MURANG'A UNIVERSITY COLLEGE

(A CONSTITUENT COLLEGE OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY)

DEPARTMENT: **ELECTRICAL AND ELECTRONIC ENGINEERING**

LEVEL: **DIPLOMA**

CLASS: **SME/A/P/14DM**

MODULE/ SEMESTER: II

ACADEMIC YEAR: 1

UNIT: **ELECTRONICS**

UNIT CODE: SME1205

DATE: 24TH APRIL 2015   TIME: 2HOURS

Instructions to Candidates

- ➤ This paper contains 4 questions

- ➤ This paper contains 2 sections section A and Section B

- ➤ **Question 1 is compulsory attempt TWO Questions from section B**

You should have the following for this Examination:

- ○ Drawing Instruments

- ○ Scientific Calculator

- ○ Mobile phones are not allowed.

SECTION A

Qn.1. (a) Distinguish between Intrinsic and Extrinsic semiconductors.   (4mks)

    b) With the aid of sketches explain the formation of the following semiconductors giving an example of impurities used in each case
    i) P-type
    ii) N-type   (6mks)
    c) i)Define the term Depletion layer
    ii) State THREE Factors upon which barrier potential depends.   (4mks)

(a) (i) Explain three advantages of digital over analog circuits

d) Define the following terms giving an example:

      I   Bit
      II   Nibble
      III Word   (7mks)
      IV Byte

e) With the aid of a diagram ,Boolean Algebra and truth tables, explain the following logic gates

    I NAND Gate
    II NOR Gate
    III EX-OR Gate
    IV NOT Gate   (9mks)

SECTION B

2.   a)   Draw Schematic symbols of each of the following diodes stating ONE application for each: LED,Varactor diode, and tunnel diode   (6mks)

    b)   (i) Sketch a well labeled I-V I Characteristic curve of a Zener diode.   (4mks)
           (ii)List TWO methods of Identifying Transistors.   (4mks)
    c)   (i) Sketch the schematic symbols of the PNP and NPN transistors and label the THREE terminals.
           (ii) Sketches the three modes of Transistor configuration.   (6mks)

3.   a)(i) With the aid of a labelled diagram explain THREE methods of Transistor biasing.   (9mks)

      (ii) With the aid of a diagram explain the Operation of a Zener Diode Stabilizer circuit   (6mks)

    b) Explain the following terms
     i) Hole Electron pair   (2mks)
     ii) Valence electrons   (2mks)
     iii) Conduction Electrons   (2mks)

4. a) With respect to SCR define the following terms
     i Break-over Voltage
     ii Holding current
     iii Peak reverse voltage   (6mks)
   b) With the aid of a diagram explain a full Wave Bridge Rectifier circuit   (6mks)

   c)From first principles show the relationship that exists between constants alpha and beta (6mks)

   d) List TWO advantages and disadvantages of Biasing with a Resistor feedback method.   (2mks)