

**THE UNIVERSITY OF WESTERN ONTARIO  
LONDON CANADA**

**COMPUTER SCIENCE 357b  
MIDTERM EXAMINATION  
FEBRUARY 14, 2004  
2 HOURS**

NAME: \_\_\_\_\_

STUDENT NUMBER: \_\_\_\_\_

Question

1-25. \_\_\_\_\_

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33. \_\_\_\_\_

34. \_\_\_\_\_

TOTAL \_\_\_\_\_

(Out of 150 marks)

There are no cheat sheets, books, or other reference materials allowed for this exam. No calculators or other electronic devices are permitted either.

Part I -- Multiple Choice, True/False -- Choose the best answer from the choices given. Circle your answer on the paper, and fill in the answer on the Scantron form. [50 marks total, 2 marks each]

1. Before sending a packet into a virtual circuit network, the source must determine all of the links that packet will traverse between source and destination.
  - a. True.
  - b. False.
  
2. For the World Wide Web as an application, the user agent is:
  - a. The user's mouse.
  - b. The user's monitor.
  - c. The user's keyboard.
  - d. All of the above put together.
  - e. None of the above.
  
3. Suppose a client sends an HTTP request message with the If-modified-since: header. Suppose the object in a server has not changed since the last time that client retrieved the object. Then the server will send a response message with the status code:
  - a. 304 Not Modified.
  - b. 404 Not Found.
  - c. 200 OK.
  - d. 403 Permission Denied.
  - e. None of the above.
  
4. Real-time streaming of multimedia data from one host to another is:
  - a. Loss-intolerant and time insensitive.
  - b. Loss-intolerant and time sensitive.
  - c. Loss-tolerant and time insensitive.
  - d. Loss-tolerant and time sensitive.
  - e. None of the above.
  
5. Local DNS name servers:
  - a. Obtain resource records from Web caches.
  - b. Cache resource records, but discard them after a period of time.
  - c. Never cache resource records.
  - d. Cache resource records and never discard them.
  - e. None of the above.
  
6. For a TCP application, a socket must be opened for communication in each direction.
  - a. True.
  - b. False.

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7. Which of the below protocols use handshaking?
    - a. TCP.
    - b. UDP.
    - c. IP.
    - d. All of the above.
    - e. None of the above.
  
  8. FDM and TDM are two approaches to:
    - a. Circuit switching.
    - b. Packet switching.
    - c. Both of the above.
    - d. None of the above.
  
  9. In a packet switching network, all packets utilize full network bandwidth.
    - a. True.
    - b. False.
  
  10. Which of the following is an organization that creates, standardizes, and maintains Internet protocols?
    - a. RFC.
    - b. IETF.
    - c. DNS.
    - d. PPP.
    - e. None of the above.
  
  11. All communication activity in the Internet is governed by protocols.
    - a. True.
    - b. False.
  
  12. If  $R$  is link bandwidth,  $L$  is packet length, and  $a$  is average packet arrival rate, then traffic intensity can be defined mathematically as:
    - a.  $aL/R$ .
    - b.  $RL/a$ .
    - c.  $Ra/L$ .
    - d.  $RLa$ .
    - e. None of the above.
  
  13. Which of the following residence access technologies are shared:
    - a. Dial-up access.
    - b. ADSL.
    - c. HFC.
    - d. All of the above.
    - e. None of the above.
  
  14. A tier-1 Internet Service Provider only links to tier-2 and lower level ISPs.
    - a. True.
    - b. False.

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15. Packets on the Internet can flow across many ISPs.
    - a. True.
    - b. False.
  
  16. HTTP directly relies upon which lower level protocol?
    - a. TCP.
    - b. UDP.
    - c. IP.
    - d. SMTP.
    - e. None of the above.
  
  17. FTP is a stateless protocol.
    - a. True.
    - b. False.
  
  18. Which of the following is provided by UDP:
    - a. Reliable, in order data delivery.
    - b. Flow control.
    - c. Congestion control.
    - d. Minimum bandwidth guarantees.
    - e. None of the above.
  
  19. Suppose that you construct a peer-to-peer network using the swarming approach discussed in class. As the number of users downloading a file increases, which of the following occurs:
    - a. On average, downloads of the file will be slower.
    - b. On average, downloads of the file will be faster.
    - c. On average, downloads of the file will be unaffected.
    - d. On average, more downloads of the file will time out and abort.
    - e. None of the above.
  
  20. The transport layer is used to provide:
    - a. Logical communication between processes.
    - b. Logical communication between hosts.
    - c. Logical communication between adjacent network entities.
    - d. All of the above.
    - e. None of the above.
  
  21. The network layer is used to provide:
    - a. Logical communication between processes.
    - b. Logical communication between hosts.
    - c. Logical communication between adjacent network entities.
    - d. All of the above.
    - e. None of the above.

22. No DNS server contains all of the host-address mappings for every host on the Internet.
- True.
  - False.
23. What information is used by a process running on one host to identify a process running on another host?
- The host name or Internet address of the host.
  - The port number the process is listening on.
  - The process identifier for the process.
  - a) and b)
  - a), b), and c)
24. Link bandwidth and link propagation speeds are roughly equivalent values.
- True.
  - False.
25. Web clients can open multiple parallel connections to retrieve web objects from a server in which version(s) of HTTP?
- In HTTP/1.0 and not HTTP/1.1.
  - In HTTP/1.1 and not HTTP/1.0.
  - In both HTTP/1.0 and HTTP/1.1.
  - In neither HTTP/1.0 nor HTTP/1.1.

26. The following question parts deal with circuit and packet switching. [12 marks total]

a. Which approach to switching, circuit or packet, can support more network users in theory? Explain your answer. [4 marks]

b. What happens to circuit switching and packet switching under heavy congestion conditions? [4 marks]

c. What kind of traffic is circuit switching best for? What kind of traffic is packet switching best for? Provide an example of each. [4 marks]









31. What are the benefits of increasing the number of links between peering ISPs, or adding new peer links to an ISP? [4 marks]
32. Many application level Internet protocols have responses that include both a status code and a status phrase. Why would they include both? [4 marks]
33. Suppose you are writing an Internet application for peer-to-peer file transfers. Which transport protocol would you use? Why? Which of the approaches to peer-to-peer networking discussed in class would you use? Why? [6 marks]

