



MACHAKOS UNIVERSITY

University Examinations for 2018/2019

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTING AND INFORMATION TECHNOLOGY

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (COMPUTER SCIENCE)

SCO 300: COMPUTER NETWORKS

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) Draw the OSI model and state (precisely) the role of each layer. (4 marks)
- b) Describe the difference between circuit switching and packet switching. (4 marks)
- c) Explain two measures that help solve the problem of IP address shortage in IPv4. (4 marks)
- d) Explain three differences between TCP and UDP. (4 marks)
- e) Explain the three broad classes of media access control (MAC) protocols. (6 marks)
- f) Define the following terms: (4 marks)
 - i. Delay
 - ii. Jitter
 - iii. Bandwidth
 - iv. Throughput
- g) Briefly describe the following terms and give examples of each. (4 marks)
 - i. Local Area Network (LAN)
 - ii. Wireless Wide Area Network (WWAN)
 - iii. Wireless Metropolitan area network (MAN)
 - iv. Personal area network (PAN)

QUESTION TWO (20 MARKS)

- a) List three services offered by the transport layer to the other layers. (3 marks)
- b) Briefly describe TCP three-way handshaking. (3 marks)

- c) With the aid of a diagram, describe how ports are used for multiplexing in the transport layer. (4 marks)
- d) List any four known ports. (4 marks)
- e) Explain four threats to the Machakos University network. Explain four counter-measures to the threats. (6 marks)

QUESTION THREE (20 MARKS)

- a) State **four** factors to put into consideration in selecting Cable type to be used in implementing a network. (2 marks)
- b) State the hardware device in your computer which hosts the data link layer. Name the address associated with the device. (2 marks)
- c) Explain why it is necessary to have both IP address and MAC address. (2 marks)
- d) Which protocol is used to get the MAC address for a given IP address? (2 marks)
- e) Explain three services offered by the data link layer. (6 marks)
- f) State three factors to put into consideration in selecting Cable type to be used in implementing a network (3 marks)
- g) Show diagrammatically and explain the layers that specify IEEE 802 standards (3 marks)

QUESTION FOUR (20 MARKS)

- a) Briefly describe the difference between virtual circuit networks and datagram networks. (4 marks)
- b) With the aid of a diagram, explain the operation of mobile IP. (4 marks)
- c) Explain four advantages of IPv6 over IPv4. (4 marks)
- d) Explain two special IP addresses. (4 marks)
- e) State four advantages of Network Address Translation (NAT). (4 marks)

QUESTION FIVE (20 MARKS)

- a) Briefly explain four protocols found at the application layer. (4 marks)
- b) Explain the meaning of the following terms: (6 marks)
 - i) Internet
 - ii) Internet exchange point
 - iii) Sensor network
- c) Describe RFID and explain three applications. (4 marks)

d) Briefly describe the following network devices and state the OSI layer in which they are found. (6 marks)

- i) Router
- ii) Switch
- iii) Hub
- iv) Bridge