SECTION A : 80 MARKS

BAHAGIAN A : 80 MARKAH

INSTRUCTION:

This section consists of **FOUR (4)** structured questions. Answer **ALL** questions.

ARAHAN :

*Bahagian ini mengandungi **EMPAT (4)** soalan berstruktur. Jawab **SEMUA** soalan.*

QUESTION 1

SOALAN 1

CLO1 C1 (a) List down **FOUR (4)** types of materials that are classified within the semiconductor's family.

*Senaraikan **EMPAT (4)** jenis bahan yang tergolong dalam keluarga separuh pengalir.*

[4 marks]
[4 *markah*]

CLO1 C2 (b) Explain the operation of forward biased voltage and the effect on the depletion layer.

Jelaskan operasi bagi voltan pincang hadapan dan kesannya ke atas lapisan susutan.

[6 marks]
[*6 markah*]

CLO1 C3 *(c)* Sketch the circuit and output signal for Negative and Positive Series Clipper circuit.

Lakarkan litar dan isyarat keluaran untuk litar Siri Pemangkas Negatif dan Positif.

[10 marks]
[*10 markah*]

QUESTION 2

SOALAN 2

CLO1 C1

(a) List **FOUR (4)** applications of Bipolar Junction Transistor (BJT).
*Senaraikan **EMPAT (4)** kegunaan Bipolar Junction Transistor (BJT).*

[4 marks]
[4 *markah*]

CLO1 C2

(b) Compare the output differences of signal A, B and AB class of amplifiers.
Bandingkan isyarat keluaran bagi kelas penguat A, B dan AB.

[6 marks]
[*6 markah*]

CLO1 C3

(c) Based on Figure A2(c) below, calculate the value of I_B, Ic_Q, V_{CQ}, $I_{C(sat)}$ and $V_{C(Cut\text{-}off)}$ for the common emitter configuration. Given the value of $\beta = 60$ and $V_{BE} = 0.3V$. (Show all calculations).
Berdasarkan Rajah A2(c) di bawah, kira nilai bagi I_B, Ic_Q, V_{CQ}, $I_{C(sat)}$ and $V_{C(Cut\text{-}off)}$ untuk konfigurasi pemancar sepunya. Diberi nilai $\beta = 60$ dan $V_{BE} = 0.3V$. (Tunjukkan semua pengiraan).

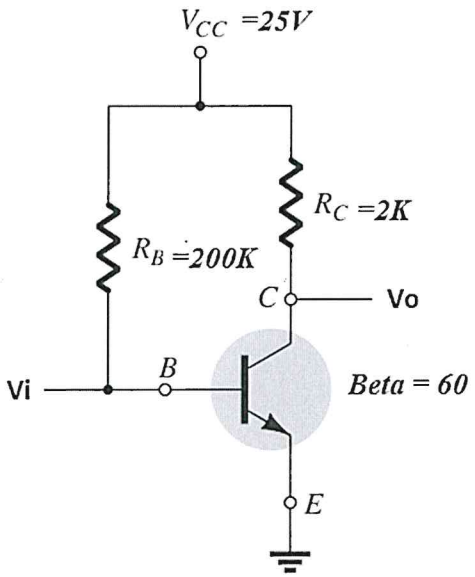

Figure A2(c) / *Rajah A2(c)*

[10 marks]
[10 *markah*]

QUESTION 3

SOALAN 3

CLO1 C1 (a) The figure A3(a) is the schematic symbol for P-Channel JFET. Identify A, B, C and D.

Rajah A3(a) adalah simbol skematik bagi saluran- P JFET. Kenalpasti A, B, C dan D.

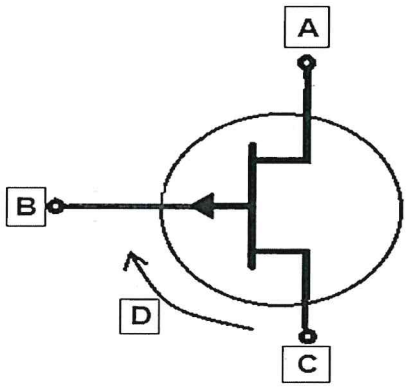

Figure A3(a) / *Rajah A3(a)*

[4 marks]
[4 *markah*]

CLO1 C2 *(b)* Explain **THREE (3)** characteristics of N-channel JFET.

*Jelaskan **TIGA (3)** ciri-ciri N-Channel JFET.*

[6 marks]
[6 *markah*]

CLO1 C3 (c) Draw the NMOS circuit as switch (using open and closed switch).

Lukiskan litar NMOS sebagai suis (menggunakan suis terbuka dan tertutup).

[10 marks]
[*10 markah*]

QUESTION 4

SOALAN 4

CLO1 C1

(a) List **FOUR (4)** types of other semiconductor components.

*Senaraikan **EMPAT (4)** jenis komponen separuh pengalir.*

[4 marks]

[*4 markah*]

CLO1 C2

(b) Figure A4(b) shows a DIAC application as a heat control circuit. Interpret how the circuit works.

Rajah A4(b) menunjukkan aplikasi DIAK sebagai litar pengawal suhu. Interpretasikan bagaimana litar tersebut berfungsi.

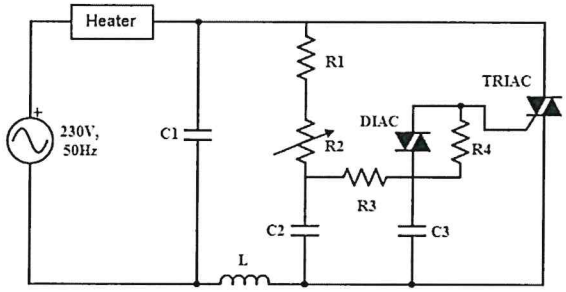

Figure A4 (b) / *Rajah A4(b)*

[8 marks]

[*8 markah*]

CLO1 C2

(c) Explain the I-V characteristics for forward and reverse bias Silicon Controlled Rectifier (SCR).

Jelaskan ciri-ciri I-V terhadap pincang hadapan dan songsang untuk Silicon Controlled Rectifier (SCR).

[8 marks]

[8 *markah*]

SECTION B : 20 MARKS

BAHAGIAN B : 20 MARKAH

INSTRUCTION:

This section consists of **ONE (1)** essay question. Answer the question.

ARAHAN:

*Bahagian ini mengandungi **SATU (1)** soalan esei. Jawab soalan tersebut.*

QUESTION 1

SOALAN 1

CLO1
C3

Sketch a center-tapped full-wave rectifier circuit with the direction of current flow. The load resistor, R_L is 2KΩ and the diode resistance is neglected. If the peak to peak voltage across the secondary winding is $220V_{pp}$, calculate Output Voltage (V_o), average voltage (V_{avg}) and average current (I_{avg}).

Lakarkan gambarajah litar penerus gelombang penuh sadap tengah berserta arah pengaliran arusnya. Nilai rintangan beban, R_L ialah 2KΩ dan rintangan diod diabaikan. Sekiranya bekalan voltan puncak ke puncak merentasi bahagian sekunder ialah $220V_{pp}$, kirakan voltan keluaran (V_o), Voltan Purata (V_{avg}) dan arus purata (I_{avg}).

[20 marks]

[*20 markah*]

SOALAN TAMAT