Code: D-21 / DC-11 **Subject: DATA COMMUNICATION & NETWORKS**
Time: 3 Hours **June 2006** **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. ITU–T's X.200 standard describes

(A) TCP/IP model **(B)** ATM Networks
(C) OSI model **(D)** ISDN Networks

b. If s(t) = s(t+T) where $-\infty < t < +\infty$ then s(t) is

(A) aperiodic signal. **(B)** periodic signal.
(C) impulse. **(D)** discrete signal.

c. A channel bandwidth of 8 MHz results in a data rate of

(A) 4 Mbps. **(B)** 2 Mbps.
(C) 8 Mbps. **(D)** 16 Mbps.

d. Delay distortion in a signal occurs due to its

(A) amplitude **(B)** phase
(C) frequency **(D)** velocity of propagation

e. An amplifier has a 30 dB voltage gain. Its V_o/V_{in} is

(A) 30 **(B)** 15
(C) 31.622 **(D)** 30.55

f. Multilevel signalling of data encoding helps in improving

(A) bandwidth efficiency **(B)** signal-to-noise ratio
(C) modulation efficiency **(D)** recovered signal quality

g. Datagram and virtual circuits are the two methods to design _____ networks.

(A) space division **(B)** packet switched
(C) message switched **(D)** circuit switched

h. LLC protocol is for

(A) WAN's **(B)** MAN's
(C) Internets **(D)** LAN's

i. Multicasting is supported by _____ IP address

(A) Class A **(B)** Class B
(C) Class D **(D)** Class C

j. UDP is a _____ protocol

(A) connection oriented **(B)** connection less
(C) connection rejection **(D)** connection abortion

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

Q.2 a. With reference to the subnetworks, describe the working of TCP and IP protocols. **(8)**

b. What are the salient features of Mobile IP? **(4)**

c. In a BPSK system, the E_b/N_o is 8.4 dB, with a BER = 10^{-4}, noise temperature = $290^{\circ}K$ and data rate 2400 bps. Calculate the received signal level in watts. **(4)**

Q.3 a. What is stop and wait flow control protocol. **(8)**

b. Compute the bandwidth efficiency for ASK, FSK, PSK and QPSK systems for a bit error rate of 10^{-7} on a channel with an SNR of 12 dB. Given Eb/No=14.2 dB for ASK and FSK and 11.2 dB for PSK.
(8)

Q.4 a. With neat block diagrams of transmitter and receiver, describe a synchronous TDM system. **(6)**

b. Write a brief note on Token ring. **(4)**

c. Describe ADSL and XDSL technologies. **(6)**

Q.5 a. Describe the salient features of Frame Relay protocol. **(6)**

b. Discuss any one-error detection/correction method used at data link layer. **(4)**

c. What are the real time and non real time services offered by ATM networks? **(6)**

Q.6 a. What are the various network topologies? List the factors that affect the choice of a topology and transmission medium in a LAN. **(8)**

b. With a neat diagram describe the IEEE 802.3 frame structure. Is it same as Ethernet frame structure? Explain your answer. **(8)**

Q.7 a. Discuss the salient features of IPv4 addressing. **(6)**

b. Compare and contrast IPV4 and IPv6. **(4)**

c. What is multicasting? What are its applications? **(6)**

Q.8 a. Describe the TCP header format. **(10)**

b. Briefly explain the following TCP mechanisms:

(i) Connection establishment. (ii) Data transfer.
(iii) Connection termination. **(6)**

Q.9 Write short notes on **ANY TWO** of the following:

(i) SMTP
(ii) Circuit switching
(iii) WWW
(iv) Different transmission media used in computer communication.
(v) Routing protocols. **(8+8)**