



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

Faculty of Engineering and Technology

DEPARTMENT OF ELECTRICAL & ELECTRONIC ENGINEERING

DIPLOMA IN TECHNOLOGY

Electrical Power Engineering
Electronics & Automation Engineering
Mechatronics & Robotic Engineering
Computer Science Engineering
Telecommunication Engineering
Electronic Engineering

EEE 2101

ANALOGUE ELECTRONIC I

SEMESTER II EXAMINATIONS

SERIES: FEBRUARY 2011 SERIES

TIME: 2 HOURS

Instructions to Candidates:

1. You are required to have the following for this examination;
 - Answer booklet
 - Electronic calculator
2. Answer Question **ONE (COMPULSORY)** and any other **TWO** Questions.
3. Maximum marks for each Question are shown.

(COMPULSORY)

Question ONE

- a) With the aid of diagrams, explain how P-type semiconductors are formed. (9 marks)
- b) With the aid of a diagram, explain how a depletion layer is formed in a P.N. junction. (9 marks)
- c) With the aid of a diagram, explain how electronic focusing is achieved in a Cathode Ray Tube. (7 marks)
- d) For a BJT, show that
- $$\beta = \frac{\alpha}{1-\alpha} \quad (5 \text{ marks})$$

(ANSWER ANY OTHER TWO QUESTIONS)

Question TWO

- a) With the aid of diagrams, explain how reverse breakdown is achieved in a P-N junction diode. (10marks)
- b) A 240 ac supply is half wave rectified and supplies a 1k Ω load resistor. With the aid of diagrams, determine the voltage and current of the load using:
- i) Ideal diode approximation
 - ii) First diode approximation
 - iii) Second diode approximation
- Assume bulk resistance to be 25 Ω . (10marks)

Question THREE

- a) i) For BJT, show that
- $$\beta = \frac{\alpha}{1-\alpha} \quad (5 \text{ marks})$$
- b) **Fig 1**

- i) State the type of biasing used in the circuit.
 - ii) Calculate
 - I) Current through R_1
 - II) Current through R_4
- (15marks)

Question FOUR

- a) With the aid of a diagram, explain the operation of a transistor series stabiliser circuit with an over current protection circuit. (12marks)

- b) A fullwave rectifier circuit has an RC II filter circuit.
 If $R = 50\Omega$
 $C = 3000\mu F$
 $V_{peak} = 14V$
 Calculate
 - i) V_{dc}
 - ii) $V_{ripple\ peak-to-peak}$
 - iii) Ripple factor(8 marks)

Question FIVE

- a) State TWO types of FETs. (2 marks)

- b)
 - i) With the aid of diagrams, explain how pinch-off voltage is achieved in FET. (5 marks)
 - ii) With the aid of diagrams, explain construction of enhancement mode MOSFET. (10marks)

- c) A JFET has signal voltage of 1.5V peak valve applied to its input terminals. The drain current is 2mA. Calculate mutual inductance of the JFET. (3 marks)