061006T4ICT

ICT TECHNICIAN LEVEL 6

IT/CU/ICT/CC/1/6

Apply Basic Electronics

July/August 2023

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TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION

COUNCIL (TVET CDACC)

WRITTEN ASSESSMENT

Time: 3 Hours

INSTRUCTIONS TO CANDIDATE

1. This paper has two sections **A and B.** Attempt questions in each section as per instructions given in the section.
2. You are provided with a separate answer booklet
3. Marks for each question are indicated in the brackets
4. Do not write on the 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)

Attempt ALL questions in this section.

1. Define the term circuit as used in electronics. (2 Marks)

2. Identify THREE components of an electronic circuits (3 Marks)

3. Name THREE parameters that are measured in an electric circuit (3 Marks)

4. Differentiate between analog and digital circuit. (4 Marks)

5. Briefly explain the role of the following in an electronic circuit (8 Marks)

   a) Inductor

   b) Resistor

   c) Transistor

   d) Diode

6. State the Ohm's Law (2 Marks)

7. Distinguish between n-type and p-type semiconductor materials. (2 Marks)

8. Demonstrate with the aid of a diagram the operation of a transistor as a switch (4 Marks)

9. Explain ONE difference between a decimal and a Hexadecimal number system (2 Marks)

10. Outline THREE advantages of binary coding (3 Marks)

11. Enumerate THREE benefits of using BCD arithmetic for numerical representation (3 Marks)

12. Describe how to determine electrical resistance in a circuit. (4 Marks)

SECTION B: (60 MARKS)

Attempt any Three (3) questions in this section.

13.

    a) Illustrate with the aid of a diagram FIVE main differences between AC and DC Circuits.

                                                                     (10 Marks)

    b) Describe how biasing a p-n junction affects its forward and reverse bias characteristics

                                                                      (5 Marks)

    c) Explain TWO major storage levels in a computer, giving an example in each.   (5 Marks)

14. (a study the circuit diagram below and answer the questions that follow;
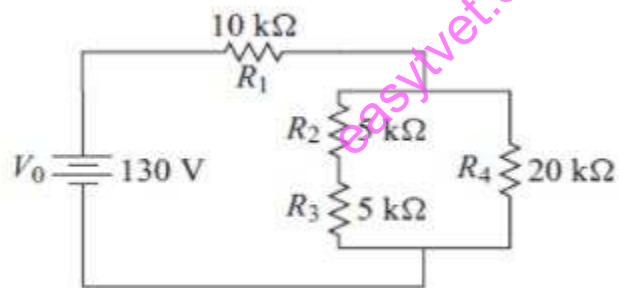
      i. Calculate the total resistance   (4 Marks)

      ii. Calculate the current   (2 Marks)

(b)List FOUR types of number systems used in computers.   (4 Marks)

c) Discuss THREE different types of semiconductor memory in modern technology.   (6 Marks)

(d) Outline FOUR importance of semiconductors   (4 Marks)

15. (a) Using binary arithmetic, explain systematically how two's complement can be used to represent negative five (-5). Provide the result. (6 Marks)

b) Perform the following calculations using BCD arithmetic (8 Marks)

    i)   Add (0111-0010) + (1010-0010)

    ii) Subtract (0000-1111) – (1001-1001)

    iii) Multiply (1001-1010)*(0011-0101)

    iv) Divide (1101-1011)/(0110-1001)

c) Explain the following types of voltages in relation to semiconductor diode (6 Marks)

    i.   Barrier voltage

    ii.   Forward voltage

    iii.   Reverse voltage

16. (a) Discuss the role of the following electronic components citing their application in the industry: (10 Marks)

    i)   Motors

    ii) Circuit breakers

    iii) Relays

    iv) Microcontroller

    v) Fuse

b) (i) Highlight THREE types of integrated circuits. (3 Marks)

(ii) Identify FOUR advantages and THREE disadvantages of integrated circuits in comparison to other components (7 Marks)