**MIDTERM Examination #1 – Oct. 22, 2014**

**COMPUTER NETWORKS : 03-60-367-01**

### University of Windsor

# School of Computer Science

# *Fall 2014 - 75 minutes*

This examination document contains all questions for the examination. Each student must surrender **only** their answer sheets. Each student may take home 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.

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| 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. Photocopies 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 **76.**  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). 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 an approved computer in ITS.

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. |

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| 2. | 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: datagram, Transport layer: segment, Network layer: message, Link layer: frame |
| D) | application layer: message, Transport layer: segment, Network layer: datagram, Link layer: frame |
| E) | None of the responses above is correct. |

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| 3. | Which option 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 |

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| 4. | UDP provides unreliable transfer of datagrams between client and server. | |
| A) | True |
| B) | False |

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| 5. | Protocols are not required to govern communication activity in the Internet. | |
| A) | True |
| B) | False |

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| 6. | 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 |

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| 7. | 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 the responses above are correct |

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| 8. | Hybrid Peer-to-Peer systems do not use “always on” servers. | |
| A) | True |
| B) | False |

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| 9. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_ delay is the result when packets wait to be transmitted onto the next link. | |
| A) | Queuing |
| B) | Transmission |
| C) | Propagation |
| D) | Nodal processing |

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| 10. | 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 responses above is correct. |

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| 11. | 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. |

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| 12. | The socket that represents a ‘passive open’ is a(n) \_\_\_\_\_\_\_\_ socket. | |
| A) | Server |
| B) | Client |
| C) | TCP |
| D) | Application |

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| 13. | Circuit switching is used to establish dedicated network paths that may be shared by other end systems. | |
| A) | True |
| B) | False |

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| 14. | Time and frequency division multiplexing schemes are used to divide link bandwidth into separately allocatable pieces. | |
| A) | True |
| B) | False |

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| 15. | HTTP response messages may have an empty message body. | |
| A) | True |
| B) | False |

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| 16. | Packet switching in the network core inevitably leads to \_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | bandwidth subdivision |
| B) | packet loss |
| C) | shared circuit switching |
| D) | resource contention |

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| 17. | All datagrams contain 2 ports. | |
| A) | True |
| B) | False |

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| 18. | Modern networks support networking sharing using techniques such as \_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Time division multiplexing |
| B) | Frequency division multiplexing |
| C) | Packet switching |
| D) | All of the above responses are correct |

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| 19. | The HTTP protocol \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | is stateless |
| B) | uses persistent connections |
| C) | can use non-persistent connections |
| D) | All of the responses above are correct. |

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| 20. | Which option below keeps track of users? | |
| A) | TCP |
| B) | Cookie |
| C) | Socket |
| D) | All of the responses above are correct. |

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| 21. | Which one is not a service provided by DNS? | |
| A) | translating host names |
| B) | Mail server aliasing |
| C) | load distribution |
| D) | congestion control |

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| 22. | Which of the options below uses a P2P protocol? | |
| A) | POP3 |
| B) | DNS |
| C) | HTTP |
| D) | BitTorrent |

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| 23. | 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 |

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| 24 | 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 |

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| 25. | 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 |

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| 26. | Which of the following is a proper layer of the TCP/IP stack? | |
| A) | Session |
| B) | Network |
| C) | Transport |
| D) | Presentation |
| E) | B and C are both correct. |

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| 27. | The time it takes for a small packet to travel from client to server and then back to the client is called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Propagation time |
| B) | Transmission time |
| C) | Round-trip time |
| D) | Delay time |

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| 28. | Both UDP and TCP require that the applications recognize their own data formats. | |
| A) | True |
| B) | False |

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| 29. | FTP separates control and data connections by using 2 sockets. | |
| A) | True |
| B) | False |

NOTE: Correction. See Kurose & Ross, page 117.

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| 30. | 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 |

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| 31. | 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. |

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| 32. | HTTP is referred to as a stateless protocol because \_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | servers and clients do not maintain open connections |
| B) | clients do not maintain historic information about transactions with servers |
| C) | servers maintain information about past client requests |
| D) | servers maintain no information about past client requests |
| E) | None of the responses above is correct. |

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| 33. | SMTP is called a \_\_\_\_\_\_\_\_\_ protocol. | |
| A) | Pull |
| B) | Push |

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| 34. | Throughput in a network is determined by the \_\_\_\_\_\_\_\_\_\_ that constrains the time of end to end message delivery. | |
| A) | bottleneck link |
| B) | minimum propagation delay |
| C) | maximum congestion delay |
| D) | All of the above responses are correct |

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| 35. | 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 |

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| 36. | Photonic (ie. optical) networks utilize \_\_\_\_\_\_\_\_\_\_\_\_ switches. | |
| A) | LAN |
| B) | TCP/IP |
| C) | CBR |
| D) | analog |
| E) | ATM |

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| 37. | TCP is a(n) \_\_\_\_\_\_\_\_ stream delivery service that guarantees that all bytes received will be identical with bytes sent and in the correct order. | |
| A) | unreliable |
| B) | reliable |
| C) | robust |
| D) | resilient |

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| 38. | In P2P networks, *peer churn* refers to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | peer connections joining and leaving |
| B) | two or more peer connections leaving |
| C) | updating successor and predecessor links |
| D) | All of the above responses are correct. |

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| 39. | In P2P networks with N=2K nodes, where each node may be connected to K other nodes, it is possible to achieve \_\_\_\_\_\_\_\_\_\_\_\_ efficiency in node access time. | |
| A) | O( N ) |
| B) | O( N logN ) |
| C) | O( logN ) |
| D) | O( N/K ) |

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| 40. | Which one is correct about HTTP and SMTP? | |
| A) | both transfer files |
| B) | both use UDP |
| C) | both use TCP |
| D) | A and C are both correct responses. |

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| 41. | The type of domain servers that deals with ***edu, com, net, org,*** and other similar extensions, is called \_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Local DNS servers |
| B) | Root DNS servers |
| C) | Authoritative DNS servers |
| D) | Top-level DNS servers |

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| 42. | Which of the following options control the sending and receiving of information within the Internet? | |
| A) | protocols |
| B) | packets |
| C) | ISP |
| D) | RFC |

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| 43. | 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 |

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| 44. | TCP abstracts data communication to appear as an apparent stream of flowing data. | |
| A) | True |
| B) | False |

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| 45. | 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) |
| E) | All of these responses are correct. |

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| 46. | A stream is a sequence of \_\_\_\_\_\_\_\_\_\_\_\_ that flow into or out of a process. | |
| A) | characters |
| B) | bytes |
| C) | segments |
| D) | packets |

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| 47. | HTTP is called a \_\_\_\_\_\_\_\_ protocol. | |
| A) | Pull |
| B) | Push |

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| 48. | WiMax \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | is a long-distance version of WiFi |
| B) | promises speeds of 5 to 10Mbps or higher |
| C) | supports distances of tens of kilometers |
| D) | All of the above responses are correct. |

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| 49. | 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 |

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| 50. | Transfer across TCP streams is \_\_\_\_\_\_\_\_\_\_. | |
| A) | half duplex |
| B) | full duplex |
| C) | best available duplex |
| D) | None of the responses above is correct. |

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| 51. | A server host may support many simultaneous TCP sockets. | |
| A) | True |
| B) | False |

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| 52. | A Denial-of-Service attack can be performed by bombarding a server with connection requests. | |
| A) | True |
| B) | False |

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| 53. | Multiple TCP streams can distinguished on a given machine using ­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Ports |
| B) | DNS addresses |
| C) | network interface cards |
| D) | cookies |

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| 54. | 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 |

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| 55. | Suppose a Client is downloading a 5MB file from a Server, through a single communication link, with bandwidth capacity of 100Mbps, as in the diagram below.  If the distance between the Client and the Server is 8000 Km and the propagation speed through the medium is 2 x 108 m/s, then the transmission delay is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | 0.4 seconds |
| B) | 0.04 seconds |
| C) | 0.02 seconds |
| D) | 0.2 micro-seconds |

NOTE: Correction. Also see Question 58.

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| 56. | The ability to inject packets into the Internet with a false source address is known as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | IP spoofing |
| B) | IP sniffing |
| C) | IP phishing |
| D) | Man-in-the-middle attack |

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| 57. | Round-trip time (RTT) is estimated based on \_\_\_\_\_\_\_\_\_\_ . | |
| A) | a weighted average RTT that is fixed after several samples |
| B) | a weighted average RTT that is continuously updated |
| C) | sampling of routes to determine minimum cost paths |
| D) | None of these responses is correct. |

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| 58. | Suppose a Client is downloading a 5MB file from a Server, through a single communication link, with bandwidth capacity of 100Mbps, as in the diagram below.  If the distance between the Client and the Server is 8000 Km and the propagation speed through the medium is 2 x 108 m/s, then the propagation delay is \_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | 0.4 seconds |
| B) | 0.04 seconds |
| C) | 0.02 seconds |
| D) | 0.2 micro-seconds |

NOTE: Correction. Also see Question 55.

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| 59. | A process sends messages into, and receives messages from, the network through a software interface called a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | protocol |
| B) | multiplexer |
| C) | socket |
| D) | cookie |

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| 60. | A host uses \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to direct segments to an appropriate socket. | |
| A) | IP addresses and port numbers |
| B) | DNS and IP addresses |
| C) | Socket numbers |
| D) | Port numbers |

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| 61. | Services that are not available in the Transport Layer include \_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Congestion control |
| B) | Delay guarantees |
| C) | Bandwidth guarantees |
| D) | Connection setup |
| E) | Both B and C responses are correct. |

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| 62. | MIME protocol refers to \_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | micromedia email extension |
| B) | movement for internet multimedia email |
| C) | multimedia mail extension |
| D) | None of these responses are correct. |

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| 63. | The acronym IETF is actually called the \_\_\_\_\_\_\_\_\_\_ . | |
| A) | Independent Engineering Task Force |
| B) | Internet Engineering Task Force |
| C) | Internet Engineering Technical Framework |
| D) | Internet Engineering Technology Framework |

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| 64. | 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 |
| E) | All of the above are correct responses. |

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| 65. | The IETF publishes documents on selected Internet topics; these are called \_\_\_\_\_\_\_ . | |
| A) | FRC |
| B) | FAQ |
| C) | ACK |
| D) | RFC |

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| 66. | 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, is it permissible that the source port number in the segments from A to S is the same as that from B to S. | |
| A) | Yes |
| B) | No |
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| 67. | The ISO/OSI reference Model has \_\_\_\_\_\_\_\_\_ layers. | |
| A) | 10 |
| B) | 5 |
| C) | 7 |
| D) | 8 |

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| 68. | With download and delete, after a user retrieves its messages from a POP server \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | The user may retrieve all their messages later on any machine |
| B) | The user may retrieve only some of their messages later on any machine |
| C) | The messages are deleted immediately after reading them |
| D) | The messages are saved for only a limited period of time, then deleted |
| E) | None of the responses above are correct. |

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| 69. | Which protocol layer is in charge of flow control? | |
| A) | Application |
| B) | Network |
| C) | Physical |
| D) | Transport |

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| 70. | Arguments against a centralized DNS approach include \_\_\_\_\_\_\_\_\_\_\_\_\_\_ . | |
| A) | Single point of failure |
| B) | Traffic volume |
| C) | Network delays handling requests |
| D) | All of the above responses are correct. |
| E) | None of the above responses is correct. |

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| 71. | Transport services and protocols provide logical communication between \_\_\_\_\_\_\_\_\_\_. | |
| A) | different hosts |
| B) | application processes |
| C) | application processes running on different hosts |
| D) | All of the responses above are correct. |

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| 72. | Applications require which of the following transport services. | |
| A) | Data loss |
| B) | Timing |
| C) | Throughput |
| D) | Security |
| E) | All of the above responses are correct |

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| 73. | Trojan Horses may be embedded in web page plug-ins. | |
| A) | True |
| B) | False |

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| 74. | SSL was added as an enhancement to TCP in order to provide process-to-process security. | |
| A) | True |
| B) | False |

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| 75. | 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. |

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| 76. | 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. |

**End of Examination.**