Brooklyn College, CIS Dept, CIS 743
Midterm Exam

Name: _____

Section: _____   Id.: _____

(*Show all work. You get 20% credit for leaving an answer blank (ie: 1 point for leaving a 5 point question blank). You get no points for a wrong answer.*)

1. (5 pts) Define *network*. What are some uses of a typical data network?

2. (5 pts) Distinguish between LANs, MANs, and WANs. Give examples where a LAN may span countries.

3. (5 pts) What is the duration of a bit for each of the following signals?

    a.   A signal with bit rate of 100 bps.

    b.   A signal with bit rate of 200 Kbps.

    c.   A signal with bit rate of 5 Mbps.

    d.   A signal with bit rate of 1 Gbps.

4. (5 pts) In a token ring or a token bus network, if a token gets lost (the computer that has it crashes), explain *two ways* how the remaining computers *might* regenerate the token. I'm looking for your reasoning on how it *might* work—not necessarily how it really works.

5. (5 pts) What is the ISO's OSI reference model? Why is it important for you to learn about it? Why is it impractical?

6. (5 pts) If the bit rate of a signal is 1000 bps, how many bits can be sent in 5 s? how many in 1/5 s? How many bits in 100 ms?

7. (5 pts) A composite signal contains frequencies from 10 kHz to 30 kHz, each with an amplitude of 10 volts. Draw the frequency spectrum.

8. (5 pts) A periodic composite signal with a bandwidth of 2000 Hz is composed of two sine waves. The first one has a frequency of 100 Hz with a maximum amplitude of 20 V; the second one has a maximum amplitude of 5 V. Draw the frequency spectrum.

9. (5 pts) Explain the term *protocol stack*. Describe situations where it would be useful not to implement the *full* stack.

10. (5 pts) 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?

11. (5 pts) Explain the term *modulation*. For what is it used?

12. (5 pts) Given that the speed of light is 186,000 mi/s and a satellite is at geosynchronous orbit, how long would it take for a signal to go from the earth station to the satellite (minimum time)?

13. (5 pts) The signal travels from point A to point B. At point A, the signal power is 100 W. At point B, the power is 90 W. What is the attenuation in dB?

14. (5 pts) A line has a signal-to-noise ratio of 1000 and a bandwidth of 4000 kHz. What is the maximum data rate supported by this line?

15. (5 pts) A sliding window protocol uses a window of size 15. How many bits are needed to define the sequence number?

16. (5 pts) How does a token passing protocol answer the question "What should be done if the medium is busy?"

17. (5 pts) Match the following to one or more of the seven OSI Layers:

    a. route determination

    b. flow control

    c. interface to outside world

    d. access to the network provided for the end user

    e. ASCII changed to EBCDIC

18. (5 pts) Match the following to one or more of the seven OSI Layers:

    a. reliable end-to-end data transmission

    b. network selection

    c. frames defined

    d. user services such as email and file transfer provided.

    e. transmission of bit stream across physical medium.

19. (5 pts) Match the following to one or more of the seven OSI Layers:

    a. direct communication with the user's application program.

    b. error correction and retransmission.

    c. mechanical, electrical, and functional interface.

    d. responsibility for information between adjacent nodes.

    e. reassembly of data packets.

20. (5 pts) Match the following to one or more of the seven OSI Layers:

    a. provide format and code conversion services.

    b. establishes, manages, and terminates sessions.

    c. ensures reliable transmission of data.

    d. provides log-in and log-out procedures.

    e. synchronizes users.