



TECHNICAL UNIVERSITY OF MOMBASA

FACULTY OF ENGINEERING AND TECHNOLOGY
ELECTRICAL AND ELECTRONICS ENGINEERING DEPARTMENT

UNIVERSITY EXAMINATION FOR:
DIPLOMA IN ELECTRICAL ENGINEERING
EEE2101: ANALOGUE ELECTRONICS I.

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2019

TIME: 2 HOURS

DATE: Pick Date Select Month Pick Year

Instructions to Candidates

You should have the following for this examination

-Answer Booklet, examination pass and student ID

This paper consists of **FIVE** questions. Attempt **ANY THREE**.

Do not write on the question paper.

Question ONE

- a) Describe the process of thermionic emission. (3mark)
- b) Explain the functions of the following in the CRO.
 - i. Aquadag
 - ii. Time base (4marks)
- c) With the aid of circuit diagrams explain the operation of a cathode ray tube stating its role in the CRO (7marks)
- d) Describe any two applications of CRO (illustrate with waveforms) (6marks)

Question TWO

- a. Explain why silicon material is preferred in semiconductors. (2marks)
- b. Using appropriate diagrams explain how the conductivity of the semiconductor material can be improved. (8marks)
- c. State any two applications of the LED and varactor diodes (4marks)
- d. A zener diode rated at 2w, 5V is to be used in a circuit to regulate the voltage 5V to the load If the supply voltage of 30V is supplied determine
 - i. the value of the series resistor to be connected in the circuit
 - ii. If the load resistor of $1K\ \Omega$ is connected determine the load current and the supply current for the circuit (6marks)

Question THREE

- a. With the aid of appropriate diagrams explain the two modes of biasing in diodes.(6marks)
- b. Using appropriate diagrams differentiate between Centre tapped and Bridge full wave rectifier circuits (6marks)
- c. Draw the circuit diagram of a voltage Tripler and explain its operation. (5marks)
- d. State any three advantages of using (3marks)

Question FOUR

- a. With the aid of sketches explain the operation of any three classes of amplifiers(9marks)
- b. (i) With the aid of the appropriate diagrams describe the construction and operation of a J FET
(ii) Compare and contrast between FET and BJT (7marks)
- c. The device parameters of an n-channel J-FET are:- Maximum drain current (I_{DSS}) is 10 mA, the pinch off voltage is -4V calculate the drain current when the $V_{DS} = -1$ and when $V_{DS} = -4V$ (4marks)

Question FIVE

- a) With the aid of sketches explain the four regions of the Bipolar Junction Transistor. (6marks)

b) Describe how the biasing and stabilization is achieved in the collector bias network.
(6marks)

c) For the circuit in Figure 1. $V_{CC} = 15V$ $\beta = 100$ and $V_{BE} = 0.7V$ determine the value of

- The base supply voltage (V_{BB})
 - The bias resistor (R_B)
 - The emitter current (I_E)
 - State the function of R_E mentioning any modification that can be introduced to improve on the stability of the circuit.
- (8marks)

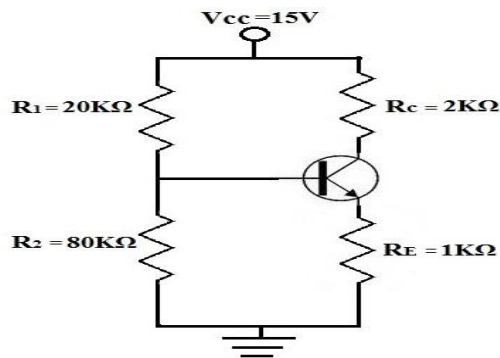


Fig. 1