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) $\boxed{\text{True.}}$
(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) $\boxed{\text{False.}}$

(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) $\boxed{\text{False.}}$

(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) $\boxed{\text{False.}}$

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

(a) True.
(b) $\boxed{\text{False.}}$

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

  (a) IP protocol.
  (b) $\boxed{\text{The ARP protocol.}}$
  (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 <u>frame</u>.

(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) $\boxed{\text{Class C network.}}$
(d) None of the above.

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

(a) SPN_1.
(b) SPN_2.
(c) $\boxed{\mathsf{SPN}_3.}$
(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	)