061006T4ICT

ICT LEVEL 6

IT/OS/ICT/CC/1/6

APPLY BASIC ELECTRONICS

Nov. /Dec. 2022

THE KENYA NATIONAL EXAMINATIONS COUNCIL

WRITTEN ASSESSMENT

Time: 3 hours

INSTRUCTIONS TO CANDIDATE

Maximum marks for each question are indicated in brackets ( ).

*This paper consists of **TWO** sections: A and B.*

Answer questions as per instructions in each section.

You are provided with a separate answer booklet.

*This paper consists of **THREE (3)** 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)

Answer ALL questions in this section.

1. Define an electronic circuit. (2 marks)
2. Describe any **FOUR** components found in an electronic circuit. (4 marks)
3. Briefly describe any **FOUR** types of electrical circuits (4 marks)
4. Distinguish between a loop network and a mesh network of an electric circuit. (4 marks)
5. Define electrical resistance. (2 marks)
6. Outline any **TWO** application areas of holographic memory in a computer. (4 marks)
7. List any **FOUR** types of capacitors. (4marks)
8. Differentiate between an atom and atomic structure. (2 marks)
9. Describe the structure of a matter (4 marks)
10. Name any **TWO** types of semi-conductor materials used. (2 marks)
11. Distinguish between P-Type materials and N-Type materials giving examples in each one of them. (4 marks)
12. Using an example illustrate why a PN Junction is used. (4 marks)

SECTION B: (60 MARKS)

Answer any THREE questions in this section

13. (a) Explain how valence electrons determine the electrical properties of a material (6 Marks)

(b) Describe the valence band, conduction band and forbidden energy gap with the help of energy level diagram. (6 Marks)

(c) List three important properties of semiconductors. (6 marks)

(d) Define a semi-conductor in terms of resistivity? (2 Marks)

14. (a) Explain the formation of a depletion Layer in a *pn* junction (10 Marks)

(b) Discuss the behavior of a *pn* junction under forward biasing. (6 Marks)

(c) Define the following terms:

i. Breakdown voltage (2 Marks)

ii. Knee voltage (2 Marks)

15. (a) Explain the operation of transistor as an amplifier. (10 Marks)

(b) Name the three possible transistor connections. (6 Marks)

(c) In a transistor, $\beta = 45$, the voltage across 5kΩ resistance which is connected in the collector circuit is 5 volts. Find the base current for the common emitter connection. (4 Marks)

16. a) With aid of a sketch, outline the configurations of PN junction diode showing both the input signal and output (8 Marks)

b) Discuss any six challenges of emerging trends in electronic manufacturing. (12 Marks)