061006T4ICT
ICT TECHNICIAN LEVEL 6

IT/OS/ICT/CC/01

Apply Basic Electronics

Nov/Dec 2024

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

WRITTEN ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. Marks for each question are indicated in the brackets.
2. The paper consists of **TWO** sections: **A** and **B**.
3. Candidates are provided with a separate answer booklet
4. **DO NOT** write on this question paper.

This paper consists of FIVE (5) 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 questions in this section.

1. In electronics field a number system is a method of expressing numbers in digital format. Use examples to illustrate the two types of number system used in electronics and programming. (4 marks)

2. Electric current is the rate of flow of electric charge through a conductor. Explain the difference between the two types of electric current. (4 marks)

3. Computer storage mediums vary widely in technology and form, and they each offer different characteristics in terms of speed, capacity, and durability. State four types of storage technologies: (4 marks)
4. Integrated circuits are foundational to modern electronics, allowing for the creation of compact and efficient devices. Give FOUR examples of integrated circuit. (4 marks)
5. The versatility of integrated circuits in enables advanced functionality and efficiency across numerous fields. State FOUR application areas of integrated circuits.(4 marks)
6. Electrical circuits can be classified into various types based on their configuration, function, and components. With aid of a labelled schematic diagram illustrate the two types of electrical circuits based on configuration. (4 marks)
7. Electronic components are represented by standardized symbols in circuit diagrams, which help to convey the functionality and connections of various components. Sketch the standard symbols of the devices named below. (4 marks)
    a. Capacitor
    b. Voltmeter
    c. Diode
    d. Electric bell
8. Understanding the roles and differences between the main memory and cache memory helps in appreciating how modern computers deliver efficient performance. Giving examples of computer main memory and cache memory and the function of each. (4 marks)
9. The decimal system uses ten digits to record a number with each digit indicating a value which depends on the position it occupies. Indicate the placevalue of each digit in the number 5281. (4 marks)

10. Resistors are identified using the standard colour code chart

Colour	1st Band	2nd Band	3rd Band	Multiplied	Tolerance
Black	0	0	0	1Ω	
Brown	1	1	1	10Ω	± 1% (F)
Red	2	2	2	100Ω	± 2% (G)
Orange	3	3	3	1KΩ	
Yellow	4	4	4	10KΩ	
Green	5	5	5	100KΩ	± 0.5% (D)
Blue	6	6	6	1MΩ	± 0.25% (C)
Violet	7	7	7	10MΩ	± 0.10% (B)
Grey	8	8	8	100MΩ	± 0.05%
White	9	9	9	1GΩ	
Gold				0.1Ω	± 5% (J)
Silver				0.01Ω	± 10% (K)

Use the chart above to determine the resistance of a resistor having color following colour code: (4 marks)

i. Green, violet, white, and gold

ii. Yellow, violet and silver

SECTION B (60 MARKS)

Answer Any THREE Questions in This Section

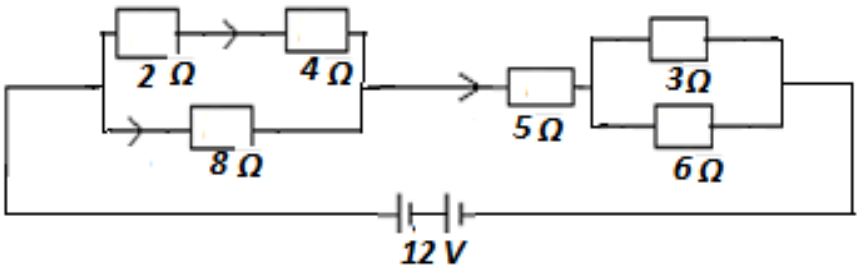
11.

a) A 2Ω Resistor isconnected in a simple circuit with a supply 10V

i. Calculate the voltage across the resistor if it is the only component connected. (4 marks)

ii. Determine the voltage across the circuit if the resistor is part of a circuit with other resistors and equally sharing the 10V supply in the network. (2 marks)

b) Six resistors are connected in a circuit as shown in the figure below.



i. Calculate the total resistance of the circuit (6 marks)

ii. Determine total current in the circuit (3 marks)

iii. The current through the 3Ω resistor (3 marks)

iv. The voltage drop across 3Ω resistor (2 marks)

12.

a) Emerging trends in electronic manufacturing present numerous challenges as the industry evolves rapidly. Discuss any SIX challenges of emerging trends in electronic manufacturing. (12 marks)

b) Diodes orientationand depletion region affects overall circuit behavior. Distinguish between forward and reverse bias of a p-n junction diode. (8 marks)

13.

a) Material purity impact the functionality and application of semiconductors. Discuss SIX differences between intrinsic and extrinsic semiconductors. (12 marks)

b) To describe the behavior of electric current in a circuit, an analysis of periodic waveform is desirable. Define the following terms as used in electric current waveform. (8 marks)

i. Cycle

ii. Periodic

iii. Frequency

iv. Peak value

14.

a) Numbers are expressed in different bases with decimal denoting base-10 while Octal denotes base-8. Convert the decimal number 27_{10} to its octal equivalent. (6 marks)

b) The characteristics and functions of different types of memory play a crucial role in the overall performance and efficiency of computing systems.

i. Explain TWO advantages of using Read only Memory (ROM) storage media citing its practical application (2 marks)

ii. State TWO reasons for using Dynamic Random Access Memory (DRAM) as a primary memory (4 marks)

iii. Describe the working mechanism of Virtual Memory as secondary storage concept (4 marks)

iv. Outline FOUR Characteristics of Auxiliary Memory (4 Marks)