



ZIMBABWE EZEKIEL GUTI UNIVERSITY

FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

DEPARTMENT OF DIGITAL TECHNOLOGY

EXAMINATION PAPER

COURSE CODE : CDT 114
COURSE TITLE : Electronics I
DURATION : 3 Hours
LEVEL : 1.1
DATE : November 2019 **18 NOV 2019**

INSTRUCTIONS TO CANDIDATES:

1. Answer all questions.
2. The paper carries 100 marks.

Question 1

- a. What is an intrinsic semiconductor? [2]
- b. What is an extrinsic semiconductor? [2]
- c. Explain the differences between a p-type and n-type semiconductors. [6]

Question 2

- a. Define a light emitting diode [2]
- b. How does a Light Emitting Diode work? [4]
- c. What value of series resistor is required to limit the current through a LED to 20 mA with a forward voltage drop of 1.6 V when connected to a 10V supply ? [4]

Question 3

- a. Compare and contrast the Avalanche breakdown and the Zener breakdown. [6]
- b. Describe using a diagram how solar cells convert sunlight into electricity. [6]

Question 4

- a. Define active components. [2]
- b. Give 2 examples of active components. [2]
- c. Define passive components. [2]
- d. Give 3 examples of passive components. [3]

Question 5

- a. What is a valence electron? [2]
- b. According to the periodic table A has an atomic number 36, B has an atomic number 32 and C has an atomic number 29. Determine which ones are/is
 - i. Good conductors. [3]
 - ii. Semiconductors. [3]
 - iii. Insulators. [3]

Please support your answers fully.

Question 6

- a. Produce a labeled structure of an NMOS transistor. [5]
- b. Explain how an NMOS transistor operates. [6]

Question 7

- a. What is a depletion region? [3]
- b. Explain the following terms
 - i. Reverse bias. [3]
 - ii. Forward bias. [3]

Question 8

- a. What is a capacitor? [2]
- b. Calculate the energy on the capacitance when the capacitance electrical charge is 25 C and voltage value is 56 V. [3]
- c. Calculate the electrical charge when the value of capacitance is 4.3F and voltage value is 11V. [3]

Question 9

- a. Explain the following terms
 - i. Current. [2]
 - ii. Resistance. [2]
 - iii. Voltage. [2]
- b. The electric current in a resistor wire is 4 Amps. When both ends are given a potential of 12 Volts. Calculate the electrical resistance. [4]

Question 10

- a. Give 5 application areas of a diode. [5]
- b. Briefly explain each. [5]

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