**061005T4ICT**

**ICT TECHNICIAN LEVEL 5**

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

**APPLY BASIC ELECTRONIC**

**Mar./Apr.2023**

**Time: 3 Hours**

# THE KENYA NATIONAL EXAMINATIONS COUNCIL

## WRITTEN ASSESSMENT

**3 Hours**



**INSTRUCTIONS TO THE CANDIDATES:**

*Maximum marks for each question are indicated in the bracket.*

*The paper consists of **THREE** sections: **A**, **B** and **C.***

*Answer questions as per instructions in each section.*

*You are provided with a separate answer booklet.*

***Candidates should answer the questions in English.***

***This paper consists of Eight (8) printed pages***

***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

## Section A (20 marks)

*Answer **ALL** questions in this section*

1. Electric current can be defined as_____. (1 mark)
   A. The rate at which free electrons can be made to drift through a material in a particular direction Coulomb.
   B. The rate at which free electrons can be made to drift through a material.
   C. Electrons in motion.
   D. Power, energy and force in a circuit.
2. 80 coulombs of charge were transferred by a current of 0.5 A. Calculate the time for which the current flowed. (1 mark)
   A. 160 minutes
   B. 40 seconds
   C. 160 seconds
   D. 80 seconds
3. Bit can be defined as? (1 mark)
   A. A set of facts.
   B. A representation of a value in binary notation.
   C. The most commonly used unit of measuring the capacity of a computer memory.
   D. Human message.
4. The rate at which energy is dissipated is? (1 mark)
   A. Power
   B. Energy
   C. Resistance
   D. Current
5. What is the function of a neutron in an atom? (1 mark)
   A. Keeps the nucleus of an atom intact.
   B. Compared the behaviour of atoms.
   C. Charges the protons in an atom.
   D. Reduces the flow of current.

6. What carries current in a PnP transistor? (1 mark)

   A. Acceptor ions
   B. Donor ions
   C. Free Electrons
   D. Holes

7. Determine the octal equivalent of $27_{10}$. (1 mark)

   A. 278
   B. B18
   C. B116
   D. 338

8. A phenomenon in which applied voltage and resulting current are in phase is? (1 mark)

   A. Resonance
   B. Energy
   C. Power
   D. E.M.F



9. Conductance is the measure of? (1 mark)

   A. Ability of material or circuit to allow current to flow through it.
   B. Protection of the terminal equipment against direct lightning stroke
   C. Connect circuits
   D. Reduce power loss

10. What is used to automatically detect transmission errors in data communication? (1mark)

   A. Parity bit
   B. Binary bit
   C. Excess -3
   D. Gray codes

11. Power factor is the ratio of? (1 mark)

   A. True power to apparent power
   B. Apparent power to True power
   C. Sum of real and Reactive power to Apparent power
   D. Apparent power to (Real – Reactive) power

12. The most commonly used unit of measuring the capacity of computer memory is? (1 mark)

    A. Bit
    B. Byte
    C. Word
    D. Binary Digits

13. The process of converting data from human language to binary language that computers can understand is_____. (1 mark)

    A. Data processing
    B. Data coding
    C. Number systems
    D. Data integration

14. The reduction of arithmetic operation exciding the assigned work area by computers is called? (1 mark)

    A. Overflow
    B. Rounding up
    C. Rounding off
    D. Truncation



15. The voltage of a domestic supply is 220V. This figure represents_____. (1 mark)

    A. RMS value
    B. Peak value
    C. Mean value
    D. Lower value

16. The best place to install a capacitor is_____. (1 mark)

    A. Any where
    B. Very near to the induction load
    C. Across the terminals of the induction load
    D. Far away from the induction load

17. All the laws and rules of D.C circuits also apply at A.C circuits containing? (1 mark)

A. Inductance only
B. Resistances only
C. Capacitance only
D. All the above

18. The SI unit of energy is? (1 mark)

A. Kelvin
B. Candia
C. Mole
D. Ampere

19. _____converts electrical energy into heat energy by opposing the flow of electric current. (1 mark)

A. Inductance
B. Resistance
C. Capacitance
D. Diode



20. When two or more resistors in a circuit allow the same current to flow through all the resistors the circuit is said to be in? (1 mark)

A. Series
B. Parallel
C. Forward biased
D. Reverse biased

## Section B (40 marks)

*Answer **ALL** questions in this section*

21. A computer company in Nairobi town intended to use the extrinsic semiconductor materials to develop some components.
    a) List **two** possible application of the material. (2 marks)
    b) Outline **two** properties of an atom. (2 marks)
22. Trainees at Kitale National Polytechnic were discussing the different types of circuits;
    a) Outline **three** AC wave form characteristics. (3 marks)
    b) Explain **two** power sources of DC circuits. (2 marks)
23. Using a diagram, explain how a forward-bias PN junction diode works. (5 marks)
24. Perform the following binary arithmetic's using Two's complement method.
    a) $11011001_2 - 1100110_2$ . (2 marks)
    b) $1011100_2 - 100001_2$. (2 marks)
25. 10Ω resistor, a 20Ω resistor and a 30 Ω resistor are connected
    a) In series
    b) In parallel with each other.
    Calculate the total resistance for each of the two connections. (4 marks)
26. Outline **four** factors affecting resistance. (4 marks)
27. Define the term power. (1 mark)
28. List **four** advantages of using DVDs in data storage over the CD- ROMs. (4 marks)
29. Determine the octal equivalent for each of the following
    a. $100A_{16}$. (2 marks)
    b. $110010111_2$. (2 marks)
30. A charge of 35mC is transferred between two points in a circuit in a time of 20ms.
    Calculate the value of current flowing. (3 marks)
31. Light emitting diodes are replacing conventional light bulbs in industrial use. Explain **two** possible reasons why. (2 marks)

## Section C (40 marks)

*Answer any **two** questions in this section.*

32. A computer refurbishing company in Mombasa city was conducting refresher course to their employers

a) Explain **two** advantages that one would have mentioned on the use of ROM storage media. (4 marks)

b) DRAM is mainly used as a primary memory in computers. Explain any **two** reasons why. (4 marks)

c) List **three** common forms of magnetic storage devices. (3 marks)

d) Virtual memory is a type of a secondary storage device. Explain how it works in computers. (3 marks)

e) Current of 1.4A when flowing through a circuit for 15 minutes dissipates 200 KJ of energy. Calculate: (6 marks)

i) the p.d;

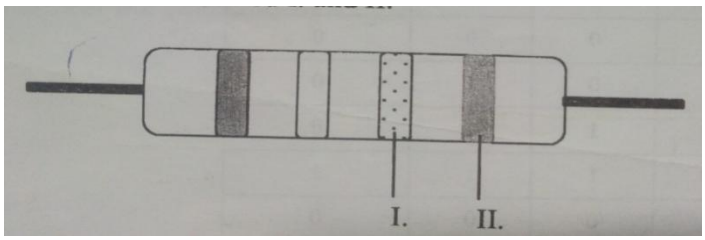
ii) power dissipated;

iii) the resistance of the circuit.



33. The figure below represents a sketch of a resistor.

a) Explain the functions of the bands on the resistor labelled I and II. (4 marks)




b) Explain the **two** main types of semiconductor materials. (4 marks)

c) Explain the characteristics of a 4 Bit BCD code and ASCII code. (4 marks)

d) Convert the following numbers to their respective equivalents

$343_{10}$ to excess-3. (2 marks)

e) Perform the following binary arithmetic;

i) $11100_2 \times 10010_2$. (3 marks)

ii) $1001010_2 \div 101_2$. (3 marks)

34. (a) Perform the following base conversions showing all the steps

i) $6057_8$ to hexadecimal. (2 marks)

ii) $A6B_{16}$ to binary. (2 marks)

iii) $240_{10}$ to hexadecimal. (2 marks)

iv) $110101.0110_2$ to decimal. (2 marks)

v) $ABF_{16}$ to decimal. (2 marks)

vi) $147_{10}$ to binary. (2 marks)

(b) Discuss **three** ways on how binary numbers is applicable in the computer storage. (6 marks)

(c) Explain how computers use the sign magnitude method in representing binary numbers. (2 marks)



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