MAULANA ABUL KALAM AZAD UNIVERSITY OF TECHNOLOGY, WEST BENGAL

Paper Code : BCA-501

DATA COMMUNICATION AND COMPUTER NETWORKS

Time Allotted: 3 Hours | *Full Marks:* 70

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

The questions are of equal value.

Group – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for the following: 1×10=10

(i) Before data can be transmitted, they must be transformed to

(a) periodic signals
(b) electromagnetic signals
(c) aperiodic signals
(d) All of these

(ii) Unipolar encoding uses

(a) only one voltage level
(b) two voltage levels
(c) three voltage levels
(d) None of these

(iii) Which error detection method uses 1's complement arithmetic?

(a) Checksum
(b) LRC
(c) CRC
(d) VRC

(iv) Optical transmission mainly uses

(a) TDM
(b) WDM
(c) FDM
(d) Flow based routing

(v) In which layer repeater is used?

(a) Physical layer
(b) Data link layer
(c) Network layer
(d) Application layer

(vi) Microwaves are used for

(a) unicast communication
(b) None of these
(c) multicast communication
(d) Both (a) and (b)

(vii) Baud is

(a) no. of bits per second.
(b) no. of signal changes per second.
(c) no. of bytes per second.
(d) no. of character changes per second.

(viii) The speed of Ethernet is

(a) 64 Kbps
(b) 64 Mbps
(c) 10 Kbps
(d) 10 Mbps

(ix) If five computers are connected to the fully connected mesh topology required — number of cabling.

(a) 20
(b) 5
(c) 10
(d) 15

(x) Which of the following method provide dedicated communication channel between two stations?

(a) Switch Network
(b) Circuit Switching
(c) Packet Switching
(d) None of these

Group – B

(Short Answer Type Questions)

Answer *any three* of the following. 5×3=15

2. (a) Explain different Transmission Media used for transfer of information.
   (b) How data transmission is carried out in half-duplex mode? Where it is used? 3+1+1=5

3. Given a 10 bit sequence 1001010110 and a divisor 1011. Find the CRC.

4. (a) Compare the go-back-N and selective Repeat Sliding Window Protocol.
   (b) "The size of the window is 2^6-1"— Justify this answer. 3+2=5

5. Explain different types of Line Coding Scheme.

6. Compare IP addressing and MAC addressing.

Group – C

(Long Answer Type Questions)

Answer *any three* of the following. 15×3=45

7. (a) Draw the Line Coding Waveforms for the data streams 111011100, in the following to NRZ-L, NRZ-I, RZ.

   (b) Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?

   (c) The human voice normally contains frequencies from 0-4 KHz. What is the bit rate, assuming 8 bit per sample?

   9+3+3=15

8. (a) Describe the Station types, Configurations, Access Control and Frame formats of HDLC. What is bit stuffing? What is the need for it?

   (b) Explain the two technologies used in a Time-division Switch. 10+5=15

9. (a) Describe the advantages and disadvantages of Twisted-pair, Coaxial Cable, and Optical Fiber.

   (b) Write down brief description over LAN, MAN and WAN networks. 9+6=15

10. (a) How is a Repeater different from an Amplifier? What is the function of Repeater, Bridge and Gateway?

    (b) Applying the CRC algorithm, determine the checksum and the transmitted frame for the data 11010111 and for the generator polynomial $X^3 + X^2 + 1$. (2+6)+7=15

11. (a) For n number of users, how many keys are needed if we use Private and Public key Cryptography Schemes? Explain how RSA works.

    (b) How Congestion Control is performed by Leaky Bucket Algorithm? In what way Token Bucket Algorithm is superior to Leaky Bucket Algorithm? (2+5)+(5+3)=15

12. Write short notes on *any three* of the following : 5×3=15

    (a) IEEE 802.3 MAC frame format
    (b) TDM
    (c) X.25 frame format
    (d) ARP
    (e) TELNET