KOLEJ YAYASAN PELAJARAN JOHOR
ONLINE FINAL EXAMINATION

COURSE NAME	**:**	**ELECTRONICS 2**
COURSE CODE	**:**	**DKE 2073**
EXAMINATION	**:**	**DECEMBER 2021**
DURATION	**:**	**2 HOURS 30 MINUTES**

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.

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 lengkuk pindah. Graf diberi di Lampiran 1.*

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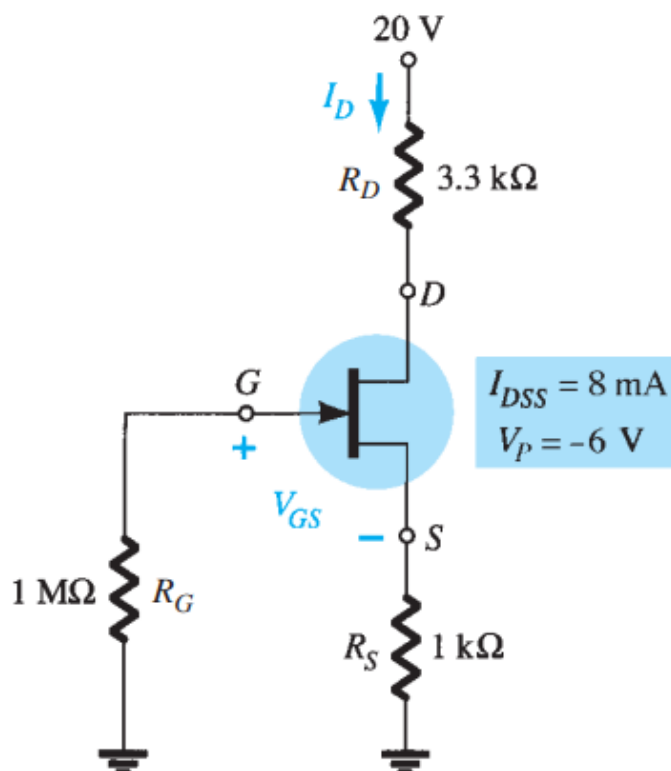

Figure 1 (a) / *Rajah 1(a)*

QUESTION 2/ SOALAN 2

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

(5 marks/ *markah*)

b) Referring to **Figure 2(b)**, determine Zi, Zo, and Av. Given I_{DSS} = 6mA, Vp = -6V, g_{os} = 40µS 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 Vp = -5V.*

b) *Merujuk kepada **Rajah 2(b)**, tentukan Zi, Zo, dan Av. Given I_{DSS} = 6mA, Vp = -6V, g_{os} = 40µS dan V_{GSQ} = -2V.*
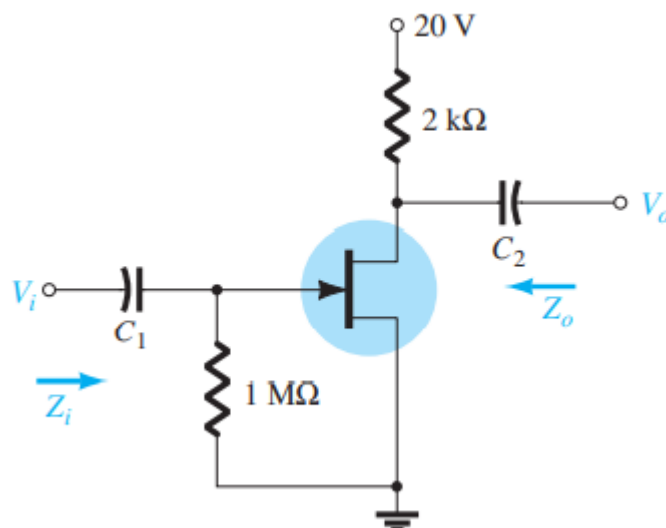

Figure 2 (b) / Rajah 2(b)

QUESTION 3/ SOALAN 3

a) Calculate the CMRR (in dB) for the circuit measurements of V_{i1} = 200µV, V_{i2} = 140µV, Vo = 120 mV, V_C = 1mV, and Vd = 20µV.

(8 marks/ *markah*)

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

(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 V.

(12 marks/ *markah*)

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

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

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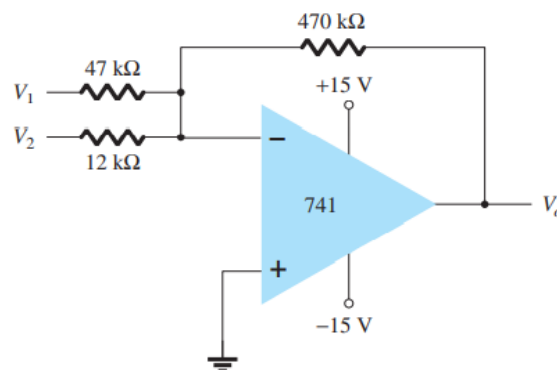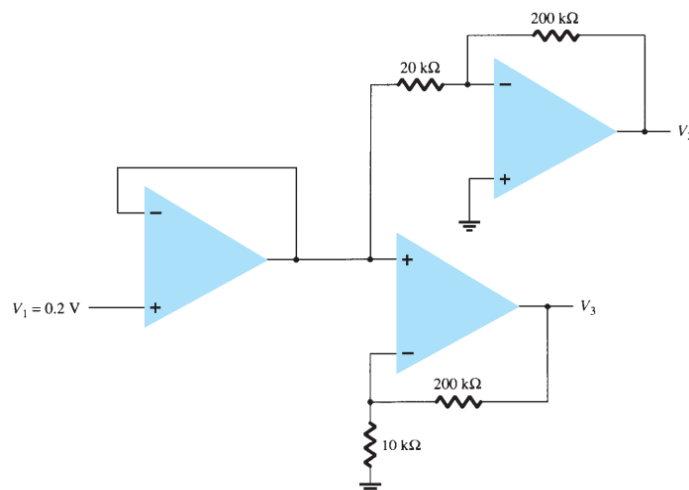

Figure 3(b) / Rajah 3(b)

Figure 3(c) / Rajah 3(c)

QUESTION 4/ *SOALAN 4*

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

    a) The peak input voltage, $V_{i(p)}$

    b) The peak voltage across the load, $V_L(p)$

    c) The peak load current, $I_L(p)$

    d) The direct current, I_{DC}

    e) The input power, $P_{in(dc)}$

    f) The output power, $P_{o(ac)}$

    g) The power dissipated by each output transistor, P_Q

    h) The circuit efficiency, $\%\eta$

    i) The maximum input power, $P_{in(max)}$

    j) The maximum output power, $P_{o(max)}$

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

    a) *Voltan puncak merentasi masukan, $V_{i(p)}$*

    b) *Voltan puncak merentasi beban, $V_{L(p)}$*

    c) *Arus puncak pada beban, $I_{L(p)}$*

    d) *Arus terus, I_{DC}*

    e) *Kuasa masukan, $P_{in(dc)}$*

    f) *Kuasa keluaran, $P_{o(ac)}$*

    g) *Kuasa yang dilesapkan oleh setiap keluaran transistor, P_Q*

    h) *Kecekapan litar, $\%\eta$*

    i) *Kuasa masukan maksimum $P_{in(max)}$*
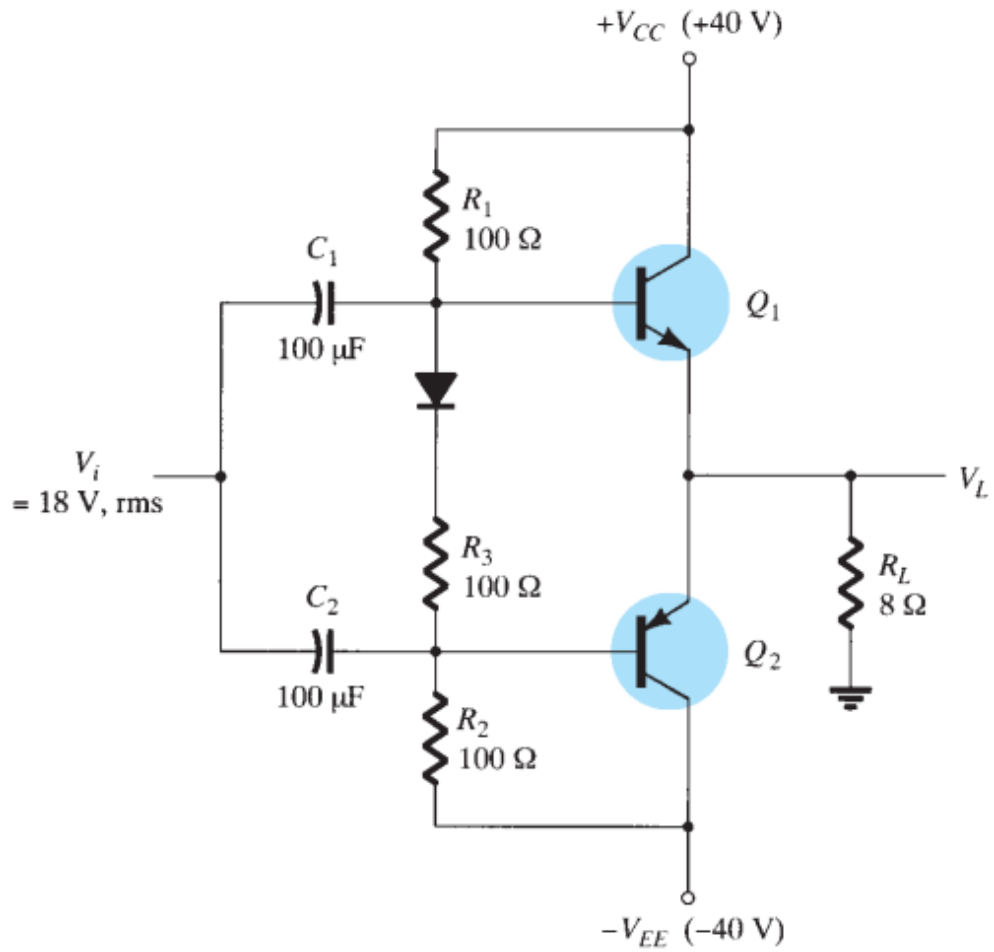
    j) *Kuasa keluaran maksimum $P_{o(max)}$*
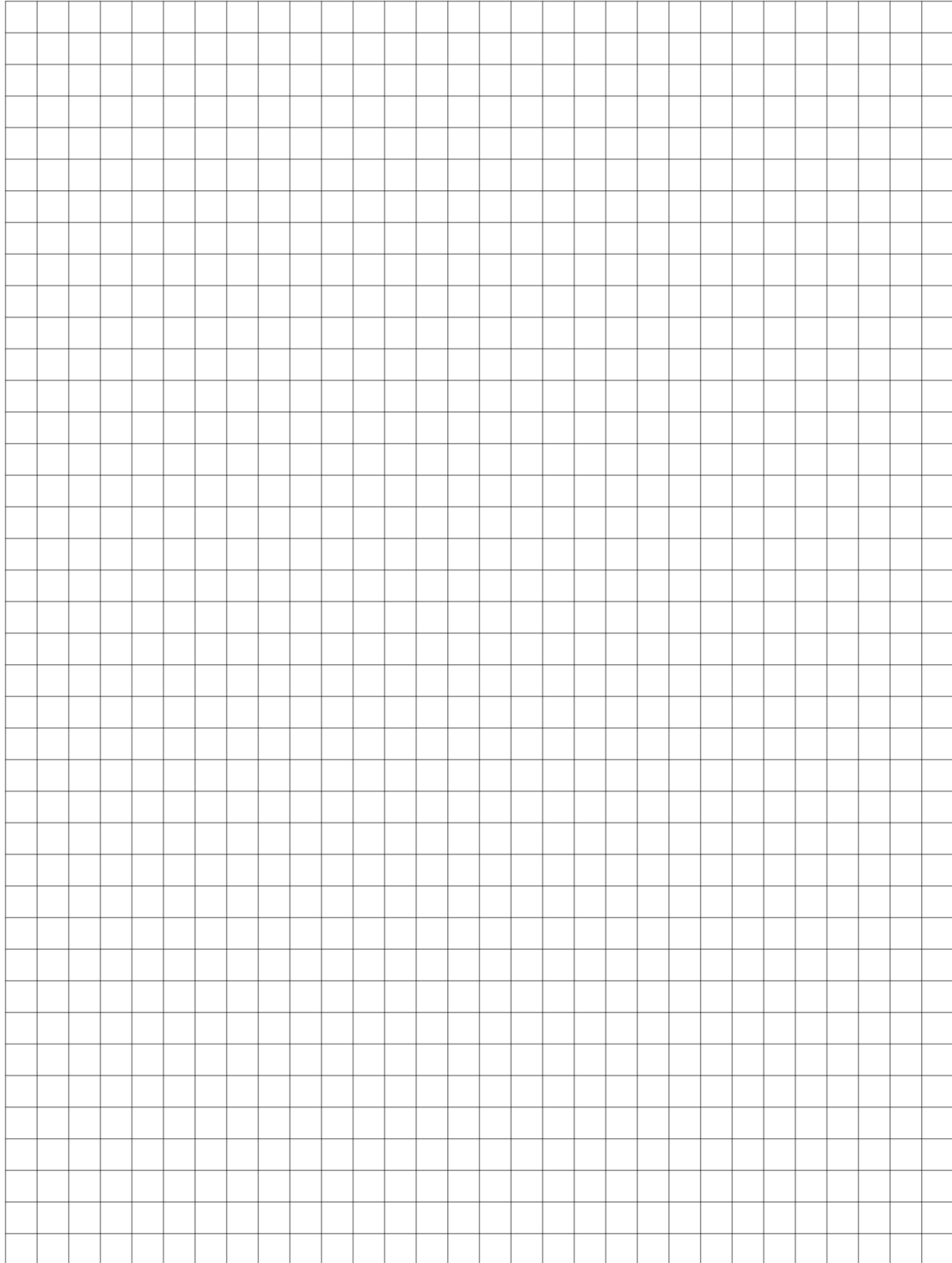
Figure 4 / Rajah 4

(25 marks/ *markah*)

[100 MARKS/ *MARKAH*]

END OF QUESTION PAPER/ *KERTAS SOALAN TAMAT*

Attachment 1 / *Lampiran 1*

Name / *Nama*   :..

Lecturer / *Pensyarah*   :..

Free Simple Grid Graph Paper from http://incompetech.com/graphpaper/lite/

Attachment 1 / *Lampiran 1*