Y Name (Last, First)* _____ Sec___

Email Address: _____

ECE3076 Computer Networks, QUIZ 3
Fall 2011

Prof. John A. Copeland Nov. 14, 2011

RULES.

i This quiz is **not** open book. One original sheet of hand-written notes may be used. Simple calculators are ok.
ii Answer all questions and show all work to receive full credit. Use back of sheets only if necessary.
iii All sub-questions have the weight shown (mostly 2 %). Put answers in tables or right-side blank areas.
iv Please do not ask the proctors any questions during the exam about exam questions. Part of the test is understanding the question, as written, without supplemental information. If you feel additional data is needed to solve the problem, make (and state) an assumption and then work the problem.
v. This is a time-limited test. All papers must be turned in 45 minutes after the start

Honor Code - I affirm that I will obey the rules of the Georgia Tech Honor Code*.

Signature _____

*Basically, I will not cheat, and I will report any observed cheating.

Question 1. Network Blocks. Complete the following dotted-decimal items for the subnet **143 . 215 . 96 . 0 / 20**.

. (2 points each = 16)

a. Network mask 11111111 11111111 11110000 00000000 a. _ **255 . 255 . 240 . 0**

b. Lowest address *[same as network address]* b. _ **143 . 215 . 96 . 0**

c. Highest address *network address + 00001111 11111111 (+ 15.255)* c. _ **143 . 215 . 111 . 255**

d. Broadcast address *[same as highest address]* d. _ **143 . 215 . 111 . 255**_

e. Maximum number of hosts that can be assigned addresses. *+ 00001111 11111111 -2* e. ____**4094**____

A Company is assigned a block of addresses by ICANN - **128.64.0.0 / 22**. Divide this into three subnets capable of having at least 500 hosts, 200 hosts and 150 hosts. Show the IP address blocks in CIDR notation below.

/22 hosts = 2^(32-22)-2 = 1022 so divide the /22 into 2 /23's
128.64.0.0/23 (23rd bit =0) , and 128.64.2.0/22 (23rd bit =2)

/24 hosts = 2^(32-24)-2 =254, so divide 128.64.2.0 /23 into 2 /24's
128.64.2.0/23 (24th bit =0) , and 128.64.3.0/23 (24th bit =1)

f. >500-host subnet ___**128.64.0.0 / 23**___

g. >200-host subnet ___**128.64.2.0 / 24**___

h. >150 -host subnet ___**128.64.3.0 / 24**___

Question 2. Routing Algorithms. Fill in the following table. (2 points each = 18)

a. What is the routing protocol used between Autonomous Systems? a. ___**BGP** (*Border Gateway Protocol*)_

b. Routers construct routing tables based on information received from ____ _____: b. ___**Other Routers**_____

c. An RIP router A receives the following distance-vector updates from neighbors (Ports)

B and C: B says: X is 6 hops away, Y is 6 hops away, c. What is A's routing port to X: _____**C**_____

C says: X is 5 hops away, Y is 6 hops away. d. What is A's routing port to Y: _____**D**_____

D says: X is 15 hops away, Y is 5 hops away. (B, C, or D)

Using Poison Reverse, to prevent (e. _), A sends an update to C saying that; e. _____**looping**_____

[A to C] : X is (f. _) hops away, Y is (g. _) hops away. f. ____**15**____ g. ___**6**_____

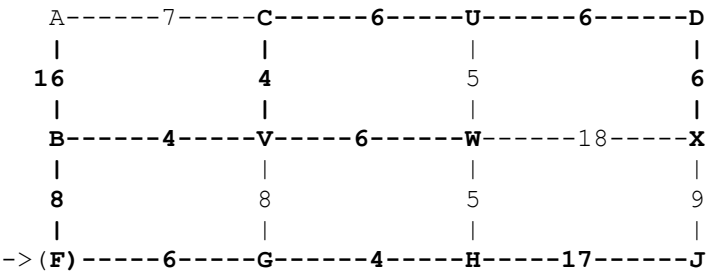
The component of a router that usually causes most of any appreciable delay is : h. ___ **output buffer** _____

Which router (B, C, or D) routes datagrams to A. : i. ___**D** *(says X is 15 hops)*

Question 3. Routing

Every router (A, B, ..., J) has advertised the costs (delays) to all the other nodes. Based on all the advertisement messages, the network topology and link costs can be mapped. The letters below represent the nodes (routers) on the network. The numbers represent costs (delay-times) on the links between them. (24 points)

These nodes are all routers and, for simplicity, routes have the same cost in both directions.



Routing Table for F
(2 points each)

A - ___B____

B - ___B____

D - ___B____

J - ___G____

Using Dijkstra's technique, calculate the cost values of routes from node "F". List Permanent Nodes in the order that they were added to the tree: (*Show work, zero points unless it and (a) indicate the you can apply Dijkstra's algorithm.)

F, _G_,_B_,_H_,_V_,_C_,_W_,_U_,_A_,_J_,_D_,_X_ (20 points if totally correct)

Question 4. Network and Lower Protocols (2 points each = 18)

What in IPv6 relative to IPv4 was added? a. _____**Flow Identifier**_____

What in IPv6 relative to IPv4 was removed? b. _____**Fragment Information**_____

What is forcing the switch from IPv4 to IPv6?? c. __**Length of Addresses (32 -> 128 bits)**__

What two characteristics define a Spanning Tree ? d. _**Covers all nodes**__ e. __**No loops**___

What two things make Ethernet more efficient than ALOHA ? f. __**Collision Detection** g. _**Carrier Sense**__

Separate LANs sharing the same Ethernet switches using 802.1q are called? h. __**VLAN** (virtual)___

Which Protocol Layer is concerned with Bit-Clock synchronization? i. _____**Physical**_____

Question 5. Steps to Get on the Internet. What is the highest level protocol used, and what (or whose) Ethernet Address is initially used for the destination MAC address for the following operations. (2 points / half answer = 20):

	Highest Protocol*, **Ethernet Address**
a. Get local IP address and other configuration parameters.	a. **_DHCP___, _ E'net Broadcast__**
b. Get Ethernet address to use for DNS server	b. **_ARP____, _ E'net Broadcast__**
c. Get remote IP address of www.cnn.com	**c. _DNS____, _Gateway Router__**
d. Get Ethernet address to use for www.cnn.com	d. **_ARP____, _ E'net Broadcast__**
e. Get www.cnn.com Web page.	e. **_HTTP____, _Gateway Router__**

Assume the DNS server and cnn.com are not on local subnet. * HTTP, DNS, ICMP, DHCP, TCP, UDP, IP, ARP, Ethernet