MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

SECOND YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (CLOUD COMPUTING AND INFORMATION SECURITY)

SCC 201: ZIGBEE TECHNOLOGY

DATE: **TIME:**

INSTRUCTIONS

- **i) Answer question ONE and any other TWO questions**
- **ii) Write on both sides of the answer sheet**
- **iii) Do not write in the margins of the answer booklet**

QUESTION ONE COMPULSORY) (30 MARKS)

a) Define the following

i. Zigbee (1 mark)
ii. AODV protocol (1 mark)
iii. Zigbee HA (1 mark)
iv. Zigbee PHY (2 marks)

b) Use diagrams to explain the following topologies of the ZigBee stack

i. Star topology (3 marks)
ii. Cluster tree topology (3 marks)
iii. Mesh topology (3 marks)

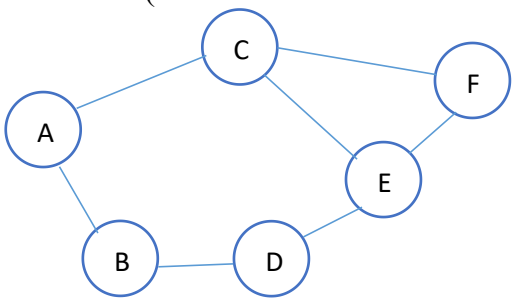
c) Name the main components of a ZigBee standard node (4 marks)

d) Explain the features of the following technologies

i. Wi-Fi (4 marks)
ii. Bluetooth (4 marks)
iii. WiMAX (4 marks)

QUESTION TWO (20 MARKS)

a) Given the following Zigbee Network where the Nodes are labelled using letters A, B, C, D, E, F and the distance between each node to be 2, answer the following questions based on the AODV (Ad hoc On demand Distance Vector) algorithm



i) Describe the kind of data transmitted in the network (3 marks)
ii) Draw a Broadcast Routing Table for the network (6 marks)
iii) If the link between Nodes C and F is broken, re-draw the routing table (4 marks)
iv) What are the advantages of using these scheme (3 marks)

b) Distinguish between Beacon Access and Non-Beacon Access in Radio communication channel (4 marks)

QUESTION THREE (20 MARKS)

a) Briefly explain the following types of logical devices in ZigBee stack:

i. ZigBee network **co-ordinator**; (4 marks)
ii. ZigBee **router**; (4 marks)
iii. ZigBee **end device**. (4 marks)

b) Describe the reasons why you may choose Zigbee Technology for connectivity of devices (8 marks)

QUESTION FOUR (20 MARKS)

a) IEEE 802.15.4 standard specification uses two forms of communication between devices in the network, explain them. (4 marks)
b) Briefly describe FOUR applications of Zigbee Technology (8 marks)
c) Every node on a ZigBee network can have up to three different types of address assigned to it. Briefly describe them (8 marks)

QUESTION FIVE (20 MARKS)

a) The ZigBee protocol can be viewed as three separate layers, each with its own specific functions. Explain the THREE Layers of Zigbee protocol. (9 marks)

b) Using a diagram briefly explain the layers of the OSI model (11 marks)