

Mt Kenya



University

UNIVERSITY EXAMINATIONS 2010/2011

SCHOOL OF APPLIED SOCIAL SCIENCES

DEPARTMENT OF I.T

END OF SEMESTER EXAMINATION FOR THE BACHELOR OF BUSINESS INFORMATION TECHNOLOGY
DEGREE

BIT 2205 DATA COMMUNICATION AND NETWORKS

DATE: April 2011

Time: 2 HRS

QUESTION 1

Mount Kenya University 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 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.

- (a) Which is the most appropriate network topology for this network. Give the reasons for your answer (2 marks)
- (b) What network devices will be used while designing the network? Briefly explain their use (8 Marks)
- (c) What transmission impairments is the network likely to experience? (8 marks)
- (d) What transmission medium will be used to connect the network? Give reasons for your answer (2 marks)
- (e) Briefly explain how the user computers will be configured to access the network (4 marks)
- (f) How will this network be secured from intruders and students who might attempt to access confidential information such as examinations? (4 marks)
- (g) What switching technique might be appropriate for the network. Give reasons for your answer (2 marks)

QUESTION 2

There are several different network topologies:

- (a) Bus

- (b) Ring
- (c) Mesh
- (d) Modern Star

From the above **four** of the above topologies:

- (i) Draw a clearly labelled diagram;
- (ii) Briefly describe its layout;
- (iii) Discuss its advantages and disadvantages.

(5 marks each)

(Total 20 marks)

QUESTION 3

The Open Systems Interconnection (OSI) 7 layer model, sometimes called the International Standards Organisation (ISO) 7 layer model, is a critical model for modern computer networking.

(a) In the correct sequence from either end, identify the **seven** layers of the ISO/OSI 7 layer model. **(4 marks)**

(b) Briefly explain the function of each layer. **(2 marks each - 14 marks)**

(c) What are the advantages of the OSI model? **(2 marks)**

Question 4

(a) With the aid of diagrams, describe the main features of modulation and demodulation when used for transmitting data across the Public Switched Telephone Network (PSTN).

(8 marks)

(b) With the aid of diagrams, explain what is meant by each of the terms: amplitude modulation, frequency modulation and phase modulation. **(12 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) Compare **four** transmission media used in LANs and WANs in terms of maximum data rates and other limitations. **(12 marks)**