061005T4ICT

ICT TECHNICIAN LEVEL 5

IT/OS/ICT/CC/01/5

APPLY BASIC ELECTRONICS

July/August 2024

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

WRITTEN ASSESSMENT

TIME: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper consists of TWO sections: A and B
2. Answer ALL questions in section A and THREE questions in section.
3. Marks for each question are indicated in the brackets.
4. Do not write on the question paper
5. Answer ALL questions in English**.**

This paper consists FIVE (5) printed pages.

Candidate should check the question paper to ascertain that

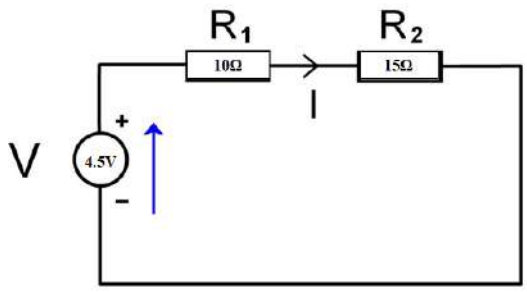
all pages are printed as indicated and that no questions are missing

SECTION A: 40 MARKS

Answer ALL the questions in this section.

1. Electronic components are the building blocks of modern electronic devices, ranging from simple circuits to complex systems. Explain the following components:
   i. Transformer (2 marks)
   ii. Inductor (2 marks)
2. An electrical circuit consists of various electrical components connected by conductive wires or traces. Name TWO types of this circuits (2 marks)
3. Kamau a basic electronics trainer at Machaka TVC asked level 5 learners to name quantities and their SI units. Highlight FOUR examples they shared with him. (4 marks)
4. Number systems are integral to various aspects of computing, from basic hardware operations to high-level programming and data representation. Outline FOUR popular number systems used in computing. (4 marks)
5. Amplifiers are designed to increase the amplitude (magnitude) of an electrical signal, name FOUR areas of their application in society. (4 marks)
6. Integrated circuits have brought a revolution in the electronics industry by harnessing the power of millions of electronic components into one. State THREE advantages of integrated circuits (3 marks)
7. A group of trainees from Utubora TTI went for a field trip to centurion systems. During the course of their visit, they discussed about various semi-conductor components. Define the following terms they came across:
   i. Doping (2 marks)
   ii. Band gap (2 marks)
   iii. Charge carrier (2 marks)
8. While examining the ability of material to either allow or not allow current to pass through, trainers from Uhai TVC classified them according to their atomic content. State THREE sub atomic particles they came up with. (3 marks)
9. While repairing a computer, Dennis a Computer Technician realized that he needed some storage devices. List FOUR types of memory that he could choose from. (4 marks)

10. The end term exam had the diagram of the circuit shown below. Use it to determine the current flowing through. (4 marks)



11. Diodes are semiconductor devices that allow current to flow in one direction. Outline TWO types of diodes (2 marks)

SECTION B: 60 MARKS

Answer any THREE questions from this section.

12.

a) Mr. Mafuta just taught you about binary representation of decimal numbers and how they can be represented by a fixed number of binary digits. Use this knowledge to perform the following calculations using BCD arithmetic

i. $(0111\text{-}0010)_{BCD} + (0101\text{-}0010)$ (2 marks)

ii. $(1001\text{-}1111) - (1001\text{-}1000)$ (2 marks)

iii. $(1001\text{-}1010) + (0011\text{-}0101)$ (2 marks)

iv. $(1101\text{-}1011) - (0110\text{-}1001)$ (2 marks)

b) Different number systems use different symbols and rules for representing numbers. Determine the decimal equivalent of each of the following number system.

i. FC716 (3 Marks)

ii. 1010 11012 (3 Marks)

c) A circuit has power of 144 watts and a conductance of (G) of 1.5×10^{-3} Siemens. Calculate the:

i. Voltage(v) (4 marks)

ii. Current(I) (2 marks)

13.

a) Different isotopes of the same Element have a varying number of neutrons in an atom which leads to differences in nuclear stability. Clarify THREE functions of neutrons in an atom. (6 Marks)

b) The behavior of a PN junction diode under different biasing is crucial for understanding its function in electronic circuits. Differentiate between forward and reverse biasing of a PN junction diodes (6 marks)

c) Imagine you are tasked with storing a diverse multimedia project for a museum that includes high-resolution photographs, video documentaries, interactive educational content, and audio interviews. Discuss the various types of Compact Disks (CDs) you might use for storage (8 marks)

14.

a) When P type and N type semi-conductor materials are combined, they form a P-N junction. Describe the FOUR areas where the P-N junction diodes can be used. (8 marks)

b) Emerging trends in electronics reflect the rapid evolution of technology and its impact on various industries and everyday life.

i. Define electronics (2 marks)

ii. Explain FIVE emerging trends in electronics. (10 marks)

15.

a) Convert the following Binary number to its decimal equivalent

i) 11010_2. (2 Marks)

ii) 10110.001_2. (4 Marks)

b) With aid of a sketch, outline the configurations of PN junction diode showing both the input signal and output. (8 marks)

c) Discuss THREE different types of semiconductor memory in modern technology. (6 Marks)

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