Mt Kenya University

Instructions: Question ONE is **COMPULSORY** and any other TWO from section B.

SECTION A.

QUESTION ONE.

(a) You have the task of designing a network for a medium-sized company.

Identify the ways in which the following factors might influence the design decisions you make:

i) The geographical area to be covered by the network.

ii) The number of users.

iii) The types of application used within the company.

iv) The type of business of the company.

v) The extent to which E-Commerce is used between the company and its (external) trading partners.

vi) The size of the budget available.

vii) The expected growth rate of the company.   (14 marks)

(b) Compare and contrast Half and Full Duplex   communication   (4 marks)

(c) Discuss the main differences between Synchronous and Asynchronous Transmission, emphasising signal timing issues. (4 marks)

(d) Describe the main elements of the Local Area Network model. (6 marks)

(e) Briefly explain the Open Systems Interconnection (OSI) network reference model by emphasising the importance of layers for functional communication requirements.

(2 marks)

Question 2

Describe the seven layers of the OSI model by focusing on the responsibilities and interface of each layer. **(20 marks)**

Question 3

(a) Briefly describe circuit switching. (4 marks)

(b) Explain how a packet-switched network works. (4 marks)

(c) Briefly discuss the main differences between TCP (Transmission Control Protocol) and UDP (User Datagram Protocol). (8 marks)

(d) Which of these services in (b) is most suitable for developing a 'real time' application? Briefly explain your reasoning. (4 marks)

Question 4.

a) Video conferencing was expected to eliminate much of the need for

business travel but has not been as widely adopted as was hoped.

i) Give THREE limitations of video conferencing. **(6 marks)**

ii) Video Voice Over Internet Protocol (VOIP) may be more likely to be

widely adopted.

A) What equipment other than a PC, monitor and broadband

connection is required for video VOIP? **(2 marks)**

B) Explain how you would find, download and install the software

needed to run video VOIP. **(4 marks)**

b) Many homes and small offices now have a wireless local area network

(WLAN).

i) What should the owner do to protect his WLAN from eavesdroppers? **(4 marks)**

ii) Give TWO advantages of using a WLAN rather than a cabled network. **(4 marks)**

(Total 20 marks)

Question 5

(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) Three physical topologies associated with LANs are: the bus, ring and star topologies. Describe **each one**, highlighting their strengths and weaknesses from a reliability point of view.

(12 marks)

(Total 20 marks)