



THE MOMBASA POLYTECHNIC UNIVERSITY COLLEGE

(A Constituent College of Jkuat)

Faculty of Engineering and Technology

DEPARTMENT OF COMPUTER SCIENCE & INFORMATION TECHNOLOGY

UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN INFOR & COMM TECH
BACHELOR OF TECHNOLOGY IN INFOR & COMMUN TECH
– BSCIT 11M & BTECH ICT 11M2

ICS 2200: ELECTRONICS/EIT 4204: FOUNDATIONS OF ELECTRONICS

SPECIAL/SUPPLEMENTARY EXAMINATION

SERIES: OCTOBER 2011

TIME: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer booklet*

Answer question **ONE (COMPULSORY)** in section A and any other **TWO** questions from section B

Maximum marks for each part of a question are clearly shown.

This paper consists of **FOUR** printed pages

SECTION A – Compulsory

Question 1 (30 marks)

- (a) (i) Explain briefly any **TWO** advantages of an oscilloscope over a multi-meter
- (ii) Explain briefly any disadvantage of an oscilloscope, compared to a multi-meter **(3 Marks)**
- (b) State any **FOUR** SI units commonly used electronic measurements **(4 Marks)**
- (c) Describe **FOUR** types of capacitors **(4 Marks)**
- (d) Describe briefly the construction of Field Effect Transistor **(4 Marks)**
- (e) (i) Describe **TWO** application of feedback in electronic circuits
- (ii) Explain the importance of standards (SI units) in electronic measurements **(4 marks)**
- (f) (i) Describe *ionization* as applied in electronics
- (ii) Outline any **TWO** types of ionization **(3 Marks)**
- (g) Explain how a transistor can be used as a switch **(4 Marks)**
- (h) Distinguish between the terms electronics and electricity **(2 Marks)**

SECTION B (ANSWER ANY TWO QUESTIONS)

Question 2 (20 marks)

- (a) (i) describe the V-I characteristic of a P-N junction diode with the aid of a well labeled diagram
- (ii) Name any **FOUR** major parts of the V-I characteristics in a) (i) above **(8 Marks)**
- (b) (i) State **THREE** main bipolar transistor configurations.
- (ii) Describe with the aid of a sketch how the configurations in b) (i) above are attained. **12 Marks**

Question 3 (20 marks)

- (a) (i) Draw the symbols for the **TWO** types of bipolar transistors
- (ii) Describe with the aid of a diagram the **THREE** configuration of a transistor **(8 Marks)**
- (b) Distinguish between the following types of operational amplifiers Op-amps
- (i) Inverting op-amp and non-inverting Op-Amp with the aid of a sketch
- (ii) Differential Op- amp and Summing Op-amp **(12 Marks)**

Question 4 (20 marks)

- (a) (i) State thevenin's theorem
 (ii) Explain ONE advantage of using Thevinin's theorem
 (ii) Calculate the equivalent voltage source
 (iii) Calculate the equivalent resistance
 (iv) Calculate the current through a resistor R_1 of $5.5\text{ K}\Omega$ is connected between A and B

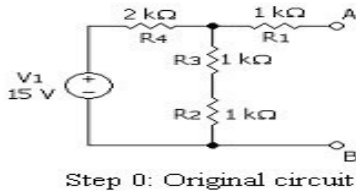


FIG 1

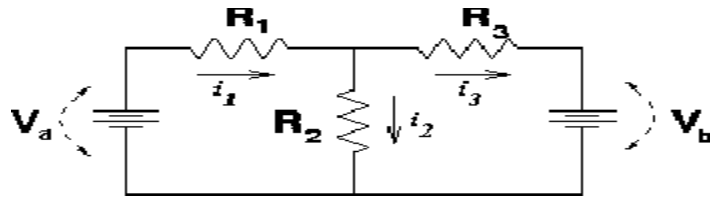
(8 Marks)

- (b) (i) State Norton's theorem
 (ii) Find the equivalent source current of Fig 1
 (iii) Find the current through resistor R_1 of $1.75\text{ K}\Omega$ connected across terminals A & B
 (iv) State **TWO** key steps involved in Norton's theorem calculations **(6 Marks)**
- (a) Explain with the aid of a diagram the internal resistance considerations and how a multi-meter is connected in a circuit to measure.
- (i) Current
 (ii) Voltage
 (ii) Resistance **(6 Marks)**

Question 5 (20 marks)

- (a) (i) Describe briefly any **FIVE** types of resistors
 (ii) State the colour code for the following resistors
- 1) $67\text{ K}\Omega$
 2) $47\text{ M}\Omega$ **(7 Marks)**
- (b) (i) Find the voltage drop across all the resistors using Kirchoff's Law
 (ii) Calculate the current through all the resistors using superposition theorem.

DATA: $V_a = 36\text{ V}$, $V_b = 24\text{ V}$, $R_1 = 10\ \square$, $R_2 = 15\ \square$, $R_3 = 20\ \square$



(8 Marks)

(c) (i) Define inductor

(ii) Describe FOUR types of inductors

(5 Marks)