KENYA METHODIST UNIVERSITY

FIRST TRIMESTER EXAMINATIONS, APRIL 2007

FACULTY	**:**	**SCIENCES**
DEPARTMENT	**:**	**MATHEMATICS AND COMPUTER SCIENCE**
COURSE TITLE	**:**	**PRINCIPLES OF TELECOMMUNICATIONS I**
COURSE CODE	**:**	**DCIS/CISY 251**
TIME	**:**	**2 HOURS**

Answer Question I and any other two questions

Question I (30 marks)

a) (i) What is telecommunication? (1 mark)

(ii) Name the components of a telecommunication system giving the functions of each component. (3 marks)

b) Compare simplex, half duplex and full duplex transmissions giving one example in each. (6 marks)

c) FDDI provides a number of fault tolerance features.

(i) Using diagrams discuss the three fault tolerance features supported by FDDI.
(9 marks)

(ii) Why is fiber optic cable preferred to copper wire cable for data transmission?
(1 mark)

d) The term *Ethernet* refers to the family of local-area network (LAN) products covered by the IEEE 802.3 standard that defines what is commonly known as the CSMA/CD protocol.

(i) Briefly explain the CSMA/CD media access method.
(4 marks)

(ii) Token Ring networks differ from Ethernet networks in what ways?
(2 marks)

e) Explain why optical fibre is the most suitable media for long distance transmissions.
(4 marks)

Question II (20 marks)

a) Give four advantages that can be realized by using Frame Relay Technology. (4 marks)

b) Using four distinctive points discuss the difference between the X.25 and Frame Relay protocols. (8 marks)

c) Packet switched networks such as Frame Relay enable end stations to dynamically share the network medium and the available bandwidth. Thus the need for congestion controls mechanism.

(i) Give two problems that may arise as a result of sharing the network medium and bandwidth. (2 marks)

(ii) Briefly discuss three congestion control mechanisms employed by Frame Relay networks. (6 marks)

Question III (20 marks)

a) Explain each of the following:

(i)` Piggy backing

(ii) Connection-oriented

(iii) Token passing

(iv) Bandwidth on demand

(v) Discard eligibility bit (5 marks)

b) ISDN (Integrated Services Digital Network) is comprised of digital telephony and data transport services offered by telephone carriers.

(i) Explain two advantages of ISDN (4 marks)

(ii) Name four application areas of ISDN technology (2 marks)

c) Distinguish between packet switching and circuit switching. (2 marks)

d) Using an illustrative diagram briefly discuss the seven layers of the OSI model. (7 marks)

Question IV (20 marks)

a) Give the functions of the following transport protocols.
   (i) Internet Control Message Protocol
   (ii) Transmission Control Protocol
   (iii) Internet Protocol
   (iv) User Datagram Protocol

(8 marks)

b) IP is the primary network-layer protocol in the TCP/IP protocol suite. Along with the Transmission Control Protocol (TCP), IP represents the heart of the Internet protocols.

   (i) Give two primary responsibilities of the IP

(4 marks)

   (ii) Name two application layer protocols in the Internet protocol suite.

(2 marks)

c) The TCP connection is established using a *"three-way handshake"* mechanism. Explain briefly how this mechanism works.

(6 marks)