

**051005T4ICT**

**ICT TECHNICIAN LEVEL 5**

**IT/OS/ICT/CC/01/5**

**APPLY BASIC ELECTRONICS**

**July /Aug 2023**



**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 brackets ()
2. This paper consists of **THREE** sections: **A, B and C**
3. You are required to provide your responses in the provided answer booklet.
4. Do not write on the question paper.

**This paper consists of SEVEN (7) 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: (20 MARKS)**

Answer **all** questions in this section.

Each question carries one Mark.

1. The deviation of resistance of a resistor is known as
  - A. Inductance
  - B. Resistivity
  - C. Tolerance
  - D. Ohms
2. An electrical component use to store electrical charge is
  - E. Charger
  - F. Adaptor
  - G. Capacitor
  - H. Logic gate
3. Copper and aluminum are examples of
  - A. Conductors
  - B. Insulators
  - C. Semi-conductors
  - D. Electricity
4. When a Semi-Conductor material is heated, it's resistance \_\_\_\_\_
  - A. Decreases
  - B. Increases
  - C. Does not change
  - D. Increase then Decreases
5. In which form does an inductor store energy
  - A. Electric
  - B. Electro-magnetic
  - C. Magnetic
  - D. Permittivity
6. The rate of change of energy is measured in
  - A. Joules
  - B. Henry

C. Voltage

D. Wattage

7. An electrical instrument used to measure the amount of current in an electrical circuit is called

A. Amperes

B. Potential difference

C. Ammeter

D. Coulombs.

8. Which of the following is not a property of a wave.

A. Power

B. Period

A. Frequency

C. Amplitude

9. The dielectric material used in a capacitor increases it's \_\_\_\_\_

A. Permittivity

B. Capacitance

C. Farad

D. Permeability

10. Which of the following types of memory is used for cache memory

B. SDRAM

C. DRAM

D. SRAM

E. CRAM

11. During a apply basic electronic practical class, a trainee was handed the component shown below. Identify the component.



A. Fixed Resistor

B. Fixed Inductor

C. Variable Resistor

D. Fixed Inductor

12. Which of the following statement correctly describes characteristic of a valence electron
- A. They are highly mobile electrons
  - B. They do not take part in bonding
  - C. They exist in any electron shell in an atom
  - D. They determine the physical characteristics of an atom
13. In modern computing, a packed BCD is preferred over unpacked BCD. What is the main reason for this preference
- A. Packed BCD is memory efficient
  - B. Packed BCD is easily understood by computer
  - C. Unpacked BCD is outdated
  - D. Unpacked BCD is ambiguous
14. A single transistor is used to implement \_\_\_\_\_ gate.
- A. NAND
  - B. OR
  - C. NOR
  - D. NOT
15. Electrical quantities whose value varies in non-continuous manner are referred to as
- A. Analogous
  - B. Encapsulation
  - C. Digital
  - D. Frequencies
16. A capacitor is constructed using how many plates
- A. 1.
  - B. 2
  - C. 3
  - D. 4
17. Name the instrument shown below:

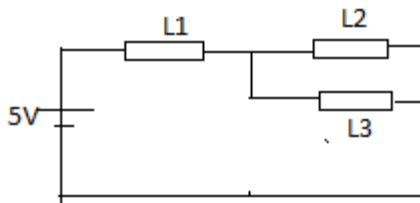


- A. Ohmmeter
  - B. Potentiometer
  - C. Digital meter
  - D. Voltmeter
18. Which of the following is the odd one out
- A. RAM
  - B. ROM
  - C. Cache
  - D. Flash disk
19. The total number of electrons in an atom is known as
- A. Atomic radius
  - B. Atomic number
  - C. Atomic size
  - D. Atomic weight
20. Which of the following is an active electrical component
- A. Transistor
  - B. Capacitor
  - C. Inductor
  - D. Resistor

**SECTION B (40 MARKS)**

Answer *all* questions in this section.

21. The measure of how difficult is it for current to pass through a material is known as resistance and it's affected by many factors. List FOUR such factors. (4 Marks)
22. RAM and ROM are primary memories of a computer. Outline FOUR differences between the two. (4 Marks)
23. Describe TWO types of biasing techniques used in a p-n junction. (4 Marks)
24. Draw a truth table of a NAND gate with two input variables. (3 Marks)
25. In number presentation, hexadecimal numbers are not preferably used. List THREE disadvantages of the hexadecimal numbers. (3 Marks)
26. The figure below shows a closed circuit of three inductors L1, L2 and L3 of 0.5H, 1H and 2H respectively Use it to answer the questions below.



- a) Determine the equivalent inductance in the circuit (4 Marks)
- b) Describe the flow of current in L1 and L3. (2 Mark)
27. Evaluate the following arithmetic giving your answer in binary:  $152_8 - 67_8$  (3 Marks)
28. Determine current in a closed circuit having two resistors connected in series of values  $10\Omega$  and  $15\Omega$  respectively with an EMF of 4.5V. (4 Marks)
29. DVDs are gaining popularity more than CD-ROM's', list FOUR advantages of a DVD over CD-ROM. (4 Marks)
30. State Ohm's Law. (2 Marks)
31. List THREE factors that could necessitate the use of inductors in a circuit. (3 Marks)

**SECTION C (40 MARKS)**

*Answer any TWO questions in this section.*

32.

- a) Differentiate between *power* and *energy* as used in electronics. (4 Marks)
- b) Determine the decimal equivalent of each of the following number system.
  - i.  $FC_{16}$  (3 Marks)
  - ii.  $1010\ 1101_2$  (3 Marks)
- c) Determine resistance of a resistor having color code given below
  - i. Green, violet, white and gold. (2 Marks)
  - ii. Yellow violet and silver (2 Mark)
- d) Explain THREE circumstances under which 2's complement is used in computer (6 Marks)

33.

- a) Integrated Circuits are used commonly when developing electronic circuits, Explain THREE benefits of Integrated Circuits. (6 Marks)
- b) With the aid of a diagram, describe the computer memory hierarchy (6 Marks)
- c) During apply Basic electronic lesson the students were required to construct a simple electronic circuit, describe the FOUR components they will use (8 Marks)

34.

- a) Differentiate between doped semiconductors and un-doped semiconductors. (4 Marks)
- b) Discuss any SIX challenges of emerging trend in electronic manufacturing. (12 Marks)
- c) Silicon is mostly preferred over germanium in fabricating semiconductors electronic devices. Explain TWO main benefits of silicon over germanium. (4 Marks)

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