061006T4ICT

ICT TECHNICIAN LEVEL 6

IT/OS/ICT/CC/01/A

IT/OS/ICT/CC/01/B

Apply Basic Electronic

July/August 2025

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

WRITTEN ASSESSMENT

Time: 3 HOURS

INSTRUCTIONS TO CANDIDATE

1. The paper consists of **TWO** sections: **A** and **B**.
2. Answer ALL questions in section A and any THREE in (3) questions in section B
3. Marks for each question are indicated in the brackets.
4. Candidates are provided with a separate answer booklet
5. 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)

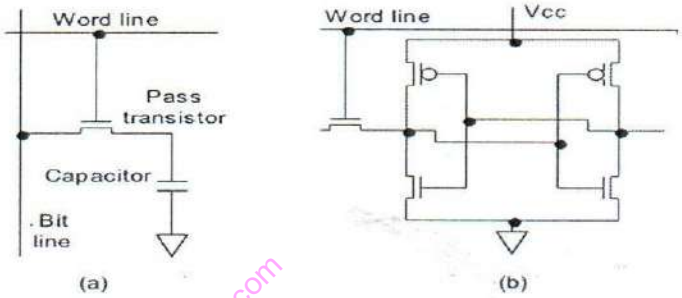
Answer ALL the questions in this section.

1. Various electronic components are used in a computer motherboard to regulate current flow. Name TWO such components. (4 marks)
2. A DC power supply of 12V is connected to a circuit containing three resistors: $R_1 = 6\Omega$ and $R_2 = 3\Omega$ are connected in parallel, while resistor $R_3 = 4\Omega$ is connected in series with the power supply. Determine the power dissipated in the circuit (3 marks)
3. When performing an electrical circuit diagram analysis, a trainee came across the following electrical quantities. Define each quantity.
   a) Electric current ; (2 marks)
   b) Potential difference. (2 marks)
4. Nano-electronics use small components and materials in the design. Explain TWO advantages of this technology. (4 marks)
5. A diode is a junction and is the fundamental electrical component used in current rectification. Explain the following concepts as applied in the junction:
   a) Forward biasing (3 marks)
   b) Reverse biasing. (3 marks)
6. State ohm's law. (2 marks)
7. Mr. T bought an electric iron with a resistance rating of 50 ohms, he plugged it into a power source and draws a current of 3.2 amperes. Calculate the voltage supplied to the iron. (3 marks)
8. Draw a labelled, schematic diagram of an electric circuit comprising of a cell, a resistor, an ammeter, a voltmeter in a closed switch circuit. (2 marks)
9. Most modern electronic systems are designed using Integrated circuits. Mention THREE reasons for their use in the design. (3 marks)
10. Intrinsic and extrinsic semiconductors are the two main semiconductors which are used to fabricate semi-conductors memories. Give TWO differences between these types of semiconductors. (4 marks)
11. Digital systems used for performing arithmetic's are designed using Binary Coded Decimal (BCD) other than pure binary. Outline THREE advantages of using the Binary Coded Decimal. (3 marks)
12. An alternating voltage is given by the equation: $v(t)=170\sin(100\pi t)$. Determine its peak voltage (2 marks)

15.	a) After conducting a test on a faulty electronic motherboard. A technician concluded that the capacitor needed replacement. Outline FOUR functions of the capacitor on the motherboard. (4 marks) b) A coil with an inductance of 0.2 H with a cross section area of 0.5 m^2 and a length of 5 cm. calculate the number of turns required in the coil. (5 marks) c) Convert the following number systems to their equivalent as indicated in each question i) 101011.1011_2 to decimal. (4 marks) ii) $1FB.F2_{16}$ to binary. (3 marks) iii) 245.89 to octal. (4 marks)
16.	a) A trainee wanted to purchase a computer memory for a new computer and considered the memory listed below. Outline TWO differences of each list: i) Zip disk and Flash disk; (2 marks) ii) Primary and secondary storage. (2 marks) b) The field of electronics has experienced lots of changes over the past few years. Describe FOUR emerging trends in this field. (8 marks) c) A computer company was planning on upgrading their computer Read Only Memory. Discuss FOUR different types of Read Only Memory they might consider. (8 marks)

SECTION B (60 MARKS)

Answer any THREE questions in this section.

13.	a) An electronics technician needs to understand how atomic structure affects electrical conductivity. Explain THREE characteristics of atomic structure that influence a material's ability to conduct electricity. (6 marks) b) The technician notices a burning smell, a high-pitched noise coming from an inductor. Describe one measuring tool the technician could use to test the inductor for the fault. (2 marks) c) With the aid of a well labelled diagram, draw an inductor. (6 marks) d) Study the diagram below and use it to answer the question that follows,  i) Mention THREE differences between type (a) and type (b) memory shown in the diagrams above. (6 marks)
14.	a) An ICT Technician is assembling a timing circuit that uses two capacitors rated at 100 μF and 200 μF connected in series across a 50V DC power supply. After turning on the circuit, the capacitors are fully charged in 5 seconds. i) Determine the total equivalent capacitance of the circuit. (3 marks) ii) Determine the total charge stored in the circuit network once it is fully charged. (3 marks) iii) Calculate the average current flowing into the capacitors during the 5 seconds charging period. (2 marks) b) An electronic student was building a small audio amplifier. To get the right balance between voltage gain and signal stability, they need to choose the right transistor configuration. Describe THREE transistor configurations that they would use. (6 marks) c) Resistance in a circuit affects how the circuit operates. Describe THREE factors that influence the choice of resistors in a circuit. (6 marks)