

Name _____

Index No. _____

1920/103

Signature _____

BASIC ELECTRONICS

July 2015

Date _____

Time: 3 hours



THE KENYA NATIONAL EXAMINATIONS COUNCIL

CRAFT CERTIFICATE IN INFORMATION TECHNOLOGY

BASIC ELECTRONICS

3 hours

INSTRUCTIONS TO CANDIDATES

A circular stamp with the date '20 JUL 2015' in the center, surrounded by text that is partially obscured.

*Write your name and index number in the spaces provided above.**Sign and write the date of examination in the spaces provided above.**Answer ALL questions in section A and any FOUR in section B.**Candidates should answer the questions in English.*

For Examiner's Use Only

Section	Question	Maximum score	Candidate's score
A	1 - 10	40	
	11	15	
	12	15	
	13	15	
	14	15	
	15	15	
Total score			

A handwritten signature consisting of two stylized letters, 'A' and 'A', written vertically.

This paper consists of 12 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 (40 marks)*Answer ALL the questions in this section in the spaces provided.*

1. Outline **four** advantages of electricity as a source of power in the society. (4 marks)

2. With the aid of a sketch, explain the alternating current (AC) through a pure inductor. (4 marks)

3. Explain **two** uses of special bit patterns in binary coded decimal. (4 marks)

4. Determine the decimal equivalent for each of the following number systems:

(i) $F9A_{16}$ (2 marks)

(ii) $11001\ 1011_2$ (2 marks)

5. Calculate each of the following hexadecimal arithmetic:

(i) $E\Delta 6 + 424;$

Ques. 5

(2 marks)

(ii) $CD1 - 311.$

(2 marks)

6. A conductor wire of length 36 m has a resistivity of $6 \times 10^{-8} \Omega \text{ m}$ and resistance of 9Ω . Determine the:

(i) cross sectional area of the wire;

(2 marks)

(ii) conductivity of the wire.

(2 marks)



7. Explain two methods used to encode Binary Coded Decimal (BCD) numbers.

(4 marks)

8. Using two's complement, determine $1000\ 1001_2 - 1110\ 1111_2$. (4 marks)

9. With the aid of a diagram, outline a typical construction and terminals of a NPN transistor showing the flow of current. (4 marks)

10. Draw a truth table for a XNOR gate. (4 marks)

SECTION B (60 marks)

Answer any FOUR questions in this section in the spaces provided.

11. (a) (i) Explain two disadvantages of DRAM as used in computers. (4 marks)

- (ii) Differentiate between *hard disk* and *optical disc* as used in computers. (4 marks)

- (b) (i) Determine the excess-3 equivalent of the number 1658_{10} . (3 marks)



- (ii) A potential difference of 5 V is connected to a uniform resistance wire of length 0.8 m and cross sectional area of $8 \times 10^{-8} \text{ m}^2$ with 0.06 A of current flowing through the wire. Determine resistivity of the wire. (4 marks)

12. (a) (i) Outline three concentration of lattice defects that affect the low temperature resistivity. (3 marks)

- (ii) Explain two types of charges that could be found in an atom. (4 marks)

- (b) (i) Using BCD, evaluate $127 + 783$. (3 marks)

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- (ii) Figure 1 shows an arrangement of logical gates. Construct a truth table showing the outputs O, P and Q. (5 marks)

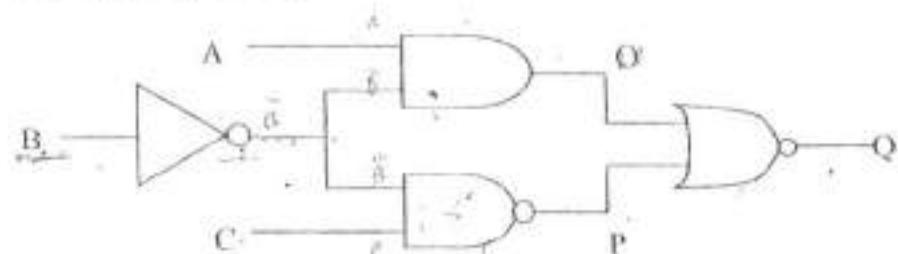


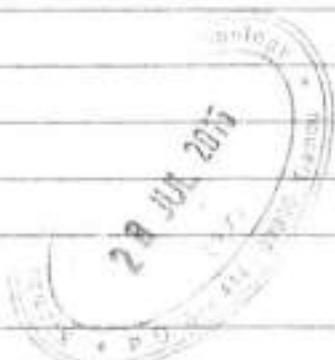
Figure 1

13. (a) (i) Draw a typical graph showing a phasor diagram of a sinusoidal waveform.
 (4 marks)

- (ii) An a.c current of 30 mA (milliamps) is connected to a 60Ω resistor R.
 Determine the:

- I. voltage of 4 V peak (maximum); (3 marks)

- II. power in R in mW (milliwatts). (2 marks)



- (b) Simplify each of the following binary arithmetic operations giving your answer in octal equivalent:

(i) $1100\ 1001 + 1001\ 1101;$ (3 marks)

(ii) $1110\ 0100 - 1111\ 0000.$ (3 marks)

14. (a) (i) Outline two ways of coping with challenges of emerging trends in electronics. (2 marks)

- (ii) Differentiate between *silicon* and *germanium* semiconductor materials. (4 marks)

ii. current across the resistor R_4 .

15. (a) (i) Outline three characteristics of a pure semiconductor. (3 marks)

(ii) Using the K-map, simplify the function:

$\Sigma m(1, 3, 5, 7, 9, 10, 11, 15)$

(5 marks)

- (b) (i) A Technician at Tepex Company Ltd. intends to familiarize the employees on the different examples of ROMs used in computers. Outline three examples that could be mentioned. (3 marks)

(ii) An electrical door is controlled by three switches A, B and C. The door opens whenever switches A, B and C are in the same positions. When A and C are in same positions, the door opens on condition that switch B is high.

Draw a truth table to represent the information. (4 marks)

