

**MIDTERM EXAMINATION #2 – VERSION A**  
**COMPUTER NETWORKS : 03-60-367-01**  
**UNIVERSITY OF WINDSOR**  
**SCHOOL OF COMPUTER SCIENCE**  
*Fall 2008 - 70 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 70 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 **47**.

*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. A router examines header fields in all IP datagrams passing through it.  
 A) True  
 B) False
  
2. First generation routers used \_\_\_\_\_.  
 A) packet copying directly from NIC to system memory, back to NIC  
 B) direct switching under direct control of CPU  
 C) bandwidth derived from system bus architecture  
 D) All of these responses are correct.
  
3. An IPv6 address has length \_\_\_\_\_ bits.  
 A) 128  
 B) 64  
 C) 48  
 D) 32
  
4. ICMP is used only by hosts and routers to communicate network-level information.  
 A) True  
 B) False
  
5. In Virtual Circuits \_\_\_\_\_.  
 A) the VC number can be changed on each link  
 B) the message path is defined from source to destination  
 C) all router forwarding tables must be defined with proper VC number entries  
 D) All of these responses are correct.
  
6. In routers that use bus based switching, the switching speed is limited by the bus bandwidth.  
 A) True  
 B) False
  
7. Network layer 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.

8. In TCP, congestion control is handled by \_\_\_\_\_.  
A) Increasing CongWin by one message size every round trip time  
B) Decreasing CongWin by one-half after each message loss  
C) Exponentially increasing the rate of sending messages until losses occur  
D) Both A and B responses above are correct
9. ATM based ABR provides that \_\_\_\_\_.  
A) the network gives a “plastic” service  
B) senders be throttled to the minimum guaranteed rate  
C) senders be throttled to the maximum guaranteed rate  
D) Both A and C responses are correct
10. Head-of-the-line blocking can occur in router \_\_\_\_\_.  
A) can occur in router output queues  
B) can occur in router input queues  
C) can lead to output buffer overflow  
D) Both B and C responses are correct.
11. An ATM network layer service model that guarantees a bandwidth rate, packet ordering and congestion feedback is \_\_\_\_\_.  
A) ABR – available bit rate  
B) VBR – variable bit rate  
C) UBR – unspecified bit rate  
D) CBR – constant bit rate
12. In forwarding, the router determines the route taken by packets from source to destination.  
A) True  
B) False
13. An IP address consists of \_\_\_\_\_.  
A) a host part in high order bits and a subnet part in low order bits  
B) a subnet part in high order bits and a host part in low order bits  
C) a fixed length subnet part chosen by the host  
D) None of these responses are correct.
14. A host may obtain an IP address \_\_\_\_\_.  
A) only after it has been hard-coded by a system administrator in a file  
B) by dynamically requesting one from a suitable server  
C) by purchasing one from ICAN  
D) Both A and B responses are correct.

15. Current generation routers use \_\_\_\_\_.  
A) bus based switching  
B) memory based switching  
C) interconnection network based switching  
D) Both A and C responses are correct.
16. Virtual circuit networks require call setup at the network layer.  
A) True  
B) False
17. In Virtual Circuits \_\_\_\_\_.  
A) it is required to uniquely allocate bandwidth and router buffers at call setup  
B) every router on the source-destination path maintains “state” for each passing connection  
C) each packet carries the destination host address  
D) All of these responses are correct.
18. In datagram networks packets between the same source-destination pair may take different paths.  
A) True  
B) False
19. In datagram networks the time a datagram spends in a router buffer is controlled by the round trip time.  
A) True  
B) False
20. In the IP address format **a.b.c.d/x**, the term **x** is \_\_\_\_\_.  
A) an unknown quantity to be determined by routing algorithms  
B) the number of bits in the host portion of the address  
C) the number of bits in the subnet portion of the address  
D) None of these responses are correct.
21. IP fragmentation occurs due to different network link types with different maximum transfer units.  
A) True  
B) False

22. The responsibility for managing localized needs for assigning IP addresses is given to internet service providers.  
A) True  
B) False
23. Before changing local network IP address, it is necessary to advise the ISP of the changes.  
A) True  
B) False
24. Network address translation is used \_\_\_\_\_.  
A) to establish local autonomy over IP address management  
B) to increase security by rendering devices inside the network invisible to the outside  
C) in conjunction with a mapping table on the NAT router  
D) All of these responses are correct.
25. ICMP may be used \_\_\_\_\_.  
A) for echo request/reply  
B) to report errors in TCP or UDP message delivery  
C) instead of IP datagrams for carrying messages  
D) Both A and C are correct.
26. An IPv6 datagram header has the size \_\_\_\_\_ bytes.  
A) 16  
B) 20  
C) 40  
D) 48
27. In IPv4 a checksum is included in the header, based on the full datagram.  
A) True  
B) False
28. When too many sources send too much data too fast for the network to handle, it is called \_\_\_\_\_.  
A) unreliability  
B) flow control  
C) traffic delay  
D) congestion

29. In TCP, a segment should be retransmitted when \_\_\_\_\_.  
A) ACKs are received before timeout  
B) ACKs are not received  
C) when more than one ACK is received for the same segment  
D) All of these responses are correct.
30. Network address translation violates the end-to-end argument for each layer to be peer-matched between sender and receiver.  
A) True  
B) False
31. 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.
32. Assuming that two senders and two receivers are connected through a common router with an infinite buffer, it is impossible for congestion to arise.  
A) True  
B) False
33. Two indicators of congestion in TCP are long delays and lost packets.  
A) True  
B) False
34. Closing a TCP connection requires one FIN/ACK message exchange.  
A) True  
B) False
35. The act of carrying IPv6 as payload in IPv4 datagrams among IPv4 routers is called \_\_\_\_\_.  
A) tunneling  
B) differential routing  
C) protocol extraction  
D) disassembly

36. The network layer service model for Internet provides \_\_\_\_\_ .  
A) best effort with congestion detection  
B) best effort with congestion inferred through packet loss  
C) no guarantees regarding loss or timing, but guarantees of order  
D) guarantees regarding minimum bandwidth
37. A packet belonging to a virtual circuit carries both the VC number and the destination address.  
A) True  
B) False
38. RIP, OSPF and BGP are examples of \_\_\_\_\_ .  
A) port matching algorithms (or protocols)  
B) link forwarding algorithms (or protocols)  
C) routing algorithms (or protocols)  
D) None of these responses are correct.
39. After establishing a connection, but before exchanging data segments in TCP, it is necessary to initialize \_\_\_\_\_.  
A) sequence numbers  
B) RcvWindow  
C) receiving rate at server  
D) Both A and B are correct.
40. The size of the TCP receive window (**RcvWindow**) stays constant throughout the duration of the connection.  
A) True  
B) False
41. TCP utilizes \_\_\_\_\_ congestion control.  
A) router feedback based  
B) server inferred  
C) network assisted  
D) end-to-end
42. Router forwarding tables use longest prefix matching \_\_\_\_\_.  
A) to map IP addresses to VC numbers  
B) to define link interfaces between routers  
C) to avoid the necessity of managing tables with  $2^{32}$  entries  
D) All of these responses are correct.

43. In an IPv4 datagram of total length 4096 bytes, the maximum size of the data payload is \_\_\_\_\_ .  
A) 4096 bytes  
B) 4076 bytes  
C) 4056 bytes  
D) most often, less than 4056 bytes due to application layer overhead
44. Once an IPv4 datagram has been fragmented at a particular router, it is reassembled only when it reaches its final destination.  
A) True  
B) False
45. Network layer protocols must exist in every host and router.  
A) True  
B) False
46. One cost of congestion is that \_\_\_\_\_.  
A) The network may carry multiple copies of the same packet  
B) Router buffers may require increases in their speed  
C) Packets may need to be retransmitted several times  
D) Upstream transmission capacity is never utilized
47. Datagram networks require call setup at the network layer.  
A) True  
B) False

---

**End of Examination.**