MIDTERM EXAMINATION #1 - B

COMPUTER NETWORKS : 03-60-367-01

UNIVERSITY OF WINDSOR

SCHOOL OF COMPUTER SCIENCE

Fall 2008 - 75 minutes

This examination document contains all questions for the examination. Each student must surrender this examination copy at the same time as they submit their answer sheets. Although you may write on this document, it will not be graded. There is no need to place your name on this document.

PLEASE READ CAREFULLY BEFORE YOU START

1. This is a CLOSED book test; no notes, textbooks, calculators or computer aids are allowed.
2. You will be asked to sign your name once before leaving the exam room (sign-out) and after submitting your exam answer sheet (Scantron computer sheet).
3. PLACE ANSWERS on the Scantron sheets provided – you must use a pencil (NO PENs). Fill in all areas required, including your name, course and section numbers. DO NOT REMOVE any pages or attach any papers to this document. If you need more space for rough work you may use any additional space on the examination question paper. No part of this examination question paper will be marked.
4. You are not allowed to give or receive unauthorized help with your test. Any misconduct, as outlined by the Senate bylaw 31 article I, will be reported accordingly.
5. **You have 75 minutes to complete this test, starting from the time stated by the instructor.**
6. **When the instructor indicates that time has elapsed all students must stop writing answers and surrender their Scantron answer sheets immediately to the proctors.**
7. Photocopies of Scantron answer sheets will be returned to students after marking. Examination questions and answers will be provided using the course website.
8. The total (maximum possible) mark on this exam is **60**

Good Luck!

All questions are either Multiple Choice or True-False. For each Multiple Choice question, you are to choose only one response which **best answers** the question. For True-False questions you may only choose one option (True or False). Place all answers on the Scantron sheet provided. The examination will be marked using the campus computer.

If an error is made you must carefully and completely erase your mistake and then indicate your choice of answer. Completely and carefully fill the circle that indicates your answer to each question. Make sure you have selected the correct question number on the Scantron sheet corresponding to the question on the examination question paper.

WARNING !

Read and think carefully about each question before answering. Questions have been scrambled by topic. The student sitting next to you is writing a different examination version. Keep your attention on your own test paper and answer sheet.

1. All communication activity in the Internet is governed by protocols.
   A) True
   B) False

2. Transfer across TCP streams is full duplex.
   A) True
   B) False

3. Interconnected routers in the Internet exist _____ .
   A) within access networks
   B) in the network core, as a network of networks
   C) on the network edge
   D) None of these responses is correct

4. Round-trip time (RTT) is estimated based on _____ .
   A) sampling of routes to determine minimum cost paths
   B) a weighted average RTT that is fixed after several samples
   C) a weighted average RTT that is continuously updated
   D) None of these responses is correct.

5. TCP flow control is provided by _____ .
   A) keeping out-of-order segments in the receiver buffer
   B) including value of the receiver buffer available size in acknowledgements
   C) keeping the send rate always less than the receive rate
   D) All of these responses are correct.

6. Connectionless demultiplexing may be performed using _____ .
   A) TCP
   B) UDP
   C) ICMP
   D) All of the above are correct responses.

7. Internet transport-layer protocols provide delay and bandwidth guarantees.
   A) True
   B) False

8. The action of a sender involving the gathering of data from multiple sockets and enveloping the data with a header is called _____ .
   A) Multiplexing
   B) Packet creation
   C) Data integration
   D) Demultiplexing

9. In pipelining protocols, the selective repeat approach requires _____ .
   A) Receiver **`acks`** individual packets
   B) Sender maintains timer for cumulative **`unacked`** packets
   C) Receiver only sends cumulative **`acks`**
   D) Both B and C responses are correct

10. Transport services and protocols provide logical communication between hosts.
   A) True
   B) False

11. Transport services and protocols _____ .
   A) are provided in hosts and routers
   B) provide communication between system processes running on different hosts
   C) make more than one transport protocol available to applications
   D) All of the above responses are correct

12. In TCP, flow control is maintained by _____ .
   A) Having senders modify their propagation speed
   B) Having receivers return the speed of clearing their buffers
   C) Having senders keep a message buffer with varying size
   D) Both A and B responses above are correct

13. Demultiplexing _____ .
   A) involves gathering data from multiple sockets
   B) involves enveloping data with header
   C) involves delivering received segments to correct socket
   D) Both A and B are correct responses.

14. In TCP based demultiplexing, TCP sockets are identified by _____ .
   A) both sender and receiver port numbers
   B) sender IP address and port numbers
   C) receiver IP address and port number
   D) both sender and receiver IP addresses and port numbers

15. In pipelining protocols, the Go-back-N approach requires _____ .
    A) Sender can have up to N **`unacked`** packets in pipeline
    B) Receiver **`acks`** individual packets
    C) If sender timer expires, retransmit all N packets
    D) Sender has timer for each **`unacked`** packet

16. Assuming that W is the maximum window size established by TCP "slow start", and the round-trip time is RTT, what is the average throughout of TCP as a function of W and RTT?
    A) W/RTT
    B) 0.5 x W/RTT
    C) 0.75 x W/RTT
    D) None of the above responses is correct.

17. Hosts A and B are directly connected with a 200 Mbps link. There is one TCP connection between the two hosts, and Host A is sending to Host B an enormous file over this connection. Host A can send application data into the link at 100 Mbps, but Host B can read out of its TCP receive buffer at a maximum rate of 50 Mbps. The long term average rate at which Host A sends data is approximately _____ .
    A) 50 Mbps
    B) 75 Mbps
    C) 100 Mbps
    D) 200 Mbps

18. A user requests a Web page that consists of some text and two images. For this page, the client will send one request message and receive three response messages.
    A) True
    B) False

19. With non-persistent connections between browser and origin server, it is possible for a single TCP segment to carry two distinct HTTP request messages.
    A) True
    B) False

20. Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. What application layer protocols are needed in this scenario?
    A) DNS and HTTP
    B) TCP for DNS; TCP for HTTP
    C) UDP for DNS; TCP for HTTP
    D) None of the above are correct responses.

21. Consider an HTTP client that wants to retrieve a Web document at a given URL. The IP address of the HTTP server is initially unknown. What transport layer protocols are needed in this scenario?
A) DNS and HTTP
B) TCP for DNS; TCP for HTTP
C) UDP for DNS; TCP for HTTP
D) All of the above are correct responses.

22. The property that a network should provide services to several applications is called _____ .
A) Scope
B) Scalability
C) Robustness
D) Configurability

23. Suppose Client A initiates a Telnet session with Server S. At about the same time, Client B also initiates a Telnet session with Server S. If A and B are different hosts, it is possible that the source port number in the segments from A to S is the same as that from B to S.
A) True
B) False

24. Using TCP, _____ message(s) are exchanged before a connection exists.
A) One
B) Two
C) Three
D) None of these are correct responses.

25. End systems, or hosts, communicate with each other using either server or client models.
A) True
B) False

26. End systems must be connected to a(n) _____ in order to connect to an edge router.
A) residential access network
B) mobile access network
C) institutional access network
D) All of these responses are correct

27. Circuit switching is used to establish dedicated network paths that may be shared by other end systems.
A) True
B) False

28. Time and frequency division multiplexing schemes are used to divide link bandwidth into separately allocatable pieces.
A) True
B) False

29. Applications require which of the following transport services.
A) Data loss and Security
B) Timing
C) Throughput
D) All of the above responses are correct

30. Delivery and storage of email messages to a server is achieved using _____ .
A) Post Office Protocol (POP)
B) Internet Mail Access Protocol (IMAP)
C) Simple Mail Transfer Protocol (SMTP)
D) Hypertext Transfer Protocol (HTTP)

31. Hybrid Peer-to-Peer systems do not use “always on” servers.
A) True
B) False

32. Packet switching in the network core inevitable leads to _____ .
A) bandwidth subdivision
B) resource contention
C) shared circuit switching
D) packet loss

33. In packet switched networks, store and forward refers to: _____ .
A) entire packet must arrive at router before it can be transmitted on next link
B) scheduling of packets to avoid congestion
C) entire message must arrive at router before it can be transmitted on next link
D) entire packet must be stored on router until acknowledgement received

34. Packet loss occurs when the packet arrival rate to a link exceeds the output link capacity.
A) True
B) False

35. Packet loss _____ .
A) may be dealt with by retransmitting packets, or ignoring them completely
B) may be reduced or eliminated by expanding hardware buffers
C) Both A and B responses are correct.
D) None of these responses is correct.

36. Packet delay may be caused by _____ .
A) time required for nodal processing requirements
B) time required for queueing
C) transmission and propagation times
D) All of these responses are correct.

37. Closing a TCP socket requires _____ Acknowledgements.
A) 0
B) 1
C) 2
D) 3

38. The property that a network should operate efficiently when deployed on a small-scale as well as on a large-scale is called _____ .
A) Migration
B) Determinism
C) Scalability
D) Autoconfigurability

39. TCP abstracts data communication to appear as an apparent stream of flowing data.
A) True
B) False

40. A single program may have several open sockets at any time.
A) True
B) False

41. Both UDP and TCP require that the applications recognize their own data formats.
A) True
B) False

42. The socket that represents a ‘passive open’ is a(n) _____ socket.
A) Server
B) Client
C) TCP
D) Application

43. In TCP, following a timeout, the server _____ .
A) disconnects from the session
B) retransmits the entire message
C) retransmits the packet
D) requests an acknowledgement from the client

44. Multiple TCP streams can distinguished on a given machine using _____ .
A) Ports
B) IP addresses
C) network interface cards
D) All of the above responses are correct.

45. Which of the following is a proper layer of the TCP stack?
A) Link
B) Network
C) Transport
D) All of the above responses are proper layers of the TCP stack.

46. UDP and TCP are examples of _____ layer protocols.
A) Application
B) Link
C) Transport
D) Network

47. The Internet may be defined as many hosts running network applications interconnected with an infrastructure consisting of communication links and routers.
A) True
B) False

48. The IETF is responsible for _____ .
A) creating new Internet protocols
B) ensuring that the Internet is operating correctly
C) approving new Internet Service Providers
D) setting Internet standards

49. The Internet is described as being _____ hierarchical.
A) strictly
B) loosely
C) non-
D) completely

50. Internet protocols define _____ .
A) format of messages
B) actions taken on message transmission and receipt
C) order of messages sent and received among network entities
D) All of these responses are correct

51. In order to deal with the situation where, too many sources send too much data too fast for a network to handle, it is necessary to use a technique called _____ .
A) Flow control
B) Congestion control
C) Routing control
D) Dynamic packet management

52. HTTP is referred to as a stateless protocol because _____ .
A) clients do not maintain historic information about transactions with servers
B) servers and clients do not maintain open connections
C) server maintains no information about past client requests
D) All of the above responses are correct

53. Consider a packet of length 1024 bytes. Assuming the packet must travel over a link of distance 2500 kilometers with propagation speed 2.5×10^8 m/s and transmission rate 2 Mbps, what is the propagation delay?
A) 1 msec
B) 10 msec
C) 21 msec
D) 100 microsec

54. Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates R1 = 800 Kbps, R2 = 2 Mbps and R3 = 1 Mbps. Assuming no other traffic in the network, what is the throughput for the file transfer?
A) 800 Kbps
B) 2 Mbps
C) 1 Mbps
D) 3.5 Mbps

55. By using Web caching _____ .
A) it is possible to reduce response time for client request
B) it is possible to reduce traffic on an institution's access link
C) the cache acts as both client and server
D) All of the above responses are correct

56. Peer-to-Peer networks are used _____ .
A) for content sharing
B) for Instant Messaging
C) for IP based telephony
D) All of the above responses are correct.

57. All datagrams contain 2 ports.
A) True
B) False

58. Message encapsulation refers to _____ .
A) designating message contents with descriptive data
B) allowing for message content verification
C) reliance upon IP for transmitting messages
D) embedding payloads and protocol headers within logically layered packages

59. The size of the TCP receive window (**`RcvWindow`**) may change throughout the duration of the connection.
A) True
B) False

60. Suppose Host A is sending Host B a large file over a TCP connection. The number of unacknowledged bytes that A sends cannot exceed the size of the receive buffer.
A) True
B) False

End of Examination.