THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

BASIC ELECTRONICS

3 hours

INSTRUCTIONS TO CANDIDATES

This paper consists of **TWO** *sections; A and B.*
Write your name and index number in the answer booklet.
Answer **ALL** *questions in* Section *A and any* **FOUR** *questions from* Section *B in the answer booklet provided.*
Candidates should answer the questions in English.

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This paper consists of 6 printed pages.

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

Answer ALL the questions in this section.

1. Outline **four** use of computer cache memory. (4 marks)

2. Explain each of the following terms as used in Electronics:

   (i)   charge; (2 marks)

   (ii) joule. (2 marks)

3. **Figure 1** represent a simple DC circuit. Use it to answer the question that follows.
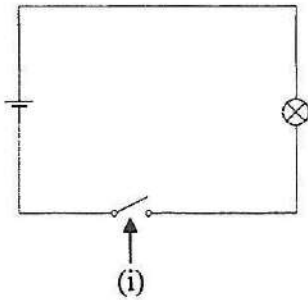

Figure 1

   Explain **two** uses of the part labelled (i). (4 marks)

4. With the aid of a sketch, outline a purely capacitive circuit. (4 marks)

5. Differentiate between *primary* and *secondary* computer memories. (4 marks)

6. Explain **two** advantages of using Excess-3 code. (4 marks)

7. Explain **two** circumstances under which fixed resistors are most applicable in the construction of electrical components. (4 marks)

8. Define each of the following terms as used in Electronics:

   (i)   cycle; (2 marks)

   (ii) peak. (2 marks)

9. Evaluate each of the following binary arithmetic:

   (i)   11101100 + 10101100 (2 marks)

   (ii) 111011100 / 100 (2 marks)

10. Draw a logic circuit for the following Boolean expression.

$X = A \cdot B + C$ (4 marks)

SECTION B (60 marks)

*Answer any **FOUR** questions from this section.*

11. (a) (i) Draw a waveform for a purely inductive circuit. (4 marks)

(ii) A circuit has been running for 1 hour with a voltage 20 V, power dissipation of 10 watts and conductivity of 1.8×10^{-2} Siemens. Determine the:

I. resistivity; (2 marks)

II. charge. (4 marks)

(b) Using a K-map, minimize the following sum of minterms. (5 marks)

$F(A, B, C, D) = \sum m(2, 3, 10, 11, 12, 13)$

12. (a) (i) List **four** colours used in a resistor colour scheme. (2 marks)

(ii) Evaluate each of the following hexadecimal number operations your assigner in binary equivalent:

I. $294 + 73$ (2 marks)

II. $F1 - D0$ (3 marks)

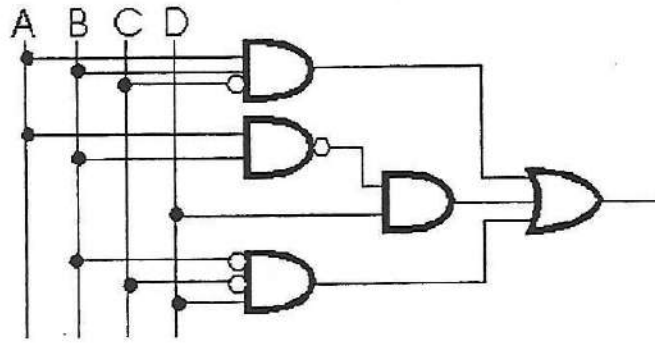(b) (i) Write the Boolean expression for the logic circuit in **Figure 4**. (4 marks)

Figure 4

(ii) Explain **two** circumstances that would necessitate the use of an electronic voltameter in electric circuits. (4 marks)

15. (a) (i) Explain **two** disadvantages of using holographic memory. (4 marks)

(ii) Differentiate between *laminated core* transformer and *autotransformer*. (4 marks)

(b) (i) Determine the octal equivalent of the gray code number **11101101**. (3 marks)

(ii) Draw each of the following using multi- input logic gates:

I. $A \cdot B \cdot C$ (2 marks)

II. $A + B + C + D$ (2 marks)

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