

## CISC 7332X Spring 2021 Midterm Exam

You may use calculators on this exam. Pick the best answer that fits the question. 5-points per question. Not all of the answers may be correct. If none of the answers fit, write your own answer.

Answers must be emailed in plain text (no formatting, no attachments). Email *must* have your *full name* at the *top*. Answers to questions must be clearly marked (question number before each answer), and be in sequence (question 1 should come before question 2, etc.).

Email must arrive by 11:59PM on 2021-03-24.

1. A microSD card is 250mg (milligrams). A truck carrying 10,000kg of 512GB microSD cards is driving 4700km (NYC to SF) at 100km/h (assuming no stops) has what capacity per second? (tip: what  $X$  terabits/second?)

(a) Answer is: \_\_\_\_\_

2. Length of an Ethernet network is limited by:

- a. data rate
- b. packet size
- c. CSMA/CD

d. all of the above

e. None of the above, answer is: \_\_\_\_\_

3. For Gigabit Ethernet (1000Mbps), the CSMA/CD happens during first  $N$  of each frame. What is  $N$  in microseconds?

(a) Answer is: \_\_\_\_\_

4. The purpose of a network mask is:

- a. To extract the host MAC address from the Ethernet frame.
- b. To find the network address.
- c. To add to the host address and get network address.

d. To cover up ugly IP addresses.

e. None of the above, answer is: \_\_\_\_\_

5. The MAC layer is responsible for:

- a. End to end error correction.
- b. Routing.
- c. Dealing with collisions.

d. Converting ASCII to EBCDIC.

e. None of the above, answer is: \_\_\_\_\_

6. On a bus network,

a. devices connect using a passive interface.

b. devices connect using an active interface.

- c. LLC layer handles CSMA/CD
- d. all of the above
- e. None of the above, answer is: \_\_\_\_\_

7. Ring network,

- a. devices connect using a passive interface.
- b. devices connect using an active interface.
- c. LLC layer handles CSMA/CD
- d. all of the above
- e. None of the above, answer is: \_\_\_\_\_

8. Slotted ALOHA improved:

- a. Principle Time.
- b. Vulnerable Time.
- c. Propagation Time.
- d. Flight Time.
- e. None of the above, answer is: \_\_\_\_\_

9. If bandwidth is 16Mhz, and SNR is 63, max capacity of the channel is (in Mbps):

- (a) Answer is: \_\_\_\_\_

10. If bandwidth is between 48 and 64Mhz, and SNR is 63, about how many voltage levels are required to achieve maximum capacity

- (a) Answer is: \_\_\_\_\_

11. We are transmitting data at a rate of 8Kbps. During transmission, the noise introduces errors so that, on average, 2% of bits are received incorrectly (i.e.: a 0 as 1, or 1 as 0). The maximum error free capacity of this channel is (in bps):

- (a) Answer is: \_\_\_\_\_

12. Continuing previous question, if we used 4 voltage levels, what's the bandwidth (in Hz) required for this channel?

- (a) Answer is: \_\_\_\_\_

13. Continuing previous question, what's the signal-to-noise ratio?

- (a) Answer is: \_\_\_\_\_

14. Noise has 2W of power. We boost signal power to 30W. What's the bandwidth required to achieve 48Kbps capacity?

- e. Answer is: \_\_\_\_\_

15. We are transmitting data at 9W, and detect only 7W when receiving, attenuation in decibels is:

(a) Answer is: \_\_\_\_\_

16. If  $SNR$  is 15, what's the  $SNR_{dB}$ ?

e. Answer is: \_\_\_\_\_

17. If bandwidth is 16kHz, and  $SNR_{dB}$  is 12, what's the error free capacity of the channel?

e. Answer is: \_\_\_\_\_

18. Which protocol is used to find the MAC address:

a. DNS

b. SMTP

c. TCP

d. ARP

e. None of the above, answer is: \_\_\_\_\_

19. Routers operate at:

a. Data Link Layer

b. Physical Layer

c. Session Layer

d. Network layer

e. None of the above, answer is: \_\_\_\_\_

20. Network switches operate at:

a. Data Link Layer

b. Session Layer

c. Network layer

d. Physical Layer

e. None of the above, answer is: \_\_\_\_\_