061006T4ICT

ICT TECHNICIAN LEVEL 6

IT/CU/ICT/CC/01/6

Apply Basic Electronic

March/April 2024

TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL (TVET CDACC)

WRITTEN ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE:

*This paper consists of **TWO** sections: **A** and **B**.*

*Answer **ALL** questions in sections **A** and any **THREE** questions in section **B** in the answer booklet provided.*

Marks for each question are indicated in brackets.

Do not write on this question paper.

*Answer the questions in **English.***

This paper consists of FOUR (4) printed pages

Candidates should check the question paper to ascertain that all pages are printed as indicated and that no questions are missing

SECTION A (40 MARKS)

*Answer **ALL** the question*

1. Define each of the following terms used in basic electronic:
    a. Doping. (1 mark)
    b. Conductivity. (1 mark)
2. A battery of E.M.F 12V supplies a current of 5A for 2 minutes. How much energy is supplied in this time? (3 marks)
3. With aid of a diagram, show a circuit showing three resistors connected in
    a. Parallel. (2 marks)
    b. Series. (2 marks)
4. Determine the arithmetic operation $345_8 + 43F_{16}$ leaving the answer in decimal equivalent (3 marks)
5. Using 2's complement, evaluate $1011\ 1111_2 - 1000\ 0001_2$. (3 marks)
6. Determine the resistance of 1200 Meters of copper cable having a diameter of 12mm if the resistivity of copper is 1.7×10^{-8} ΩM. (4 marks)
7. For how long must a current of 100mA flow through a circuit to build a charge of 80C. (3 marks)
8. A 100V battery is connected across a resistor R and causes a current of 5 mA to flow through it. Determine the value of the resistor. (3 marks)
9. A computer company intended to use the extrinsic semiconductor materials to develop some components. Explain TWO possible uses of the material. (4 marks)
10. State FOUR characteristics of Random Access Memory. (4 marks)
11. In a DC circuit, resistors are used to control current flow. Outline TWO common types of resistors in the market. (2 marks)
12. List the FIVE types of Read Only Memory used in computers. (5 marks)

SECTION B (60 MARKS)

*Answer any **THREE** questions*

13.

a. Convert the binary number 1010 1011.01111$_2$ to:
   a) Hexadecimal. (3 marks)
   b) Decimal. (3 marks)

b. Explain THREE disadvantages of DRAM used in computer. (6 marks)

c. A p-n junction is an essential component in many semi-conductor devices used to control flow of current. Describe how the junction is formed. (6 marks)

d. Define memories as used in computers. (2 marks)

14.

a. Calculate each of the following arithmetic operation:
   a) $453_8 + 444_{8.}$ (3 marks)
   b) EA616 +42416. (3 marks)
   c) 11102 * 1112. (4 marks)

b. Using a well labelled diagram, draw a structure of a silicon atom and list TWO types of bonds present in it. (6 marks)

c. Outline FOUR opportunities created by emerging trends of electronic components. (4 marks)

15.

a. Parallel circuit offers several advantages over series circuit making them a preferred choice in many electrical appliances. Explain THREE advantages of a parallel circuit. (6 marks)

b. Draw a circuit diagram to distinguish between forward and reverse bias of p-n junction diode. (6 marks)

c. Kiprono wanted to design an electrical circuit using inductors. Outline FOUR types of inductors he is likely to use in his circuit. (4 marks)

d. In a DC circuit, several components are commonly included to perform various functions. Outline FOUR components used for power supply. (4 marks)

16.

a. Explain FOUR factor that affect the resistance of a conductor. (8 marks)

b. A 5μF capacitor is required so that the p.d. between its plates is 800V. Calculate how long the capacitor can provide an average discharge current of 2mA.

(4 marks)

c. Explain what happens to the depletion layer when a diode is:

a) Forward biased. (4 marks)

b) Reverse biased. (4 marks)

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