

061005T4ICT

ICT TECHNICIAN LEVEL 5

IT/OS/ICT/CC/01/5

Apply Basic Electronics

Nov/Dec 2024



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

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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 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 questions in this section.*

1. Electrical components can be divided into active and passive elements. Name FOUR examples of active elements in an electrical circuit. (4 marks)
2. While studying semiconductor theory, trainees were asked to define the following terms:
 - a. Atom (1 mark)
 - b. Conduction band (1 mark)
 - c. Energy gap (1 mark)
 - d. Hole (1 mark)
3. Dennis was asked to list the different types of bonds between atoms. Give FOUR types of bonds he is likely to mention. (4 marks)
4. Memory is a very important component in a computer. List FOUR advantages of optical memory. (4 marks)
5. A diode can either be forward biased or reverse biased. Outline FOUR uses of reverse bias of a diode. (4 marks)
6. Agnes noticed that some computer motherboards had some color bands. Determine the resistance of each color band:
 - a. Green, white, yellow, gold (2 marks)
 - b. Brown, black, green, silver (2 marks)
7. During a basic electronics lessons, trainees collected different types of materials with different conductivity. Comment on the conductivity of each of the following materials:
 - a. Metal (1 mark)
 - b. Glass (1 mark)
 - c. Silicon rod (1 mark)
 - d. Plastic (1 mark)
8. Amplifiers are designed to increase the amplitude (magnitude) of an electrical signal, name FOUR types amplifiers in society. (4 marks)
9. Signals in electronics travel as electrical signal and are interpreted as 0 or 1. Identify FOUR advantages of this number system. (4 marks)
10. Name FOUR advantages of integrated circuits. (4 marks)

SECTION B (60 MARKS)***Answer Any THREE Questions in This Section***

11. While trying to switch off the lights in her room, Jane noticed that the light in the bathroom and the balcony went off too.
- Name the type of circuit connection between the three bulbs. (1 mark)
 - Explain FOUR advantages of the circuit connection in (a) above. (8 marks)
 - The bulb in Jane's room has a power rating of 20W, the one the balcony has a power rating of 15W and the one in the bathroom 15W and a current of $250,000\mu\text{A}$ is flowing through the bulb in Jane's room.
 - Calculate the voltage drop across each of the bulbs. (7 marks)
 - Calculate the resistance in each bulb. (4 marks)
12. Allan bought a computer from a shop and notice that the computer was using magnetic memory.
- Explain FOUR benefits he is likely to derive from using such memory (8 marks)
 - Other than magnetic TWO other types of memories. (2 marks)
 - Describe THREE typ d in computers. (6 marks)
 - Differentiate between DVD-R and DVD-RW as used in computer memories (4 marks)
13. Semiconductors are used to create transistors which are essential components in the current generation of electronic devices.
- Explain FOUR applications of transistors. (8 marks)
 - Differentiate between NPN and PNP transistors. (6 marks)
 - With the aid of a diagram, describe a simplified structure of a silicon crystal lattice. (6 marks)
14. Number systems are very essential especially when working with digital systems.
- Convert the following numbers to binary
 - $1A34_{16}$ (2 marks)
 - 1024_8 (2 marks)
 - 255.375_{10} (2 marks)
 - Determine the excess-3 equivalent of 346_8 . (4 marks)
 - Using BCD, evaluate $45 + 22$ (4 marks)

d. Evaluate each of the following in hexadecimal giving your answer in octal:

i. $A1_{16} + 6C_{16}$ (3 marks)

ii. $F7_{16} - 5D_{16}$ (3 marks)