Grade 10 Chapter 5 Workbook Questions

St John Baptist De La Salle Catholic School, Addis Ababa

22/23 Academic Year

Questions

1. Let's say we want to study a signal visually. For an AC signal of a maximum voltage 12V and frequency of 60 Hz, draw a visual representation of what we would expect to see on an oscilloscope. You are free to give the oscilloscope the time base and gain control of your choice.

2. State the uses of a transistor and explain how amplification is possible through a double junction. Draw the paths of current in the transistor and state Kirchhoff's Law. Explain why the word "amplification" is misleading while using it for transistors.

3. Explain the difference between P-type and N-type semiconductors and how they are made. Explain how their properties gives rise to rectification. Explain what rectification is and state what the opposite process of rectification is(inversion) and state how we can rectify or invert current.

4. Define and explain the following terms:

   (i) Doping and impurities.

   (ii) Acceptor and Donor atoms.

   (iii) Conduction band theory and lattice structures.

5. Explain what we mean by 0 and 1 electrical signals. Explain what logic gates are. Give 3 examples of ligc gates used in real life.

6. In what way can we achieve a full wave rectification?

7. An input of direct current is sent into an unknown electrical device and when current emerges out of the device, the output current is alternating. What device could the unknown be?

8. What is the emission of conduction electrons from the hot meta in a Fermi valve is known as?

9. Why is the Fermi valve referred to as a "valve"?

10. Check whether the logic gates given below are equivalent or not.

    A. An **AND** and a **NOT-NAND**

    B. An **OR** and a **NOT**

    C. An **AND** and a **NAND**

    D. A **NOT** and an **XOR**

11. What does it mean when a P-N junction is forward biased? What about when it is reverse biased?

12. Why is rectification by a single diode always half-wave?

13. Plot a signal for a CRO measuring a signal of frequency 200Hz and maximum voltage 8V if the gain control is 4V/cm and time base is 2ms/cm.

14. The collector current of a transistor is 4.2 A for a base current of 3.4 mA. What is the current gain?

15. The base current of a transistor is 5.4 A, and its current gain is 1200. What is the collector current?