



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 WOMEN'S UNIVERSITY OF SCIENCE AND TECHNOLOGY
UNIVERSITY EXAMINATION, 2023/2024 ACADEMIC YEAR
SECOND YEAR, FIRST/SECOND SEMESTER EXAMINATION
FOR THE BACHELOR OF SCIENCE IN COMPUTER SCIENCE
& MATHEMATICS
KCS 201- DATA COMMUNICATIONS AND NETWORKS**

Date: 08TH AUGUST 2023
Time: 2:30PM – 4:30PM

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE (COMPULSORY) AND ANY OTHER TWO QUESTIONS

QUESTION ONE (30 MARKS)

Kiriri Women's University of Science and Technology requires a network that will cater for their administrative and students' needs. The users range from lecturers, administrative assistants and students. All types of users need to access the internet through the network. The university management also requires the network to support Wi-Fi access at different points within the university. The university members of staff need to access the university management information system, which should not be accessed by the students. The total number of expected users is 2,500 at any given time.

Use the above context to answer the following questions.

- a) State four geographical factors that will be considered before choosing any type of network to be used to design the above network. (2 Marks)
- b) Identify which type of computer network that is suitable for the above case and why. (2 Marks)
- c) Which is the most appropriate network topology for this network? Give the reasons for your answer. (2 Marks)
- d) Explain the three transmission impairments the network is likely to experience? (3 Marks)
- e) Highlight the transmission medium that will be used to connect the network? Give two reasons for your answer. (3 Marks)
- f) What switching technique might be appropriate for the network? Give two reasons for your answer. (3 Marks)

- g) Describe how the above network is going to benefit the institution and its members. (5 Marks)
- h) Highlight at least five network components that will be used while designing the network? Briefly explain their use. (5 Marks)
- i) How will this network be secured from intruders and students who might attempt to access confidential information such as examinations? (5 Marks)

QUESTION TWO (20 MARKS)

- a) Briefly explain the roles of the network protocols
- i) FTP (2 Marks)
 - ii) TCP (2 Marks)
 - iii) UDP (2 Marks)
 - iv) HTTP (2 Marks)
- b) Explain three reasons why most networking organizations prefer using mesh network topology over daisy chain network topology. (4 Marks)
- c) Explain the concept of switching in data communication along its different categories. Use diagrams. (8 Marks)

QUESTION THREE (20 MARKS)

- a) Use diagrams to describe how serial data transmission and parallel data transmission transmit data digitally from source to destination. (6 Marks)
- b) The multiplexing technique is the technique used to combine and send the multiple data streams over a single medium. State and explain three classifications of data multiplexing techniques of data transmission in network. (6 Marks)
- c) Explain four factors that need to be considered when designing the transmission media. (8 Marks)

QUESTION FOUR (20 MARKS)

- a) Describe four network security threats that computer users face today. (4 Marks)
- b) Draw the OSI reference model and briefly explain the function of each layer. (8 Marks)
- c) Computer networks are classified based on various factors. Discuss. (8 Marks)

QUESTION FIVE (20 MARKS)

- a) Briefly describe the relevance of the following internetwork technologies:
- i) Internet technology (2 Marks)

ii) Ethernet technology (2 Marks)

iii) Intranet technology (2 Marks)

iv) Extranet technology (2 Marks)

b) Elaborate on the term LAN and explain any three factors that affect the performance of a LAN.

(4

Marks)

c) Describe four measures that must be considered in order to protect and secure general computer networks and their contents. (8

Marks)