Brooklyn College, CIS Dept, CIS 49.2
Midterm Exam

Name: _____

Section: _____ Id.: _____

(*Each question is worth 5 points. You get 2 points for leaving an answer blank. You get no points for a wrong answer.*)

1. (5 pts) What is the purpose of DNS? Explain how domain names are resolved. What does your computer do when you call `gethostbyname(...)`. Why is cache important?

2. (5 pts) Explain how DNS can seemingly operate through the firewall (why don't the returning packets bounce off the firewall?)

3. (5 pts) Describe the function of a router. Explain why it is important for any routing technique to have alternate routes available to send messages.

4. (5 pts) List at least three pieces of information in a routing table. Define the purpose of each.

5. (5 pts) Explain the purpose of TCP/IP's sub-protocols such as: IP, ICMP, ARP, UDP, and TCP. What is each of them used for?

6. (5 pts) Describe the steps Sendmail (or any email program) takes in finding a proper mail exchange to use to send email. What are "MX" records?

7. (5 pts) You need to send a "Hello World" email to `blah@somehost.com`. You don't have an email program, no web-browser (no webmail), and no ISP provided SMTP server. All you have is `telnet` and `dig` (dig is a DNS lookup utility). Describe exactly how you would send this email.

8. (5 pts) How would you retrieve `http://www.google.com/search?q=telnet` using telnet. Write out command line, and what you'll type into telnet.

9. (5 pts) Trace the path of a 1 byte file as it is transmitted using HTTP. Identify several types of addresses that are required as a message moves from the application layer on one computer to the application layer on another.

10. (5 pts) What is the purpose of a data-link layer?

11. (5 pts) What is the purpose of a Network layer?

12. (5 pts) Given a signal, explain how you might go about removing all frequencies above 4kHz.

13. (5 pts) What are raw sockets and why are they useful?

14. (5 pts) Suppose the data are stored on 1.4 Mbyte floppy diskettes that weigh 30 grams each. Suppose that an airliner carries 10^4 kg of these floppies at a speed of 1000 km/h over a distance of 5000 km. What is the data transmission rate in bits per second of this system?

15. (5 pts) What is the difference between a hub, switch, and router? What layers of ISO's OSI model are involved in each?

16. (5 pts) Define the terms *segmentation* and *reassembly* as they apply to communication. How does it work? Why are they needed? Explain.

17. (5 pts) Distinguish between *synchronous* and *asynchronous*. Give examples were each one may be used.

18. (5 pts) Explain how dial up networking allows you to browse the Internet over a telephone line.

19. (5 pts) Explain why a LAN has a physical length limit. Name at least two things that affects the length of a LAN. How and why do full duplex links avoid this issue?

20. (5 pts) List all seven ISO's OSI layers, and their purpose.

21. **(5 pts) EXTRA CREDIT:** Two trains 200 miles apart are moving toward each other. Each one is going at a speed of 50 miles per hour. A fly (carrying a message), starting on the front of one of them, flies back and forth between them at a rate of 75 miles per hour. It does this until the trains collide and crush the fly to death. What is the total distance the fly has flown?