



MURANG'A UNIVERSITY OF TECHNOLOGY

SCHOOL OF COMPUTING AND INFORMATION TECHNOLOGY

DEPARTMENT OF INFORMATION TECHNOLOGY

UNIVERSITY ORDINARY EXAMINATION

2018/2019 ACADEMIC YEAR

**FIRST YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN
INFORMATION TECHNOLOGY**

EET 050 - BASIC ELECTRONICS

DURATION: 2 HOURS

DATE: 11/12/2018

TIME: 9 – 11 A.M.

Instructions to candidates:

1. Answer question One and Any Other Two questions
2. Mobile phones are not allowed in the examination room.
3. You are not allowed to write on this examination question paper.

SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

QUESTION ONE (30 MARKS)

- a. Define the term resistance. (2 Marks)
- b. Calculate the equivalent resistance of three resistors of 500Ω , $1k\Omega$ and $2.5k\Omega$ connected in parallel. (5 Marks)
- c. Define the term capacitance. (2 Marks)
- d. Calculate the equivalent capacitance of three capacitors of $200\mu\text{F}$, $500\mu\text{F}$ and 1nF connected in series. (5 Marks)
- e. Draw the symbols for the following:
 - i. Fixed resistor
 - ii. Variable resistor
 - iii. Ammeter
 - iv. Voltmeter
 - v. Switch (5 Marks)
- f. State TWO applications of p-n junction diodes. (2 Marks)
- g. Determine the value and tolerance of a resistor having colour codes of orange-green-red-yellow-gold. (4 Marks)
- h. State THREE applications of operational amplifiers (op-amps). (3 Marks)
- i. Using symbols to distinguish between NPN and PNP transistors. (2 Marks)

SECTION B – ANSWER ANY TWO QUESTIONS IN THIS SECTION

QUESTION TWO (20 MARKS)

- a. State TWO examples of each of the following:
 - i. Conductors
 - ii. Insulators
 - iii. Semi-conductors (6 Marks)
- b. Calculate the equivalent inductance, L_{eq} , of three inductors of $L_1 = 0.5\text{mH}$, $L_2 = 4\text{mH}$ and $L_3 = 7\text{mH}$ connected in series. (4 Marks)
- c. Draw the symbols for each of the following:
 - i. p-n junction diode

- ii. Cell
 - iii. Inductor
 - iv. Variable capacitor (4 Marks)
- d. Show that $\beta = \frac{\alpha}{1-\alpha}$ (6 Marks)

QUESTION THREE (20 MARKS)

- a. Define the following terms as used in semi-conductors theory:
- i. Electron
 - ii. Hole
 - iii. Doping
 - iv. Diffusion (8 Marks)
- b. Show that the equivalent resistance of three resistors connected in series is given by:
- $$R_{eq} = R_1 + R_2 + R_3 \quad (6 \text{ Marks})$$
- c. Capacitances of 3uF, 7uF, 11uF and 13uF are connected in parallel to a direct voltage supply of 100V. Determine:
- i. The equivalent circuit capacitance
 - ii. The total charge
 - iii. The charge on the 13uF capacitor (6 Marks)

QUESTION FOUR (20 MARKS)

- a. State TWO applications of transistors. (2 Marks)
- b. Show that $\alpha = \frac{\beta}{\beta+1}$ (6 Marks)
- c. Name the types of Field-Effect transistors. (2 Marks)
- d. Name any FOUR typical components and interfaces that are found on a computer motherboard. (4 Marks)
- e. Determine the equivalent resistance for the circuit shown below: (6 Marks)

