



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

**FOURTH YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR
BACHELOR OF SCIENCE IN COMPUTER SCIENCE.**

SCO 401: NETWORK MANAGEMENT

DATE:

TIME:

INSTRUCTIONS

This paper consists of **FIVE** questions.

Answer **question ONE** and **any other TWO** questions in this paper.

QUESTION ONE (30 MARKS)

- a) Define the following terms:
 - i. Delay
 - ii. Jitter
 - iii. Bandwidth
 - iv. Throughput(4 marks)
- b) Based on the range of topics covered in the Network Management course, using examples, analyze the technological success and failure of the Internet. (6 marks)
- c) Explain three differences between TCP and UDP. (4 marks)
- d) Explain the three broad classes of media access control (MAC) protocols. (6 marks)
- e) Explain two measures that help solve the problem of IP address shortage in IPv4. (4 marks)
- f) Briefly describe the following MAC protocols:
 - i. Token passing
 - ii. Slotted ALOHA(6 marks)

QUESTION TWO (20 MARKS)

- a) Discuss three functions with the aid of well labeled diagrams for each function, the diagnostic tools that work alongside IP to support routing. (6 marks)
- b) Host A in network A, wants to send a packet to a Server in network B. Describe the path the packet will pass to reach the server and any diagnosis that need to be done along the path to the server. (4 marks)
- c) A University college requires a Network that will cater for their administrative and student's 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 WIFI access. 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 500 at any given time.
 - i) Explain how this network be secured from intruders and students who might attempt to access confidential information such as examinations? (4 marks)
 - ii) Discuss what transmission impairments the network is likely to experience and how the administrative block will deal with the deterioration and unavailability of services. (6 marks)

QUESTION THREE (20 MARKS)

- a) With the aid an example, explain and show how address wastage occurs in IPv4 addresses. (2 marks)
- b) Discuss Three factors which influenced the development of the current Internet structure. (3 marks)
- c) You have been assigned to design IP addressing of a given organization. Create 3 sub-networks.
Use a class C IP address 192.168.1.0. Determine the Network ID and Broadcast ID of each sub-network. (6 marks)
- d) In a packet switched network a message is divided into packets which are routed independently in the network. State two reasons why a packet may be lost in the network and possible reactions to the loss. (4 marks)
- e) Channel access is handled at the MAC sublayer of the Data Link layer in the OSI model. Discuss the five major types of channel access methods. (5 marks)

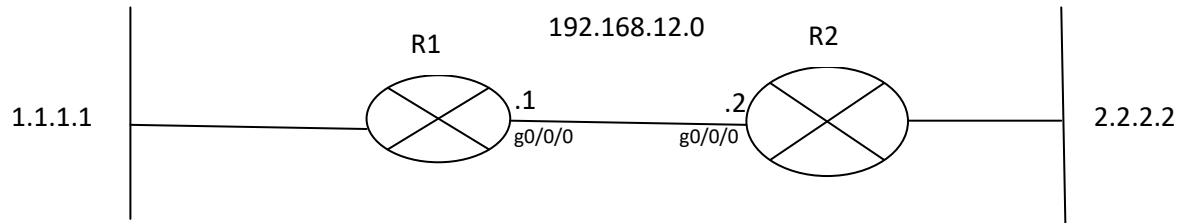
QUESTION FOUR (20 MARKS)

- a) Local Area Networks (LANs) require an 'access method' which determines how computers share a common transmission medium. Write down the two main approaches for controlling this sharing in wired networks. Briefly explain how each approach operates. (8 marks)
- b) With the aid of diagrams, differentiate between Circuit Switched networks and Packet Switched networks. (5 marks)
- c) i) Describe and, with the aid of an example, illustrate the IP Time-To-Live (TTL) mechanism for minimizing the impact of routing-loops. (3 marks)
- ii) Describe a disadvantage of the approach in (c)(i) including the symptoms that might be experienced in a network subject to this disadvantage, and with the aid of a diagram, describe a test that may identify the problem. (4 marks)

QUESTION FIVE (20 MARKS)

- a) An organization has contracted you to network three of its offices to enable intranet communication. Each office has three computers. One of the requirements is to simulate the network for the organization before actual implementation.
- Draw a well labeled topology and describe the steps of building the network that will enable communication between the end devices, explaining all configurations on the devices that will need to be done, type of cables to use, addressing scheme and addresses to use, and routing that will be needed. (8 marks)
- b) You have been assigned the responsibility of adding a new vendor's components with its own management system to an existing network managed by a network management system. Discuss the three sets of functions that you need to do to fulfill your task (6 marks)

c) Use the diagram below to answer the following questions.



- i) Describe and explain the configurations that can be done to ensure R1 can reach the network with loopback interface 2.2.2.2 and R2 to reach network with loopback interface 1.1.1.1. (2 marks)
- ii) Describe and explain with examples how the connectivity can be tested. (2 marks)
- iii) Explain the security measures that can be configured to disallow Router R1 from reaching network 2.2.2.2 from one of the IP addresses. (2 marks)