SE 4C03 Winter 2002

Midterm Test Answer Key

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You have 50 minutes to complete this test consisting of 6 pages and 20 questions. You may use your notes and textbooks. Circle the *best* answer for the multiple choice questions, and write the answer to the other questions in the space provided. Good luck!

(1) [3 pts.] Collisions can occur on a point-to-point Ethernet network consisting of two Ethernet cards and one crossover cable. Is this statement true or false?

(a) [True.]
(b) False.

(2) [3 pts.] A host running TCP/IP requires at least one physical network interface. Is this statement true or false?

(a) True.
(b) [False.]

(3) [3 pts.] An IP datagram d that cannot be delivered is normally returned to the source address of d encapsulated in an ICMP message. Is this statement true or false?

(a) True.
(b) [False.]

(4) [3 pts.] Like Ethernet, all the hosts on a token ring have simultaneous access to the network. Is this statement true or false?

(a) True.
(b) [False.]

(5) [3 pts.] The UDP protocol provides more reliability than the IP protocol. Is this statement true or false?

(a) True.
(b) [False.]

(6) [5 pts.] What is part of the "glue" that connects the Internet to the underlying physical networks?

(a) IP protocol.
(b) The ARP protocol.
(c) Protocol ports.
(d) All of the above.

(7) [5 pts.] Fill in the blank. An IP address is to an IP datagram as an Ethernet address is to an Ethernet frame.

(8) [5 pts.] What organization is most responsible for starting the development of the internet technology used today?

Answer: The U.S. Defense Department agency ARPA.

(9) [5 pts.] What network technology can be used for both LANs and WANs?

Answer: ATM.

(10) [5 pts.] Answer the following question using no more than two sentences: What happens if one of the fragments of a fragmented IP datagram is lost?

Answer: An ICMP message, type 11, code 1, is sent to the source address of the IP datagram after the assembly time limit is exceeded.

(11) [5 pts.] Answer the following question using no more than two sentences: What is the main security concern of the ping service?

Answer: The ping service enables a potential attacker to probe an organization's network for vulnerabilities.

(12) [5 pts.] Answer the following question using no more than two sentences: What is the main security concern of source routing?

Answer: Source routing can be used to have an IP datagram sent back to an address different from the datagram's source address.

The rest of the questions refer to a diagram of a conventional internet (which is not shown) using the TCP/IP protocols. $\mathsf{I}_1, \ldots, \mathsf{I}_8$ are interfaces to the single physical networks $\mathsf{SPN}_1, \ldots, \mathsf{SPN}_4$. $\mathsf{J}_1, \ldots, \mathsf{J}_5$ are interfaces to the loopback networks. $\mathsf{H}_1, \ldots, \mathsf{H}_5$ are hosts. The internet has other hosts and interfaces. The following table shows what IP addresses and subnet masks are assigned to the $\mathsf{I}_1, \ldots, \mathsf{I}_8$ interfaces.

Interface	IP Address	Subnet Mask
I_1	131.56.78.5	255.255.0.0
I_2	131.56.12.47	255.255.0.0
I_3	137.86.88.51	255.255.240.240
I_4	137.86.87.53	255.255.240.240
I_5	200.56.97.7	255.255.224.0
I_6	200.56.100.7	255.255.224.0
I_7	211.209.139.98	255.255.255.0
I_8	211.209.139.111	255.255.255.0

(13) [5 pts.] Which members of $\{\mathsf{H}_1, \ldots, \mathsf{H}_5\}$ are internet routers?

Answer: $\{\mathsf{H}_2, \mathsf{H}_3, \mathsf{H}_4\}$ or $\{\mathsf{H}_1, \ldots, \mathsf{H}_5\}$.

(14) [5 pts.] Suppose an IP datagram is sent from host H_1 to H_5 in the most direct way. At what network interfaces could fragmentation occur?

Answer: $\{\mathsf{I}_1, \mathsf{I}_3, \mathsf{I}_5, \mathsf{I}_7\}$.

(15) [5 pts.] How many IP addresses are in the subnet of SPN_2?

Answer: $2^{4+4} = 2^8 = 256$.

(16) [5 pts.] What is the subnet address of SPN_3?

Answer: 200.56.96.0

(17) [5 pts.] The IP address of each interface of SPN_3 is a member of a

(a) Class A network.
(b) Class B network.
(c) Class C network.
(d) None of the above.

(18) [5 pts.] Which SPN is using supernetting?

(a) SPN_1.
(b) SPN_2.
(c) SPN_3.
(d) SPN_4.

Recall that a route in a subnet routing table has the form (a, m, r, i) where:

- a is the address of a subnet S.
- m is the mask of S.
- r is an IP address in S for the "next hop" ($r = *$ for direct routes).
- i is an interface.

(19) [10 pts.] Write down the routing table for H_5 as a list of (a, m, r, i) tuples. Do not use any host-specific routes.

Answer:

(	127.0.0.0,	255.0.0.0,	$*$,	J_5)
(	211.209.139.0,	255.255.255.0,	$*$,	I_8)
(	0.0.0.0,	0.0.0.0,	211.209.139.98,	I_8)

(20) [10 pts.] Write down the routing table for H_3 as a list of (a, m, r, i) tuples. Do not use any host-specific routes.

Answer:

(	127.0.0.0,	255.0.0.0,	$*$,	J_3)
(	137.86.80.48,	255.255.240.240,	$*$,	I_4)
(	200.56.96.0,	255.255.224.0,	$*$,	I_5)
(	131.56.0.0,	255.255.0.0,	137.86.88.51,	I_4)
(	211.209.139.0,	255.255.255.0,	200.56.100.7,	I_5)