



UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019**

COURSE NAME : ELECTRONIC PRINCIPLES
COURSE CODE : BNR 20503
PROGRAMME CODE : BND
EXAMINATION DATE : JUNE / JULY 2019
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF **EIGHT (8)** PAGES

- Q1**
- (a) Differentiate semiconductors, conductors and insulators on the basis of band gap.
(3 marks)
 - (b) With the aid of diagram, differentiate between intrinsic and extrinsic semiconductors.
(4 marks)
 - (c) Sketch the atomic structure of copper (29 electrons) and discuss why it is a good conductor and how its structure is different from that of germanium (32 electrons) and silicon (14 electrons).
(6 marks)
 - (d) Describe the difference between n -type and p -type semiconductor materials.
(6 marks)
 - (e) Sketch the I - V characteristics of P-N junction diode for ideal situation and using different material (silicon, germanium and gallium arsenide) in a graph. Using the same graph, mark the reverse region, forward region, voltage drop and breakdown voltage.
(6 marks)

- Q2** (a) Explain the function of the rectifier shown in **Figure Q2(a)** during both positive and negative half cycles of the AC signal. Then, sketch **TWO (2)** circuit diagram showing the direction of current flow at each positive and negative half cycles of the AC signal. (4 marks)
- (b) Compare the efficiency of full-wave diode rectification and half wave rectification by draw out the comparative load voltage waveform for each rectification methods. (4 marks)
- (c) **Figure Q2(c)** shows the series connection between diode, source and load. Using load line analysis, determine:
- (i) Q-point values of i and v . (4 marks)
- (ii) Load voltage. (1 mark)
- (d) Determine I_1 , I_2 and I_{D2} for the network of **Figure Q2(d)**. (4 marks)
- (e) A half wave rectifier is connected with a resistive load. The waveforms for the input voltage is shown in **Figure Q2(e)**.
- (i) Sketch output voltage, V_o across the load rectifier. (2 marks)
- (ii) Sketch output waveform of the current, I_s flow through diode. (2 marks)
- (iii) Sketch output voltage, V_D across the diode. (2 marks)
- (f) Outline the circuit diagram and the output voltage of a center-tapped full-wave rectifier. (2 marks)

- Q3** (a) With the aid of diagram, shows the output or collector characteristics for a common-base transistor amplifier (5 marks)
- (b) A transistor with voltage divider bias is shown in **Figure Q3(b)**. Determine:
- (i) collector voltage, V_C (6 marks)
- (ii) base voltage, V_B (3 marks)
- (iii) emitter voltage, V_E (4 marks)
- (c) Calculate the Q point from **Figure Q3(b)** and draw the load line. (7 marks)
- Q4** (a) Discuss **TWO (2)** advantages of field effect transistor (FET) compared to bipolar junction transistor (BJT). (4 marks)
- (b) Describe the basic construction of the n -channel JFET during no bias condition with the aid of diagram. (4 marks)
- (c) Circuit in **Figure Q4(c)** has $I_{DSS} = 10$ mA, and $V_{GS(off)} = -8$ V. Calculate:
- (i) drain voltage, V_D (3 marks)
- (ii) drain saturation current, $I_{D(sat)}$ (3 marks)
- (d) Determine V_D , V_S , V_{DS} and V_{DG} for the network of **Figure Q4(d)**. (6 marks)
- (e) A JFET series switch is shown in **Figure Q4(e)**. Determine the output voltages when the transistor is in on and off state. Note that the JFET has a resistance of $10\text{ M}\Omega$ when it is off. Then, determine the on-off ratio. (5 marks)

- END OF QUESTIONS -

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2018/2019
 COURSE NAME : ELECTRONIC PRINCIPLES

PROGRAMME CODE : BND
 COURSE CODE : BNR 20503

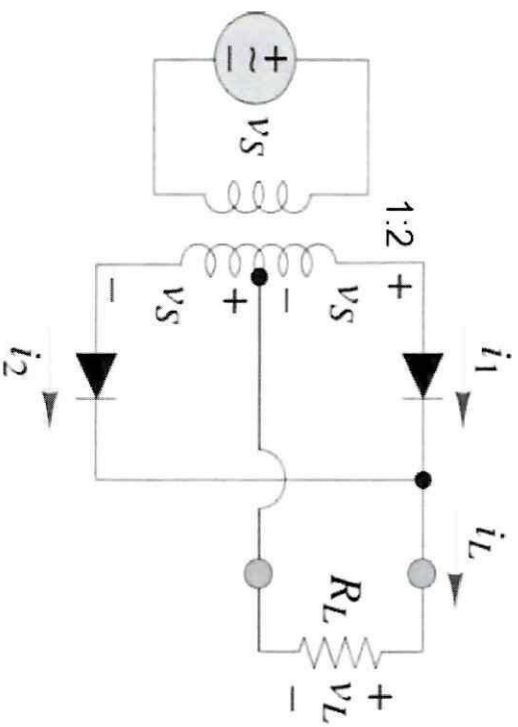


Figure Q2(a)

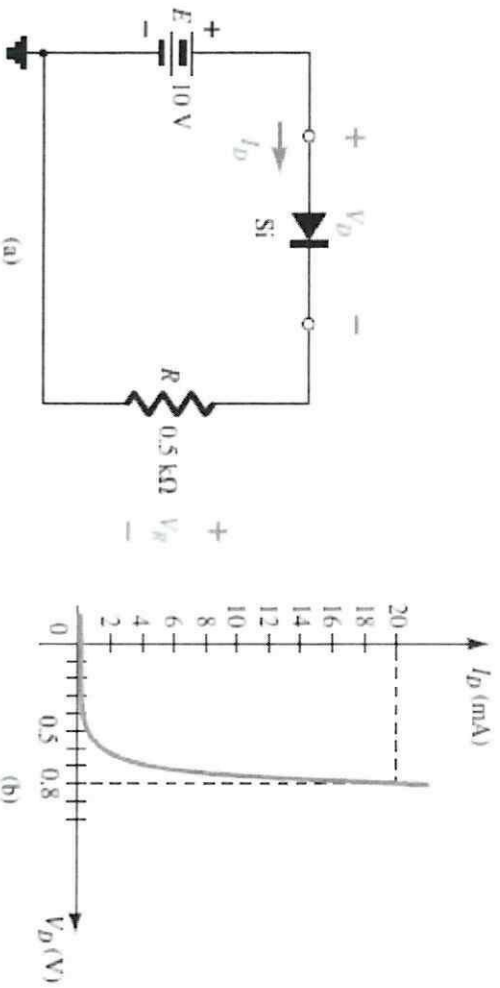


Figure Q2(c)

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2018/2019
 COURSE NAME : ELECTRONIC PRINCIPLES

PROGRAMME CODE : BND
 COURSE CODE : BNR 20503

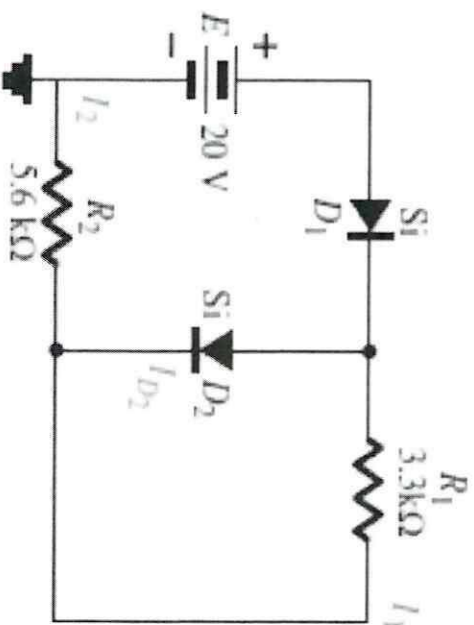


Figure Q2(d)

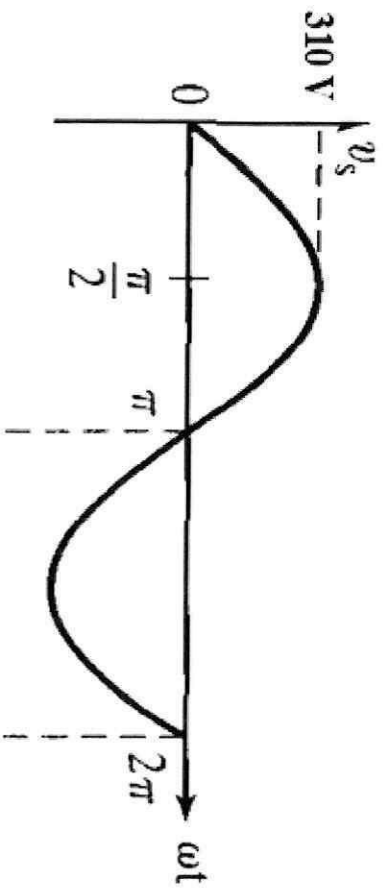


Figure Q2(e)

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2018/2019
COURSE NAME : ELECTRONIC PRINCIPLES

PROGRAMME CODE : BND
COURSE CODE : BNR 20503

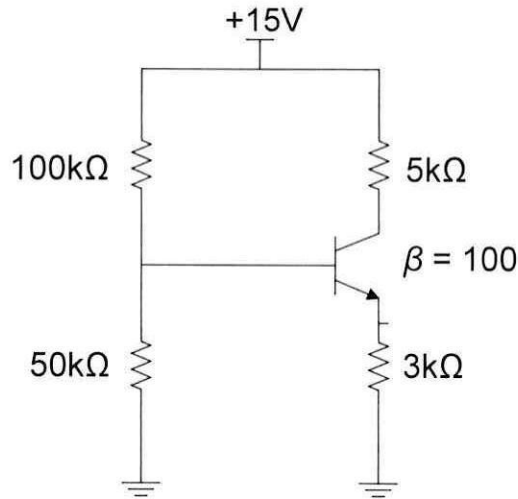


Figure Q3(b)

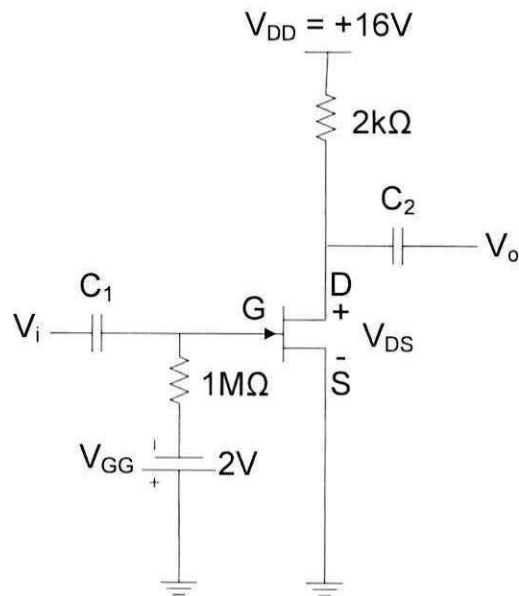


Figure Q4(c)

FINAL EXAMINATION

SEMESTER / SESSION : SEM II / 2018/2019
 COURSE NAME : ELECTRONIC PRINCIPLES

PROGRAMME CODE : BND
 COURSE CODE : BNR 20503

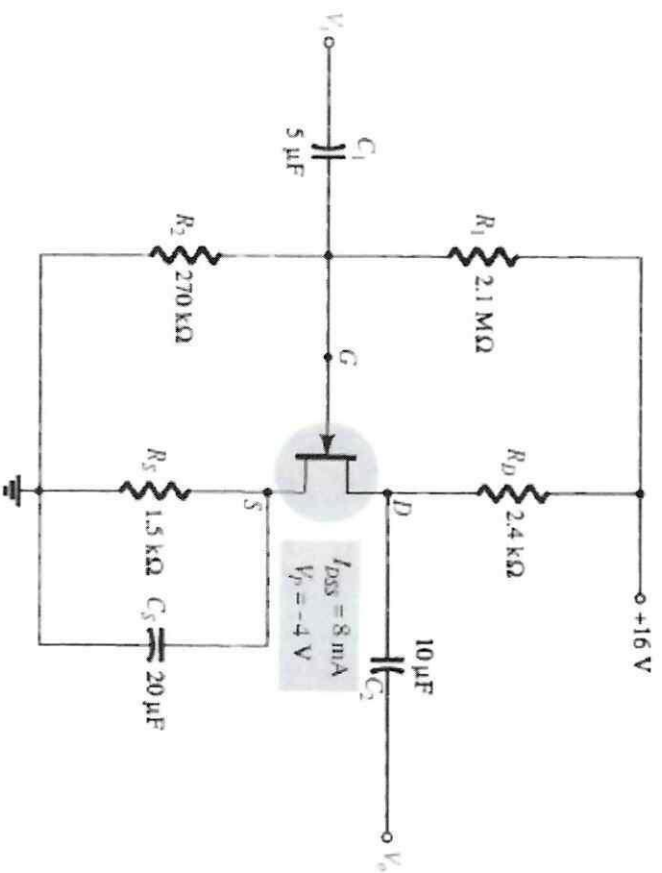


Figure Q4(d)

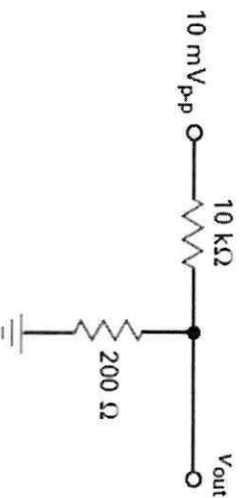


Figure Q4(e)