Code: D-21 / DC-11 **Subject: DATA COMMUNICATION & NETWORKS**

December 2005

Time: 3 Hours

Max. Marks: 100

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q. 1. must be written in the space provided for it in the answer book supplied and nowhere else.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1 Choose the correct or best alternative in the following: (2x10)

a. A slotted ALOHA system uses a 56 kbps channel. On an average, each terminal originates a 1024 bit packet every 30 seconds. The number of terminal the system can accommodate is

(A) 301 **(B)** 603
(C) 501 **(D)** 503

b. Flow control is needed to prevent_____.

(A) Bit errors.
(B) Overflow of the sender buffer.
(C) Overflow of the receiver buffer.
(D) collision between sender and receiver.

c. An ATM switch performs the following functions.

(A) call routing. **(B)** header translation.
(C) queuing. **(D)** All of the above.

d. In asynchronous TDM, the transmission rate of the multiplexed path is usually _____ the sum of the transmission rates of the signal sources.

(A) Greater than **(B)** Less than
(C) Equal to **(D)** 1 less than

e. In _____, each packet of a message need not follow the same path from sender to receiver.

(A) Circuit switching
(B) Virtual circuit switching
(C) Message switching

(D) Datagram switching

f. Which LAN has the highest data rate?

(A) 10 Base 5 **(B)** 10 Base – T
(C) FDDI **(D)** Twisted pair token ring

g. The collision domain of traditional Ethernet is _____ meters. The collision domain of fast Ethernet is _____ meters.

(A) 250, 250 **(B)** 250, 2500
(C) 2500, 250 **(D)** 2500, 2500

h. What is the maximum size of the data portion of the IP datagram?

(A) 65,535 bytes **(B)** 65,515 bytes
(C) 65,475 bytes **(D)** 65,460 bytes

i. In Ipv6, the _____ field in the base header restricts the lifetime of a datagram.

(A) version **(B)** priority
(C) next-header **(D)** hop limit

j. Frame relay operates in the _____.

(A) Physical layer **(B)** Physical & Data link layer
(C) Data link layer **(D)** Physical, Data link & Network layer

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Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. Explain the different transmission media used in computer communication. Compare with data rates. **(10+2)**

b. Given a channel with an intended capacity of 20 Mbps, the bandwidth of the channel is 3 MHz. What signal to noise ratio is required to achieve this capacity? **(4)**

Q.3 a. Compare OSI reference model with TCP/IP reference model. **(7)**

b. What is a protocol? Mention the various characteristics and functions of a protocol. **(2+3+4)**

Q.4 a. What do you mean by statistical multiplexers? Explain with suitable diagrams. **(10)**

b. Twenty four voice signals are to be multiplexed and transmitted over twisted pair. What is the bandwidth required for FDM? Assuming a bandwidth efficiency of 1bps/ Hz, what is the bandwidth required for TDM using PCM. **(6)**

Q.5 a. Find the CRC for a frame 101001101. Assume $G(X) = (x^5 + x^4 + x^2 + 1)$. **(7)**

b. Compare circuit switching and packet switching with suitable timing of events diagram. **(9)**

Q.6 a. Discuss MAC sublayer protocol of IEEE 802.3 giving details of frame format. **(8)**

b. Write a note on wireless LAN with special reference to IEEE 802.11 standard. **(8)**

Q.7 a. What are the different classes of IP addressing? Explain subnet addressing with an example. **(10)**

b. A class B network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts per subnet? **(6)**

Q.8 a. What is a digital pipe? List various standardised ISDN channels. **(6)**

b. How does ATM differ from frame relay? Explain two methods of transmitting ATM cells. List the various services provided by AAL. **(10)**

Q.9 Write explanatory notes on **ANY TWO:**

(i) HTTP
(ii) SMTP Mail flow
(iii) Congestion Control
(iv) IP Multicasting **(8+8)**