Kasarani Campus
Off Thika Road
Tel. 2042692 / 3
P. O. Box 49274, 00100
NAIROBI
Westlands Campus
Pamstech House
Woodvale Grove
Tel. 4442212
Fax: 4444175

KIRIRI WOMENS' UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2022/2023 ACADEMIC YEAR
SECOND YEAR, FIRST SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
KCS 203- ELECTRONICS

Date: 7th December, 2022
Time: 8:30am – 10:30am

INSTRUCTIONS TO CANDIDATES
ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

a) Define diode. (2 Marks)

b) Briefly explain the following.
   i) Doping
   ii) Donor atom
   iii) Acceptor atom (6 Marks)

c) Define beta of a transistor. (2 Marks)

d) A transistor has a βDC of 250 and a base current, IB, of 20 μ A. Calculate the collector current, IC. (4 Marks)

e) Define the following types of diodes.
   i) Photo diode
   ii) Zener diode
   iii) Tunnel diode (6 Marks)

f) Junction field effect transistor is a three-terminal semiconductor transistor, name the three terminals and explain the function of each terminal. (6 Marks)

g) Briefly explain the difference between RC Coupled Amplifier and Direct Coupled Amplifier. (4 Marks)

QUESTION TWO (20 MARKS)

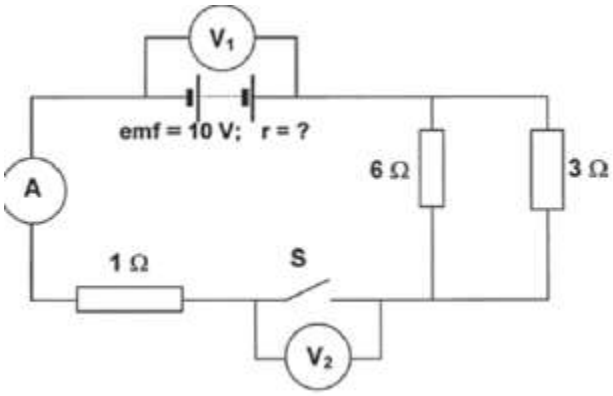
a) Briefly Explain the following.
   i) Tunneling Effect as used with tunnel diode (4 Marks)
   ii) The working of photodiode (4 Marks)

b) What is depletion layer in a p-type and n-type semi-conductor. With the help of a diagram explain how it is formed.
(8 Marks)

c) Explain the term doping. What is the effect of temperature on extrinsic semiconductor?
(6 Marks)

QUESTIONS THREE (20 MARKS)

a) In the circuit represented below, the battery has an emf of 10 V and an unknown internal resistance. Voltmeter V1 is connected across the battery and voltmeter V2 is connected across the open switch S. The resistance of the connecting wires and ammeter can be ignored. Switch S is open.



i) What is the reading on V1? (2 Marks)
ii) What is the reading on V2? (2 Marks)
iii) When Switch S is closed, the reading on V1 drops to 7.5 V, what is the new reading on V2? (2 Marks)
iv) Calculate the reading on the ammeter. (6 Marks)
v) Calculate the internal resistance of the battery. (4 Marks)

b) Using a suitable example, show that two resistors connected in parallel will always have resulting total resistance less than the resistance of the individual resistors. (4 Marks)

QUESTION FOUR (20 MARKS)

a) Define transistor biasing, with the help of a diagram explain the difference between forward and reverse biasing. (8 Marks)

b) Explain the following operation modes in Bipolar Junction Transistor (BJT) (4 Marks)
i) Cut-off mode
ii) Saturation mode

c) You are provided with a 12V A.C. source, four diodes and a resistor.
i) Draw a circuit diagram for full wave rectifier and show the points at which the output is taken. (4 Marks)
ii) Sketch a graph of voltage against time before rectification. (2 Marks)
iii) Sketch a voltage – time graph after rectification. (2 Marks)

QUESTION FIVE (20 MARKS)

a) Differentiate between NPN and PNP bipolar Junction Transistor? (4 Marks)

b) With the aid of diagram, Explain the following configurations of Bipolar Junction Transistor.
i) Common Base Configuration (4 Marks)
ii) Common Emitter Configuration (4 Marks)
iii) Common Collector Configuration (4 Marks)

c) State the advantages of MOSFET over BJT in power electronics. (4 Marks)