MIDTERM EXAMINATION #2 – NOV. 19, 2015
COMPUTER NETWORKS : 03-60-367-01
UNIVERSITY OF WINDSOR
SCHOOL OF COMPUTER SCIENCE
Fall 2015 - 75 minutes

This examination document contains all questions for the examination. Each student must surrender **only** their answer sheets. Each student may take this examination question paper for future reference. Although you may write on this document, it will not be graded if it is submitted. 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 YOUR NAME AND STUDENT ID NUMBER on the Scantron sheets provided – you must use a pencil (NO PENs). Your examination is Course/Section: 03-60-367-01
4. PLACE ANSWERS on the Scantron sheets provided – you must use a pencil (NO PENs).
5. 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.
6. **You have 75 minutes to complete this test, starting from the time stated by the instructor.**
7. **When the instructor indicates that time has elapsed all students must stop writing answers and surrender their Scantron answer sheets immediately to the proctors.**
8. <u>Photocopies</u> of Scantron answer sheets will be returned to students after marking. Examination questions and answers will be provided using the course website.
9. The total (maximum possible) mark on this exam is **75.**

Good Luck!

All questions are either Multiple Choice or True-False. For each Multiple Choice question, you are to choose <u>only one</u> response which **best answers** the question. For True-False questions you may <u>only</u> choose one option (True <u>or</u> False). There may be up to five (5) response options for some questions. 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. Keep your attention on your own test paper and answer sheet.

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1. In circuit switching networks, which of the following options is true?
    A) Transmission rate cannot be guaranteed.
    B) The resources needed along a path are reserved.
    C) Uses the resources on demand.
    D) A and B responses are both correct.

2. _____ delay is the result when packets wait to be transmitted onto the next link.
    A) Queuing
    B) Transmission
    C) Propagation
    D) Nodal processing

3. Which of the following options show the correct name for a packet of information in each layer?
    A) application layer: frame, Transport layer: segment, Network layer: datagram, Link layer: message
    B) application layer: message, Transport layer: frame, Network layer: datagram, Link layer: segment
    C) application layer: message, Transport layer: segment, Network layer: datagram, Link layer: frame
    D) None of the responses above is correct.

4. The type of domain that deals with *edu, com, net, org,* and other similar extensions, is called a _____ .
    A) Root DNS server
    B) Top-level DNS server
    C) Authoritative DNS server
    D) Local DNS server

5. Which one is not a service provided by DNS?
    A) translating host names
    B) Mail server aliasing
    C) load distribution
    D) congestion control

6. 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 the responses above are correct

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

8.   Ethernet is _____ .
    A) One of the physical media
    B) One of the LAN technologies
    C) One of the WAN technologies
    D) A client-server network

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

10.   SSL was added as an enhancement to TCP in order to provide process-to-process security.
    A) True
    B) False

11.   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.

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

13.   A network's speed is expressed in terms of _____ .
    A) Routing protocol
    B) Round trip time
    C) Bit rate and latency
    D) I/O buffer response
    E) Delay and Routing

14. Photonic (ie. optical) networks utilize _____ switches.
    A) LAN
    B) TCP/IP
    C) CBR
    D) analog
    E) ATM

15. Which layer is in charge of flow control?
    A) Application
    B) Network
    C) Physical
    D) Transport

16. The time it takes for a small packet to travel from client to server and then back to the client is called _____ .
    A) Round-trip time
    B) Propagation time
    C) Transmission time
    D) Delay time

17. Which of the following options control the sending and receiving of information within the Internet?
    A) protocols
    B) packets
    C) ISP
    D) RFC

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

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

20. 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

21. Transfer across TCP streams is _____ .
    A) half duplex
    B) full duplex
    C) best available duplex
    D) None of the responses above is correct.

22. A DNS resource record is a tuple that contains _____ .
    A) Name, Value
    B) Name, Value, Type
    C) Name, Value, Time-to-live
    D) Name, Type, Time-to-live
    E) Name, Value, Type, Time-to-live

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

24. Which option best describes the server program in a connection-oriented transport service?
    A) Create socket and then, in a loop, wait for incoming connection request, read request, write reply, then close
    B) Create socket, send request, read reply, close
    C) Create socket, read request, write reply
    D) Create socket, send request, read reply, close

25. What is a Distributed Hash Table (DHT)?
    A) A Server side searching table.
    B) It is used in DNS.
    C) An indexing and searching technique for a P2P network.
    D) None of the responses above is correct.

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

27. 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

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

29. 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) is not a problem with current technologies
    D) Both A and B responses are correct.
    E) None of these responses is correct.

30. Router switching may be accomplished using _____ .
    A) memory
    B) bus
    C) crossbar
    D) All of the above responses are correct

31. With GoBackN, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.
    A) True
    B) False

32. Head-of-the-line blocking occurs only at the input port.
    A) True
    B) False

33. The _____ is defined as the fraction of time the sender is actually busy sending bits into the channel.
    A) utilization
    B) capacity
    C) efficiency
    D) None of these responses is correct.

34. TCP strives to give each connection traversing a link an equal share of the link's bandwidth. This service by TCP is known as _____.
    A) congestion control
    B) bandwidth control
    C) equal-opportunity
    E) None of these responses is correct.

35. Port numbers in the range 0 - 1023 are known as _____ .
    A) small port numbers
    B) destination port numbers
    C) source port numbers
    D) well-known port numbers
    E) None of these responses is correct.

36. IP service model is based on a _____ delivery service.
    A) guaranteed
    B) reliable
    C) best-effort
    D) None of these responses is correct.

37. A transport layer protocol provides for logical communication between _____ .
    A) hosts
    B) processes
    C) routers
    D) None of these responses is correct.

38. The maximum amount of data that can be placed in a segment is limited by the _____ .
    A) maximum bandwidth
    B) protocol version used
    C) maximum segment size
    D) maximum transmission unit

39. As segments arrive from the network, a destination host directs each segment to the appropriate socket by examining the destination port number. This process is known as _____ .
    A) multiplexing
    B) demultiplexing
    C) routing
    D) segmentation

40.   In a receiving host, data is delivered from the transport layer to processes through an intermediary _____ .
        A) port
        B) socket
        C) IP address
        D) None of these responses is correct.

41.   A checksum is used to provide _____ .
        A) error detection
        B) error correction
        C) error algorithm
        D) None of these responses is correct.

42.   To maintain the EstimatedRTT of the SampleRTT's, TCP uses the _____ of the SampleRTT's.
        A) weighted average
        B) minimum
        C) maximum
        D) average of the maximum and minimum

43.   The _____ imposes a constraint on the rate at which a TCP sender can send traffic into the network.
        A) congestion indicator
        B) congestion window
        C) transmission buffer
        D) choke packet

44.   Which of the following is not a component of a route?
        A) Input ports
        B) Output ports
        C) Switching ports
        D) Switching fabric

45.   To better manage the network, network administrators usually divide a single network into _____ by allocating ranges of IP addresses within the network.
        A) islands
        B) subnets
        C) groups
        D) local area networks

46. In the datagram format for IPv4, the _____ field is included to ensure that datagrams do not circulate forever in the network.
    A) destination
    B) options
    C) protocol version
    D) time-to-live

47. _____ is used to extend the use of the limited IPv4 address space.
    A) DHCP
    B) NAT
    C) DNS
    D) TTL
    E) IPv6

48. IPv6 has _____-bit addresses.
    A) 32
    B) 64
    C) 128
    D) variable length
    E) None of these responses is correct.

49. Slow start and congestion avoidance are mandatory in TCP congestion-control algorithm.
    A) True
    B) False

50. The _____ protocol is used for error reporting in the network layer.
    A) TCP
    B) checksum
    C) SMTP
    D) ICMP
    E) IPsec

51. Window size in TCP is used to avoid congestion within the IP network
    A) True
    B) False

52. What is the TCP response to a timeout event?
    A) sending the next packet
    B) retransmitting the segment that caused the timeout
    C) restarting the connection
    D) None of these responses is correct.

53. Which of the following is correct about TCP?
    A) provides full-duplex service
    B) provides point-to-point connection
    C) starts the connection using three-way handshake
    D) All of the responses above are correct.

54. A(n) _____ is used to formulate routing problems.
    A) algorithm
    B) graph
    C) routing table
    D) All of the responses above are correct.

55. If a router malfunctions, using Distance-Vector protocols, _____ .
    A) node can advertise incorrect path cost
    B) each node computes only its own table
    C) corrective actions occur immediately to isolate the error
    D) Both A and B are correct responses.

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

57. If a router malfunctions, using Link-State protocols, _____ .
    A) node can advertise incorrect link cost
    B) each node computes only its own table
    C) each node's table is used by others so error propagates through network
    D) Both A and B are correct responses.

58. Network layer protocols must be defined in every router.
    A) True
    B) False

59. Routing algorithms may be classified based on _____ .
    A) availability of global information
    B) availability of local information
    C) rate of change of network paths
    D) All of the responses above are correct.

60. Network services and protocols provide logical communication between hosts.
    A) True
    B) False

61. A datagram network provides network-layer _____ service.
    A) connectionless
    B) connection
    C) core implementation dependent
    D) None of the responses above is correct.

62. Router buffer sizes should be selected based on _____ .
    A) message round-trip time
    B) link capacity
    C) tolerance for data loss due to overflow
    D) All of the responses above are correct.

63. Forwarding refers to _____ .
    A) the manner by which datagrams are routed from source to destination ports of end hosts
    B) the manner by which datagrams are routed from input to output ports of individual routers
    C) the set of algorithms required to ensure near-optimal path selection of datagrams
    D) the manner by which datagrams are routed from source to destination between adjacent routers

64. IP datagrams may be fragmented into several smaller IP datagrams _____ .
    A) that are reassembled at the next router link
    B) in order to adapt to the largest transport layer datagram
    C) that are reassembled only at the final destination
    D) Both B and C are correct responses.

65. In datagram networks _____ .
    A) routers maintain state about end-to-end connections
    B) packets are forwarded using destination host address and virtual circuit number
    C) packets between same source-destination pair may take different paths
    D) None of these responses is correct.

66. Datagram networks require call setup at the network layer.
    A) True
    B) False

67. When the link cost increases suddenly between two routers in a network, poisoned reverse is used to _____ .
    A) accelerate the convergence to a stable routing table
    B) replace all update link costs initially to infinity for all routes through the affected routers
    C) guarantee unique routing solutions in the final routing tables
    D) Both A and B responses are correct.

68. Assume that three routers, U, V and W, have link costs: c(U,V) = 4, c(U,W) = 6 and c(V,W) = 1. Using the Bellman-Ford algorithm, the common routing table for all routers is:

```
        U   V   W
    U   0   4   5
    V   4   0   1
    W   5   1   0.
```
    A) True
    B) False

69. The first item in an IP datagram is the _____ .
    A) header length (in bytes)
    B) total datagram length (in bytes)
    C) protocol version number
    D) type of service

70. The motivation(s) for utilizing Network Address Translation include(s) _____ .
    A) making available a range of unique IP addresses for all devices in every subnet
    B) ability to change addresses of devices in local network without notifying outside world
    C) ability to change ISP without changing addresses of devices in global network
    D) establishing direct addressability to local devices inside subnet

71. Network Address Translation is used because it expands the available device address space through use of port numbers and thereby satisfies the end-end argument at the network layer.
    A) True
    B) False

72. The IPv6 datagram header has length _____ bytes.
    A) 20
    B) 40
    C) 32
    D) 128

73.   IPv6 has _____-bit addresses..
        A) 48
        B) 64
        C) 128
        D) Variable length

74.   ICMP (Internet Control Message Protocol) messages are carried in IP datagrams.
        A) True
        B) False

75.   RIP, OSPF and BGP are examples of _____ .
        A) application layer routing protocols
        B) transport layer routing protocols
        C) network layer routing protocols
        D) Both B and C responses are correct.

End of Examination.