



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2023/2024

- COURSE NAME : ANALOG ELECTRONICS
- COURSE CODE : BEV 10503
- PROGRAMME CODE : BEV
- EXAMINATION DATE : JULY 2024
- DURATION : 3 HOURS
- INSTRUCTIONS :
1. ANSWER ALL QUESTIONS
 2. THIS FINAL EXAMINATION IS CONDUCTED VIA
 - Open book
 - Closed book
 3. STUDENTS ARE **PROHIBITED** TO CONSULT THEIR OWN MATERIAL OR ANY EXTERNAL RESOURCES DURING THE EXAMINATION CONDUCTED VIA CLOSED BOOK

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

- Q1**
- (a) Differentiate between a diode and a Zener diode. (2 marks)
 - (b) Describe the difference between conductor, isolator and semiconductor. (3 marks)
 - (c) Explain the majority and minority carriers in n-type and p-type semiconductors. (2 marks)
 - (d) Describe the resistance levels of a diode in term of its type, equation, special characteristics and graphical determination. (6 marks)
 - (e) Calculate the maximum and minimum values of input voltage V_i for the Zener diode in **Figure Q1.(e)** to maintain in the “on” state dan sketch a graph of V_L vs V_i .

(9 marks)

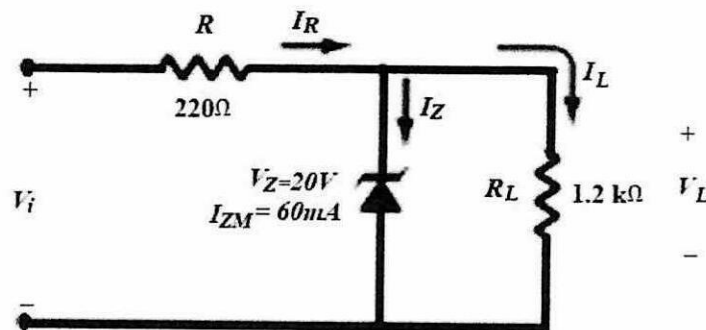


Figure Q1.(e)

- (f) Describe the models of diode equivalent circuit in term of its type, conditions, equivalent model and characteristics. (3 marks)
- Q2**
- (a) Define the transistor construction. (2 marks)
 - (b) Explain the active region, the cutoff region and the saturation region of a bipolar junction transistor in a common-base configuration. (3 marks)

- (c) Analyse the values of I_{CQ} and V_{CEQ} for the voltage divider configuration of a transistor circuit in **Figure Q2.(c)** using an exact analysis and an approximate analysis.

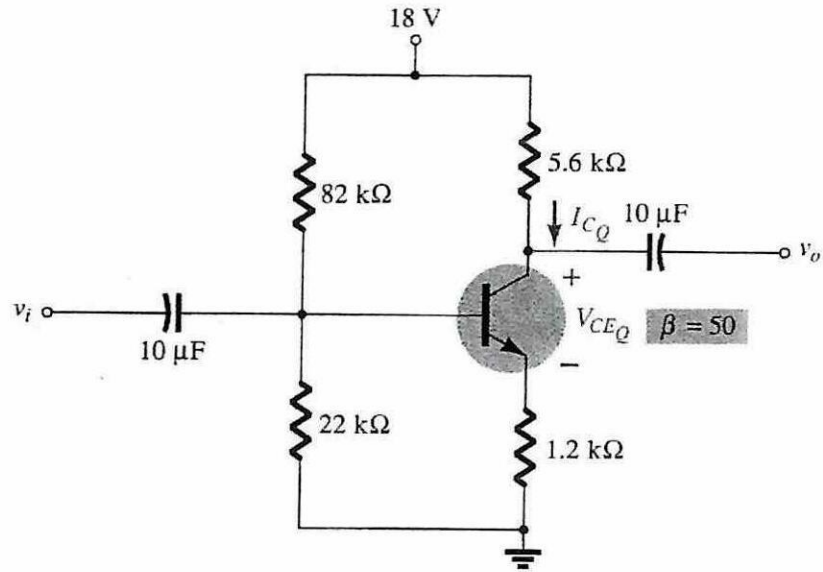


Figure Q2.(c)

(20 marks)

- Q3** (a) Draw the symbols of n-channel and p-channel enhancement-type MOSFETs. (2 marks)
- (b) Describe the field-effect transistor (FET). (1 mark)
- (c) Draw the junction field-effect transistor (JFET) symbols for n-channel and p-channel. (2 marks)

- (d) Analyse the value of V_{GSQ} , I_{DQ} , V_{DS} , V_D , V_G and V_S the transistor circuit in **Figure Q3.(d)** using mathematical approach and graphical approach.

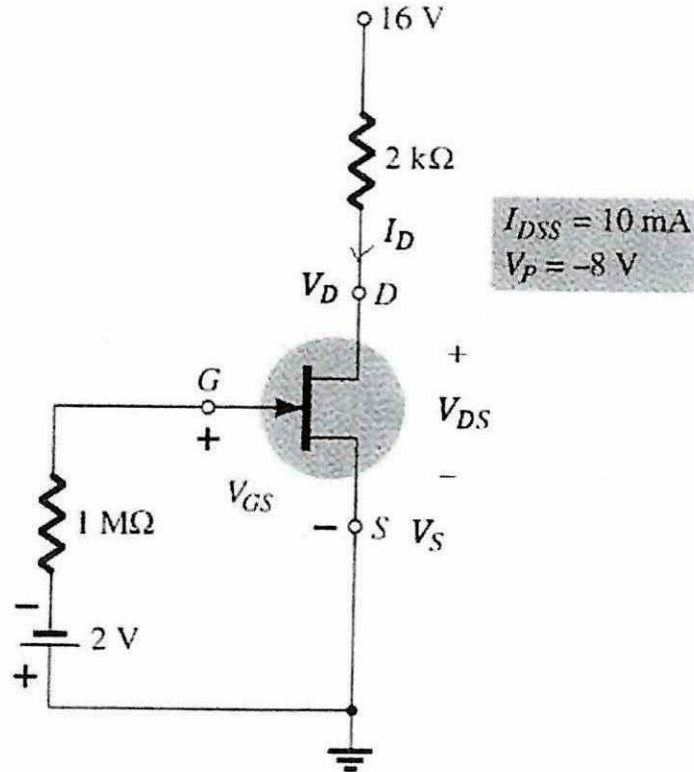


Figure Q3.(d)

(20 marks)

- Q4** (a) Differentiate the power amplifier classes based on its operating cycle and power efficiency.

(5 marks)

- (b) Explain in brief the **FIVE (5)** characteristics of power amplifier.

(5 marks)

- (c) Calculate the input power, output power, and efficiency of the amplifier circuit in **Figure Q4.(c)** based on a base current of 10 mA peak.

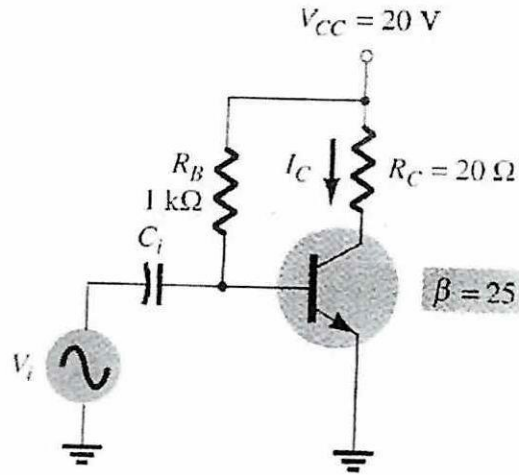


Figure Q4.(c)

(15 marks)

- END OF QUESTIONS -