V$ .

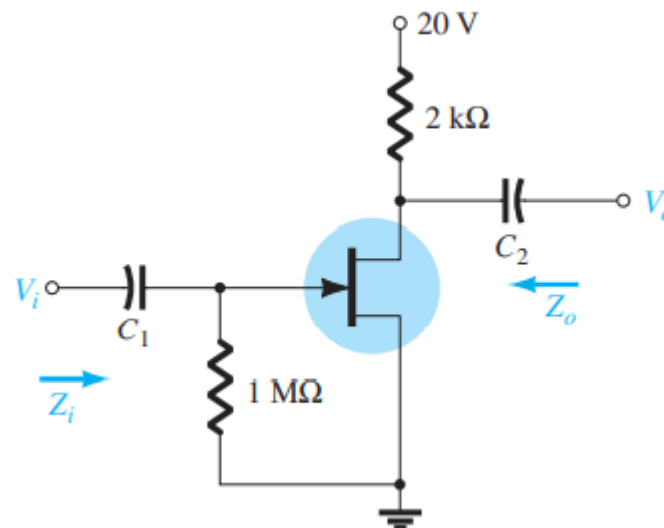


Figure 2(b) / Rajah 2(b)

## QUESTION 3/ SOALAN 3

- a) Calculate the CMRR (in dB) for the circuit measurements of  $V_{i1} = 200\mu\text{V}$ ,  $V_{i2} = 140\mu\text{V}$ ,  $V_o = 120\text{mV}$ ,  $V_C = 1\text{mV}$ , and  $V_d = 20\mu\text{V}$ .

(8 marks/ markah)

- b) Calculate the output voltage for **Figure 3(b)** below. Given  $V_1$  (rms) = 40mV and  $V_2$  (rms) = 20mV.

(5 marks/ markah)

- c) Referring to the operational amplifier circuit in **Figure 3(c)**, calculate the output voltages  $V_2$  and  $V_3$ . Given  $V_1 = 0.2\text{V}$ .

(12 marks/ markah)

- a) Kirakan CMRR (dalam dB) bagi ukuran litar  $V_{i1} = 200\mu\text{V}$ ,  $V_{i2} = 140\mu\text{V}$ ,  $V_o = 120\text{mV}$ ,  $V_C = 1\text{mV}$ , dan  $V_d = 20\mu\text{V}$ .

- b) Kirakan voltan keluaran bagi **Rajah 3(b)** di bawah. Diberi  $V_1$  (rms) = 40 mV dan  $V_2$  (rms) = 20mV.

- c) Merujuk kepada litar penguat kendalian dalam **Rajah 3(c)**, kirakan voltan keluaran  $V_2$  dan  $V_3$ . Diberi  $V_1 = 0.2\text{V}$ .

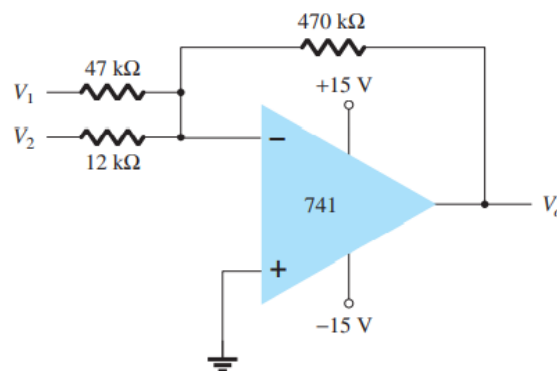


Figure 3(b) / Rajah 3(b)

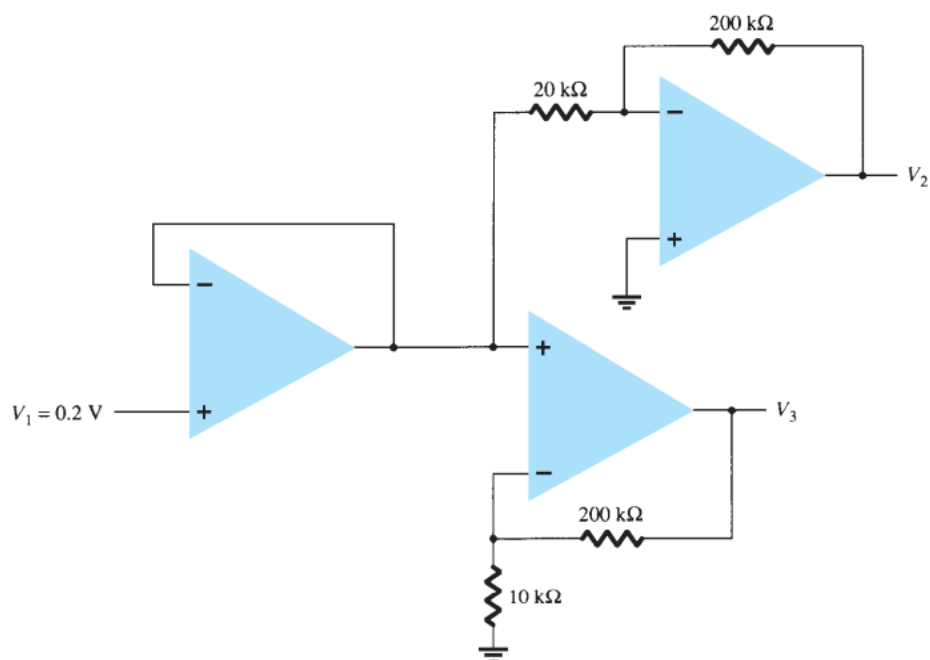


Figure 3(c) / Rajah 3(c)

## QUESTION 4/ SOALAN 4

Based on Class B Power Amplifier circuit in **Figure 4**, calculate:

- the peak input voltage,  $V_i(p)$ .
- the peak voltage across the load,  $V_L(p)$ .
- the peak load current,  $I_L(p)$ .
- the direct current,  $I_{DC}$ .
- the input power,  $P_{in(dc)}$ .
- the output power,  $P_{o(ac)}$ .
- the power dissipated by each output transistor,  $P_Q$ .
- the circuit efficiency,  $\% \eta$ .
- the maximum input power,  $P_{in(max)}$ .
- the maximum output power,  $P_{o(max)}$ .

(25 marks/ markah)

Berdasarkan litar Penguat Kuasa Kelas B dalam **Rajah 4**, kirakan:

- voltan puncak merentasi masukan,  $V_{i(p)}$ .
- voltan puncak merentasi beban,  $V_{L(p)}$ .
- arus puncak pada beban,  $I_{L(p)}$ .
- arus terus,  $I_{DC}$ .
- kuasa masukan,  $P_{in(dc)}$ .

- f) kuasa keluaran,  $P_{o(ac)}$ .
- g) kuasa yang dilesapkan oleh setiap keluaran transistor,  $P_o$ .
- h) kecekapan litar,  $\% \eta$ .
- i) kuasa masukan maksimum  $P_{in(max)}$ .
- j) kuasa keluaran maksimum  $P_{o(max)}$ .

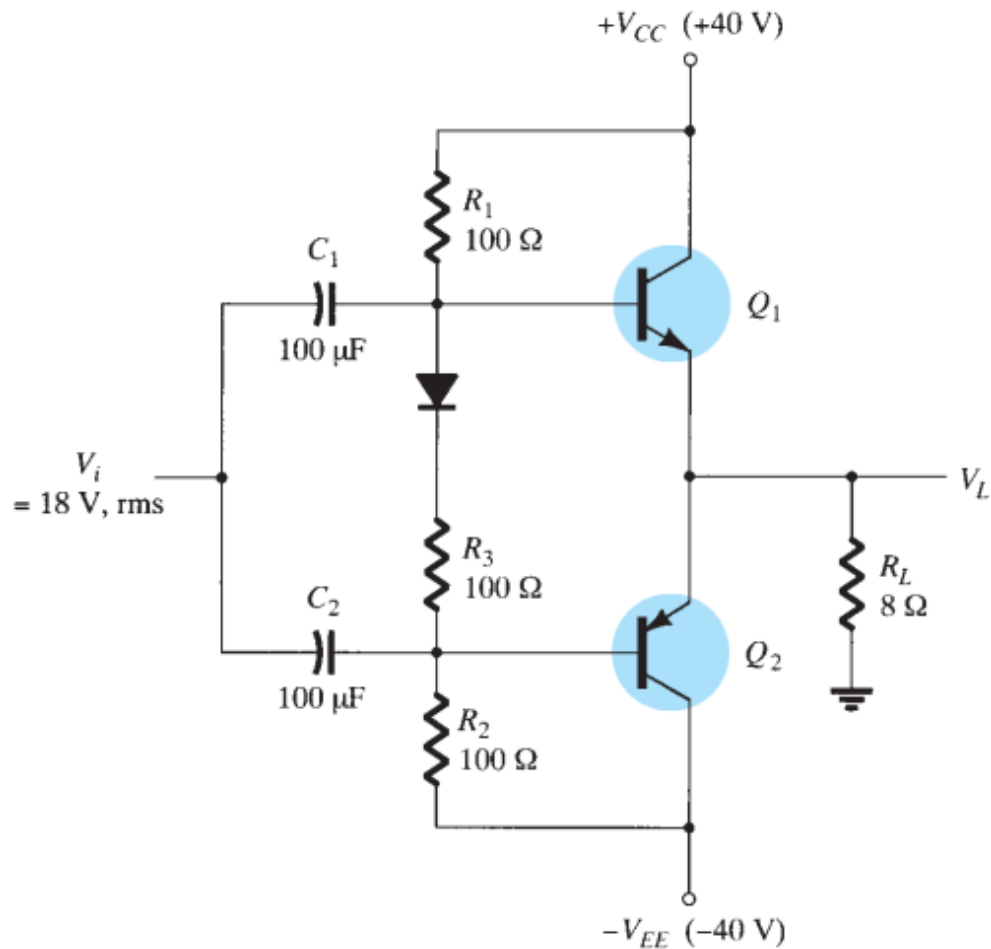


Figure 4 / Rajah 4

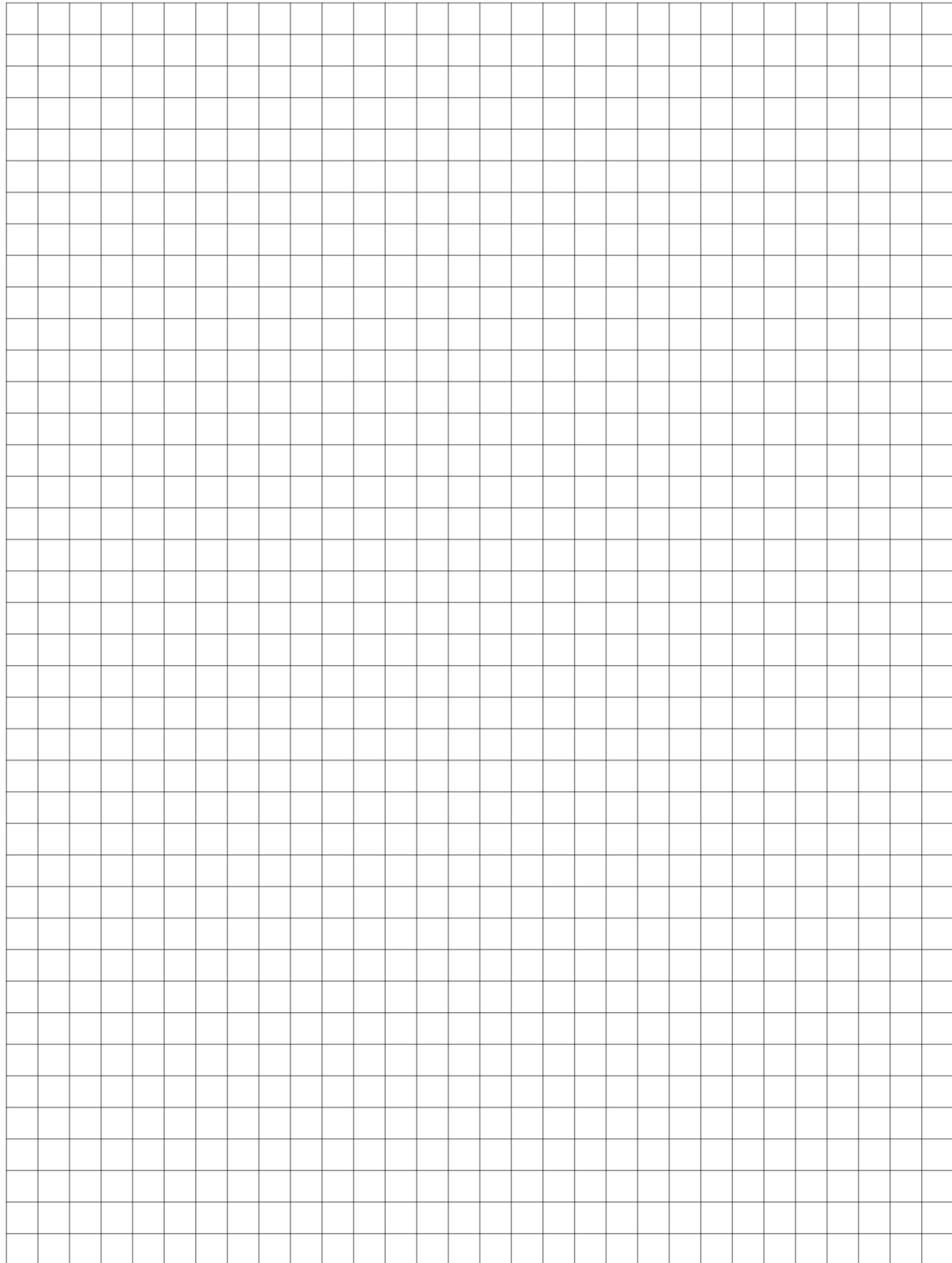
[100 MARKS/ MARKAH]

END OF QUESTION PAPER/ KERTAS SOALAN TAMAT

**Attachment 1 / Lampiran 1**

**Name / Nama** : .....

**Lecturer / Pensyarah** : .....



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