



MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

THIRD YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR SCIENCE (MATHEMATICS AND COMPUTER SCIENCE)

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

BACHELOR OF SCIENCE (INFORMATION TECHNOLOGY_

SCO 300: COMPUTER NETWORKS

SIT 373: COMPUTER NETWORKS

DATE:

TIME:

INSTRUCTIONS: Answer question one and any other two questions in this paper

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) Describe the functions of a terminator in bus topology (3 marks)
- b) Discuss two functions of a MAC address (4 marks)
- c) Differentiate between a hub and a switch (4 marks)
- d) Name four devices that can be found in a LAN. (4 marks)
- e) State three methods that can be used to identify a user in a network. (3 marks)
- f) Explain the following terms as used in networking:
 - i. Resource (2 marks)
 - ii. Signal Bounce (2 marks)
 - iii. Crosstalk (2 marks)
- g) Discuss the 3-tier architecture operating system and highlight its benefits and limitations (6 marks)

QUESTION TWO (20 MARKS)

- a) Explain the three main elements of a protocol (3 marks)
- b) Describe the purpose of carrier sense, multiple access/collision detection (CSMA/CD) (6 marks)
- c) Outline the duties of a Network Technical Support Engineer (5 marks)
- d) Describe THREE ways which are used to enhance the performance of a network. (6 marks)

QUESTION THREE (20 MARKS)

- a) Differentiate between a Firewall and an Antivirus. (6 marks)
- b) With the aid of diagram discuss the four main network topologies (8 marks)
- c) Discuss the responsibilities of application layer of OSI model (6 marks)

QUESTION FOUR (20 MARKS)

CASE STUDY

You are employed as a network administrator in a small medium company which has just opened a branch in the neighboring town which is 60 km away. The current company premises have been networked and now they want to expand the network to the new offices. The finance department wants your professional advice on the type of cable / medium most appropriate to be procured for the expansion of the network.

- a) Discuss five factors that you would consider while giving the advice (10 marks)
- b) Give five reasons why the computers have to be networked (10 marks)

QUESTION FIVE (20 MARKS)

CASE STUDY

A small, independent, business / home / life insurance Company consisting of an owner, a business manager, an administrator, and four agents decides to implement a network. The company occupies half of a small building in an office park. Their volume of business had been stable for

the past three years, but recently it has been increasing. To handle the increased business volume, two new agents will be hired.

Everyone in the company has a computer, but the business manager has only a printer. These computers are not connected by any form of networking. When agents need to print a document, they must first copy the file to a flash disk, then carry it to the business manager's computer, where they are finally able to print it. Similarly, when staff members want to share data, the only means available is to copy the data on one computer to a flash disk and insert the disk in another computer. Recently, problems have arisen. The business manager is spending too much time printing other people's documents; and it is frequently unclear which copy of a given document is the current and authoritative version.

TASK

Design a network for this company putting in consideration of the following:

- a) Type of network (5 marks)
- b) Network model (5 marks)
- c) Topology of the network (10 marks)