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Assignment1 – Concept of layering, LAN technologies

Q1. In serial data transmission, every byte of data is padded with a '0' in the beginning and one or two '1's at the end of byte because

A. receiver is to be synchronized for byte reception

B. receiver recovers lost '0's and '1's from these padded bits

C. padded bits are useful in parity computation

D. none of the above

Q2. Assume that each character code consists of 8 bits. The number of characters that can be transmitted per second through an asynchronous serial line at 2400 baud rate, and with two stop bits is

A. 109

B. 216

C. 218

D. 219

Q3. A broadcast channel has 10 nodes and total capacity of 10 Mbps. It uses polling for medium access. Once a node finishes transmission, there is a polling delay of 80 µs to poll the next node. Whenever a node is polled, it is allowed to transmit a maximum of 1000 bytes. The maximum throughput of the broadcast channel is

A. 1 Mbps
B. 100/11 Mbps
C. 10 Mbps
D. 100 Mbps

Q4 How many 8-bit characters can be transmitted per second over a 9600 baud serial communication link using asynchronous mode of transmission with one start bit, eight data bits, two stop bits and one parity bit?

A. 600

B. 800

C. 876

D. 1200

Q5. Consider the following message M = 1010001101. The cyclic redundancy check (CRC) for this message using the divisor polynomial x5 + x4 + x2 + 1 is :

A. 01110

B. 01011

C. 10101

D. 10110

Q6. A computer network uses polynomials over GF(2) for error checking with 8 bits as information bits and uses x^3+x+1 as the generator polynomial to generate the check bits. In this network, the message 01011011 is transmitted as

(A) 01011011010 (B) 01011011011

(C) 01011011101 (D) 01011011100

Q7 A network has a data transmission bandwidth of 20×10^6 bits per second. It uses CSMA/CD in the MAC layer. The maximum signal propagation time from one node to another node is 40 microseconds. The minimum size of a frame in the network is _____ bytes

Q8. Which of the following statements is TRUE about CSMA/CD

A. IEEE 802.11 wireless LAN runs CSMA/CD protocol

B. Ethernet is not based on CSMA/CD protocol

C. CSMA/CD is not suitable for a high propagation delay network like satellite network

D. There is no contention in a CSMA/CD network

Q9. The minimum frame size required for a CSMA/CD based computer network running at 1 Gbps on a 200m cable with a link speed of 2 × 108m/s is

A. 125 bytes

B. 250 bytes

C. 500 bytes

D. None of the above

Q10. Consider a CSMA/CD network that transmits data at a rate of 100 Mbps (bits per second) over a 1 km (kilometer) cable with no repeaters. If the minimum frame size required for this network is 1250 bytes, what is the signal speed (km/sec) in the cable?

A. 8000

B. 10000

C. 16000

D. 20000

Q11. What is the distance of the following code 000000, 010101, 000111, 011001, 111111?

A. 2

B. 3

C. 4

D. 1

Q12. An error correcting code has the following code words: 00000000, 00001111, 01010101, 10101010, 11110000. What is the maximum number of bit errors that can be corrected?

A. 0

B. 1

C. 2

D. 3

Q13. In an Ethernet local area network, which one of the following statements is TRUE?

A. A station stops to sense the channel once it starts transmitting a frame.

B. The purpose of the jamming signal is to pad the frames that are smaller than the minimum frame size.

C. A station continues to transmit the packet even after the collision is detected.

D. The exponential back off mechanism reduces the probability of collision on retransmissions

Q14. Determine the maximum length of the cable (in km) for transmitting data at a rate of 500 Mbps in an Ethernet LAN with frames of size 10,000 bits. Assume the signal speed in the cable to be 2,00,000 km/s.

(A) 1 (B) 2 (C) 2.5 (D) 5

Q15. Which of the following statements is FALSE regarding a bridge?
A. Bridge is a layer 2 device
B. Bridge reduces collision domain
C. Bridge is used to connect two or more LAN segments
D. Bridge reduces broadcast domain

Q16. There are n stations in a slotted LAN. Each station attempts to transmit with a probability p in each time slot. What is the probability that ONLY one station transmits in a given time slot?
(A) $(1-p)^{(n-1)}$
(B) $np(1-p)^{(n-1)}$
(C) $p(1-p)^{(n-1)}$
(D) $1-(1-p)^{(n-1)}$

Q17. A 2 km long broadcast LAN has 10^7 bps bandwidth and uses CSMA/CD. The signal travels along the wire at 2×10^8 m/s. What is the minimum packet size that can be used on this network?
(A) 50 bytes
(B) 100 bytes
(C) 200 bytes
(D) None of these

Q18 Suppose the round trip propagation delay for a 10 Mbps Ethernet having 48-bit jamming signal is 46.4 μs. The minimum frame size is:

A. 94

B. 416

C. 464

D. 512

Q19 A link has transmission speed of 10^6 bits/sec. It uses data packets of size 1000 bytes each. Assume that the acknowledgement has negligible transmission delay, and that its propagation delay is the same as the data propagation delay. Also assume that the processing delays at nodes are negligible. The efficiency of the stop-and-wait protocol in this setup is exactly 25%. The value of the one way propagation delay (in milliseconds) is_____.

Q20 In Ethernet when Manchester encoding is used, the bit rate is:

A. Half the baud rate

B. Twice the baud rate

C. Same as the baud rate

D. None of the above

Answers

1	A
2	C
3	B
4	C
5	A
6	C
7	200Bytes
8	C
9	B
10	D
11	A
12	B
13	D
14	B
15	D
16	B
17	D
18	D
19	12msec
20	A