



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of JKUAT)

Ukunda Campus

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

CERTIFICATE IN ELECTRICAL POWER ENGINEERING

EEE 1101: ANALOGUE ELECTRONICS I

END OF SEMESTER EXAMINATION

SERIES: APRIL 2012

TIME: 2 HOURS

Instructions to Candidates:

This paper consists of **FIVE** questions

- *Answer Booklet*

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

Marks are indicated for each part of the question

This paper consists of **THREE** printed pages

Question One (COMPULSORY)

- a) Define the following terms:
- (i) Valence electrons
 - (ii) Conduction band
 - (iii) Valence band
 - (iv) Free electrons
 - (v) Atom
 - (vi) Rectification
 - (vii) Smoothing
- (14 marks)
- b) With an aid of a diagram, describe how the Cathode Ray Tube (CRT) operates (13 marks)
- c) Briefly describe the formation of an n-type material (3 marks)

Question Two

- a) Differentiate between intrinsic semi conductors and extrinsic semi conductors (4 marks)
- b) Define the term “Doping” (1 marks)
- c) Briefly explain the formation of P type materials (3 marks)
- d) With the aid of diagrams, explain the **THREE** transistor configuration (12 marks)

Question Three

- a) Briefly describe the **THREE** layers of a bipolar transistor (9 marks)
- b) With an aid of a well labeled diagram, explain how a diode is:-
- (i) Forward bias
 - (ii) Reverse bias
- (8 marks)
- c) Differentiate between saturation and cut-off region (3 marks)

Question Four

- a) Explain the functional difference between the crystal diode and zener diode (4 marks)
- b) A Zener diode is connected as a voltage regulator has $V_z = 10V$ and $I_{zm} = 32\text{ mA}$ is used to supply available load. A current limiting resistor of $1\text{ K}\Omega$ is connected in series to the diode. A fixed D.C voltage of $50V$ is used to supply the regulator
- (i) Draw the circuit diagram of the regulator
 - (ii) Determine the range R_L and I_L will result in V_L being maintained at $10V$.
 - (iii) Plot the graph of V_L verses R_L and V_L versus I_L
 - (iv) Determine the maximum wattage rating of the diode as a regulator
- (12 marks)
- c) Explain **TWO** functions of bipolar transistor amplifier (4 marks)

Question Five

- a) (i) With an aid of a diagram, explain the principle of half wave rectification (10 marks)
- (ii) Draw the wave form diagram of the above rectification (3 marks)
- b) Outline the **TWO** classes of transformers (2 marks)
- c) With an aid of diagrams, state and explain **TWO** types of transistors (5 marks)