DipIETE – ET/CS (OLD SCHEME)

Code: DE21/DC11 **Subject: DATA COMMUNICATION & NETWORKS**
Time: 3 Hours **Max. Marks: 100**

DECEMBER 2010

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.**
- **The answer sheet for the Q.1 will be collected by the invigilator after half an hour of the commencement of the examination.**
- **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 the best alternative in the following:** **(2×10)**

a. In _____ transmission, a start bit and a stop bit frame a character byte.

    (A) Asynchronous serial **(B)** Synchronous serial
    (C) Parallel **(D)** (a) and (b)

b. Which multiplexing technique shifts each signal to a different carrier frequency?

    (A) FDM **(B)** TDM
    (C) Both (a) and (b) **(D)** None of the above

c. One factor in the accuracy of a reconstructed PCM signal is the _____

    (A) Signal bandwidth
    (B) Carrier frequency
    (C) Number of bits used for quantization
    (D) Baud rate

d. Which media does not come under the guided media?

    (A) Fiber optics **(B)** Coaxial cable
    (C) Microwave **(D)** Twisted pair

e. Which error detection method involves polynomials?

    (A) Simple parity check **(B)** Two-dimensional parity check
    (C) CRC **(D)** Checksum

f. _____ is a random-access protocol.

    (A) MA **(B)** Polling
    (C) FDMA **(D)** CDMA

g. Which AAL type is designed to support a data stream that has a constant bit rate?

(A) AAL 1   (B) AAL 2
(C) AAL ¾   (D) AAL 5

h. In _____ routing, the mask and destination addresses are both 0.0.0.0 in the routing table.

(A) Next-hop   (B) Network-specific
(C) Host-specific   (D) Default

i. The _____ defines the client program.

(A) Ephemeral port number   (B) IP address
(C) Well-known port number   (D) Physical address

j. Which of the following is a retrieval method?

(A) HTTP   (B) FTP
(C) TELNET   (D) All the above

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

Q. 2 a. What is the function of a modulator? What is the function of a demodulator? Compare the FM bandwidth with the AM bandwidth in terms of the modulating signal. **(5)**

b. A signal is sampled. Each sample represents one of four levels. How many bits are needed to represent each sample? If the sampling rate is 8000 samples per second, what is the bit rate? **(4)**

c. Discuss the modes for propagating light along optical channels with proper diagrams. **(7)**

Q. 3 a. For each of the following four networks, discuss the consequences if a connection fails. **(4)**

   (i) Five devices arranged in a mesh topology.
   (ii) Five devices arranged in a star topology (not counting the hub).
   (iii) Five devices arranged in a bus topology.
   (iv) Five devices arranged in a ring topology.

b. What is a peer-to-peer process? What are headers and trailers, and how do they get added and removed? **(4)**

c. On what basis will you compare OSI and TCP/IP reference models? Explain in detail. **(8)**

Q.4 a. What is inverse multiplexing? Discuss the duration of a data unit before and after the TDM process. **(4)**

b. How is CRC superior to the two-dimensional parity check? How does the checksum checker know that the received data unit is undamaged? **(6)**

c. Why is flow control needed? How does Go-Back-N ARQ differ from Selective Repeat ARQ? Name the types of HDLC frames, and give a brief description of each. **(6)**

Q.5 a. What is the purpose of a transceiver? Complete Table 1. **(8)**

	Characteristics	10Base5	10Base2	10Base-T	10Base-FL
1.	Type of cable				
2.	Type of transceiver				
3.	Need for cable end				

b. Explain LAN standards. Write a short note on wireless LAN. **(8)**

Q. 6 a. What is the fundamental difference between circuit switching and packet switching? Explain external and internal operations in virtual circuits and datagrams with the help of proper examples and diagrams. **(10)**

b. Discuss in brief some of the routing techniques. **(6)**

Q. 7 a. Which fields in the IP header remain the same as the packet travels from source host to destination host? Name and describe the three types of IPv6 addresses **(6)**

b. Differentiate the following giving suitable example:
(i) Unicast and Multicast routing.
(ii) Interior and Exterior routing protocol. Discuss any one of the routing protocols in detail. **(10)**

Q. 8 a. What do you mean by term ISDN? Write a brief note on Broadband ISDN. **(6)**

b. Discuss the various fields in ATM cell header. **(4)**

c. What is congestion? Explain the Leaky Bucket algorithm for congestion control. **(6)**

Q. 9 a. Discuss SMTP standard for transferring mail between two hosts with the help of a typical mail flow diagram. **(8)**

b. Explain two protocols that SNMP uses to perform management tasks. **(8)**