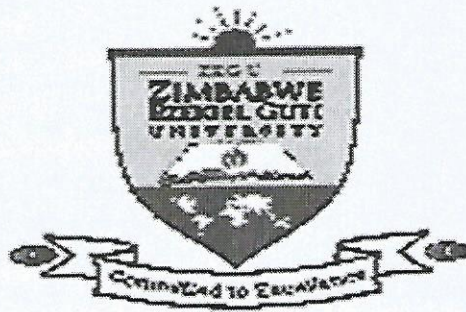


ZIMBABWE EZEKIEL GUTI UNIVERSITY



FACULTY OF HEALTH, SCIENCE AND TECHNOLOGY

Department of Digital Technology

Module: CDT 114 Electronics 1

Exam Duration: 3 hours

End of Semester Examination for 2019

3 June 2019

Instructions

- (i) Answer all questions, the mark allocation for each question is shown in square brackets.
- (ii) Number your answers accordingly.
- (iii) The total marks for the examination is 100.

Question 1

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

Question 2

- 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 3

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

Question 4

- 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 5

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

Question 6

- 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 7

- 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. [3]

Question 8

- a. i) Give five application areas of a diode. [5]
ii) Briefly explain each. [5]

Question 9

- 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 10

- a. Using a diagram explain how a diode is used as a rectifier. [4]
b. What an ideal diode model? [3]
c. An a.c. voltage of peak value 20 V is connected in series with a silicon diode and load resistance of 500 Ohms. If the forward resistance of diode is 10 Ohms. Calculate:
i. peak current through diode. [2]
ii. peak output voltage. [2]

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