Midterm 2: CST8182 Networking Fundamentals

Fall 2010

Time: 60 minutes; Total Marks available: 50 marks + 4 bonus marks
(Allocation of marks is shown beside each question)

Master Version

STOP!

Mark your test version in the field titled "Grade or Educ" on the scantron form.
(A = 1, B = 2, C = 3, D = 4, E = 5, F = 6)
Do it NOW!

Instructions:

1. BEFORE answering any questions, please check that your copy of the test has all pages (as indicated in the footer at the bottom of each page). Please read all questions carefully, then answer question 1 first!

2. Be sure to **mark your name and version of this midterm** on the scantron answer sheet.

3. All answers should be circled on this test paper **and** then marked on the scantron answer sheet.

4. If you do not find an answer which is clearly the correct choice, choose the *best* answer.

5. If you are uncertain what a question is asking, make reasonable assumptions, write those assumptions down on this test paper, and continue answering the question.

1. What is your:

NAME? _____ Student Id? _____

(Continued on next page)

1. [0 marks] What version of the test are you writing? The version letter on the first page (cover)
   (a) A
   (b) B
   (c) C
   (d) D
   (e) E
   (leave blank) F

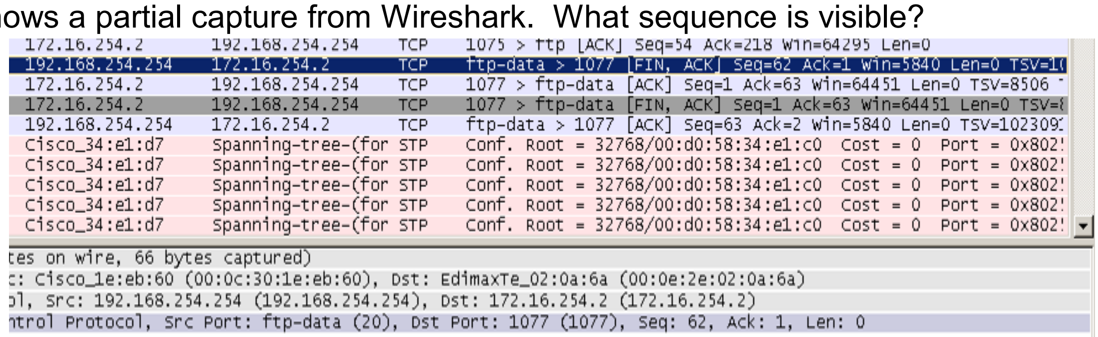
2. [1 mark] A student issues the command "route DELETE 0.0.0.0" in WinXP. This command:
   (a) has an excellent chance of fixing network routing problem on the PC (it's an invalid route)
   (b) will probably cause some serious problems for networking on the PC **Correct**
   (c) will completely stop the PC from reaching any other devices on the network
   (d) probably won't change anything (related to networking) on the PC
   (e) isn't a valid command

3. [1 mark] What is the exact command you would use under WinXP to determine how "far" the computer "www.google.ca" is from yours?
   (a) tracert www.google.ca **Correct**
   (b) traceroute www.google.ca
   (c) traceroute -d www.google.ca
   (d) ping www.google.ca (and then pay close attention to the number of ms it takes)
   (e) ping -i 1 www.google.ca (and then pay close attention to the number of ms it takes)

4. [1 mark] By the time a (modern, network-aware) application's data is being transferred over the wire, what layers of addressing have been added?
   (a) protocol, transport, physical
   (b) network access, transport, internet **Correct**
   (c) transport, physical, network access
   (d) application, presentation, session
   (e) none are needed.

5. [1 mark] What application protocol is used to *receive* email (assume a home user)?
   (a) POP **correct**
   (b) UDP
   (c) TCP
   (d) SMTP
   (e) HTTP

6. [1 mark] The figure shows a partial capture from Wireshark. What sequence is visible?
   (a) 3-way handshake
   (b) 4-way handshake
   (c) 3-way teardown
   (d) 4-way teardown **Y**
   (e) 4-layer OSI model



7. [1 mark] Which of the following is an invalid mask?
   (a) 0.0.0.0
   (b) 2.0.0.0 **Correct**
   (c) 224.0.0.0
   (d) 255.255.0.0
   (e) 255.255.255.255

8. [1 mark] A student practicing in the lab gets the following output under WinXP:

```
===========================================================================
Interface List
0x1 ........................... MS TCP Loopback interface
0x3 ......00 23 26 b6 a0 61 .. Intel(R) 82567LM Gigabit Network Connection
0x20002 ..00 21 6a 8a 10 a8 .. Intel(R) WiFi Link 5300 AGN
===========================================================================
Active Routes:
Network Destination        Netmask          Gateway    Interface  Metric
        127.0.0.0        255.0.0.0        127.0.0.1    127.0.0.1       1
  255.255.255.255  255.255.255.255  255.255.255.255            3       1
  255.255.255.255  255.255.255.255  255.255.255.255        20002       1
===========================================================================
```

   Where would a packet destined to 192.168.254.254 (eg. Eagle-server) go?
   (a) out the interface with address 127.0.0.1
   (b) out the interface numbered 3
   (c) out the interface numbered 20002
   (d) out the loopback interface
   (e) nowhere; the destination is unreachable **Correct**

9. [1 mark] Given a starting network of 99.99.99.0/23, what is the number of usable hosts when subnetting to provide 8 subnets with as few extra subnets as possible?
   (a) 30
   (b) 32
   (c) 62 **Correct**
   (d) 64
   (e) 126

10. [1 mark] Which IP address is a subnet address?
   (a) 12.12.12.12/30 **Correct**
   (b) 20.20.20.20/29
   (c) 24.24.24.24/28
   (d) 24.24.24.24/27
   (e) none of the above

11. [1 mark] What do the following protocols have in common?
   ARP, DNS, HTTP, TFTP, IP
   (a) they are all application layer protocols
   (b) they all use TCP for their transport layer
   (c) the are all considered secure
   (d) they don't require any passwords or authentication **Correct**
   (e) none of the above

12. [1 mark] When is the ACK flag present?
   (a) In all UDP datagrams
   (b) In all TCP segments
   (c) In every TCP segment except the first **Correct**
   (d) In every UDP datagram except the first
   (e) In every one of the 3-way handshake segments

13. [1 mark] Which of the following is **not** a correct pairing?
   (a) network – frame **Correct**
   (b) network access – frame
   (c) Internet – packet
   (d) transport – datagram
   (e) transport – segment

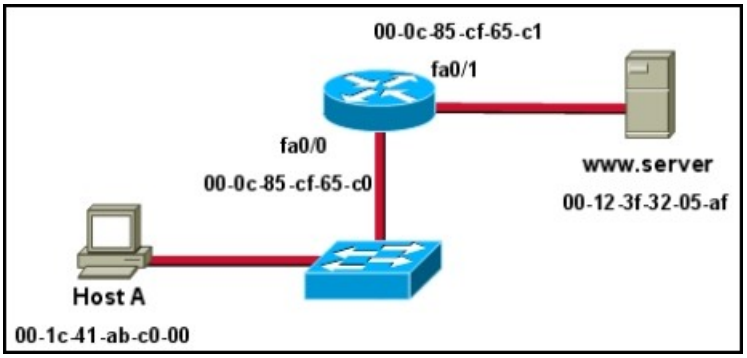
14. [1 mark] Can a PC have a default route?
   (a) Yes **Correct**
   (b) Yes, but only if it **is** directly connected to a router
   (c) Yes, but only if it **is not** directly connected to a router
   (d) No
   (e) How should I know? I didn't pay attention to the Lab 4 Post-lab questions!

15. [1 mark] Which of the following best describes multiplexing?
   (a) Breaking a data stream into smaller chunks
   (b) Interleaving data from several sources over a single media **Correct**
   (c) A computer processing multiple programs at the same time
   (d) Having redundant routes for data
   (e) Having more than one interface for use with the routing table

16. [1 mark] What makes multiplexing possible?
   (a) MAC addresses
   (b) IP addresses
   (c) port numbers **Correct**
   (d) the binary number system (only two symbols)
   (e) switches which intelligently forward frames

17. [2 marks] Given a starting network of 1.2.3.0/24 that is subnetted into 4 subnets, what is the broadcast address of subnet #2?
   (a) 1.2.3.63
   (b) 1.2.3.126
   (c) 1.2.3.127
   (d) 1.2.3.191 **Correct**
   (e) none of the above

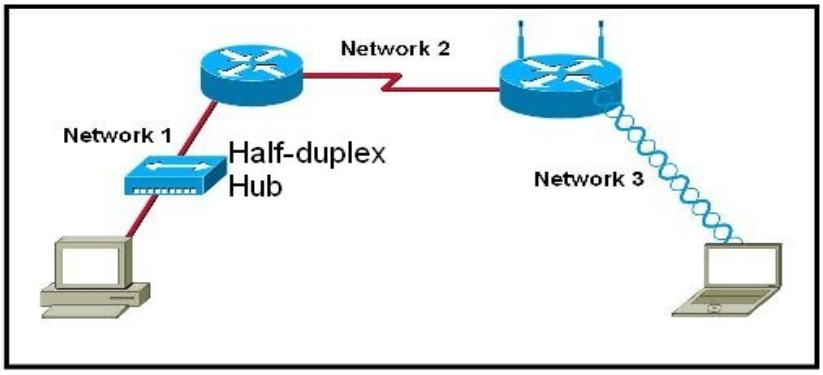
18. [1 mark] Assume that the network in the diagram is converged (meaning the routing tables and ARP tables are complete). What MAC address will **Host A** use as the destination address in frames sent to **www.server**?



(a) 00-1c-41-ab-c0-00
(b) 00-0c-85-cf-65-c0 **Correct**
(c) 00-0c-85-cf-65-c1
(d) 00-12-3f-32-05-af
(e) **Host A** won't know what MAC address to use since **www.server** isn't on the same subnet.

19. [1 mark] What is the purpose of the preamble in an Ethernet frame?
(a) It is used as a padding for data
(b) It is used for timing synchronization **Correct**
(c) It is used to identify the source address
(d) It is used to identify the destination address
(e) It is used to identify the frame type

20. [1 mark] What media access control methods are used by the networks in the diagram?



(a) All 3 networks use CSMA/CA
(b) None of the networks require media access control.
(c) Network **1** uses CSMA/CD and Network **3** uses CSMA/CA. **Y**
(d) Network **1** uses CSMA/CA and Network **2** uses CSMA/CD.
(e) Network **2** uses CSMA/CA and Network **3** uses CSMA/CD.

21. [1 mark] Which of the following is **not** one of the benefits achieved by moving from simple signalling & encoding methods to more advanced schemes such as 4B/5B and MLT-3?
(a) Better error detection due to unused codes that can be replaced by the closest match
(b) Codes can be chosen to balance the number of 1's and 0's
(c) Fewer bits need to be transmitted, resulting in faster data rates **Correct**
(d) It is possible to have control codes for “start” and “stop” that aren't confused with data
(e) The codes have enough transitions up & down to control timing & synchronization

22. [1 mark] In most office LANs, which connector is used with twisted-pair networking cable?
(a) BNC
(b) Ethernet
(c) RJ-11
(d) RJ-45 **Correct**
(e) Type F

23. [1 mark] Which of the following is a characteristic of single-mode fiber-optic cable?
(a) generally uses LEDs as the light source
(b) relatively larger core with multiple light paths
(c) less expensive than multimode
(d) generally uses lasers as the light source **Correct**
(e) generally used between buildings or in a downtown core, rather than between cities

24. [1 mark] With the use of unshielded twisted-pair copper wire in a network, what causes **crosstalk** within the cable pairs?
(a) the magnetic field around the adjacent pairs of wire **Correct**
(b) the use of braided wire to shield the adjacent wire pairs
(c) the reflection of the electrical wave back from the far end of the cable
(d) the collision caused by two nodes trying to use the media simultaneously
(e) the *crossing* of the wires in the "twisted pair"

25. [1 mark] What is a primary role of the Physical layer in transmitting data on the network?
(a) create the signals that represent the bits in each frame on to the media **Correct**
(b) provide physical addressing to the devices
(c) determine the path packets take through the network
(d) control data access to the media
(e) interfacing to the hardware layer of the device

26. [1 mark] Are optical fibers generally half-duplex or full duplex? Which of the following optical fiber **connectors** provide bidirectional data? (Choose **all** that apply.)

(a) 

(b) 

(c) **Y** 

(d) 

27. What is a benefit of choosing wireless instead of copper or optical fiber?
(a) more host mobility **Correct**
(b) lower security risks
(c) reduced susceptibility to interference
(d) less impact of the surroundings on the effective coverage area
(e) greater number of hosts can connect

28. What characteristic of UTP cable helps reduce the effects of interference?
(a) the metal braiding in the shielding
(b) the reflective cladding around core
(c) the twisting of the wires in the cable **Correct**
(d) the insulating material in the outer jacket
(e) the combination of a thin conductor surrounded by an outer metal braid

29. [2 marks] Which of the following is **not** a suitable address for a default gateway?
   (a) 172.10.31.63/24
   (b) 172.10.31.129/25
   (c) 172.10.31.64/26 **Correct**
   (d) 172.10.31.6/30
   (e) none of the above

30. [1 mark] What is the highest level of addressing in a STP frame?
   (a) Layer 1
   (b) Layer 2 **Correct**
   (c) Layer 3
   (d) Layer 4
   (e) none of the above; CDP uses direct communication

31. [1 mark] In which pane does Wireshark show the Ethernet CRC field?
   (a) top pane only
   (b) middle pane only
   (c) bottom pane only
   (d) middle and bottom panes
   (e) none of the above **Correct**

32. [1 mark] From our lab work, an “ARP cache” and a “MAC table” provide the “matches” between which layers?
   (a) An ARP cache matches L1 to L2 “addresses”, a MAC table matches L2 to L3 addresses
   (b) An ARP cache matches L2 to L3 addresses, a MAC table matches L3 to L4 addresses
   (c) A MAC table matches L1 to L2 “addresses”, an ARP cache matches L2 to L3 addresses **Y**
   (d) A MAC table matches L2 to L3 addresses, an ARP cache matches L3 to L4 addresses
   (e) none of the above

33. [2 marks] Given the host address 131.23.100.45/23 and the fact that the starting network was 131.23.96.0/20, calculate the **subnet #** for this host address.
   (a) 1
   (b) 2 **Correct**
   (c) 3
   (d) 8
   (e) none of the above

34. [2 marks] Given the host address 10.10.45.66/30 and the fact that the starting network was 10.10.45.0/25, what is the **host #** of this IP address?
   (a) 1
   (b) 2 **Correct**
   (c) 32
   (d) 64
   (e) none of the above

35. [2 marks] What is the **broadcast address** of the subnet 172.17.20.0/22?
   (a) 172.17.22.254
   (b) 172.17.22.255
   (c) 172.17.23.254
   (d) 172.17.23.255 **Correct**
   (e) none of the above

36. [2 marks] What is the **first valid host** on the network 20.74.209.189/16?
   (a) 20.0.0.0
   (b) 20.0.0.1
   (c) 20.74.0.1 **Correct**
   (d) 20.74.0.189
   (e) none of the above

37. [2 marks] What is the **last valid host** for the network 75.191.8.215/18?
   (a) 75.191.8.254
   (b) 75.191.8.255
   (c) 75.191.63.254 **Correct**
   (d) 75.191.63.255
   (e) none of the above

38. [2 marks] What is the **subnet ID** for the IP address 77.18.81.193/12?
   (a) 77.0.0.0/12
   (b) 77.16.0.0/12 **Correct**
   (c) 77.18.0.0/12
   (d) 77.18.81.0/12
   (e) none of the above

39. [1 mark] How many hosts can you have on the network **128.255.255.0/22**?
   (a) 1
   (b) 512
   (c) 1022 **Correct**
   (d) 2046
   (e) none of the above

40. [1 mark] How many hosts can you have on the network **127.255.255.0/22**?
   (a) 1 **Correct**
   (b) 512
   (c) 1022
   (d) 2046
   (e) none of the above

41. [1 mark] Which network device(s) decrement the TTL value of IP packets? Choose **all** that apply.
    (a) the end host computer
    (b) only the default gateway
    (c) all routers **Correct**
    (d) all servers
    (e) all switches

42. [2 marks] Given a starting network of 172.16.32.0/21 that is subnetted to provide 3 subnets, what is the address of **host #17** on **subnet #3**?
    (a) 172.16.32.17
    (b) 172.16.33.17
    (c) 172.16.34.17
    (d) 172.16.36.17
    (e) 172.16.38.17 **Correct**

43. [2 marks] Rogers has subnetted one of their starting networks 24.192.0.0/10 to provide subnets with 512 hosts per subnet. What is the address of **host #257** on **subnet #8**?
    (a) 24.192.17.1
    (b) 24.192.33.1 **Correct**
    (c) 24.224.0.1
    (d) 24.225.0.1
    (e) none of the above

44. [2 marks] Algonquin wants to subnet their internal network of 10.0.0.0/8 into subnets for each one of their 500 labs. What is the address of **host #256** on **subnet #256**?
    (a) 10.64.1.0
    (b) 10.64.0.255
    (c) 10.128.1.0 **Correct**
    (d) 10.128.2.0
    (e) none of the above