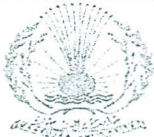


Mansoura University		Department: Computers Engineering And Systems	Faculty of Engineering
Total Marks: 110 Marks			

Course Title: Elective 4 (Internetworking)	Course Code: C 3415	Year: 4 th
Date: Jan 21, 2012 (First term)	Allowed time: 3 hrs	No. of Pages: (2)

Remarks: (Answer the following questions... assume any missing data)

Question No. (1) (20 Marks)

(Q1-A) [4 points] What is the difference between a hub, a bridge, a switch, and a router?

(Q1-B) [4 points] What are the main differences between connectionless networks and connection-oriented networks?

(Q1-C) [4 points] List the different Elements of the computer network? For each write a short note.

(Q1-D) [4 points] Network can be classified according may parameters (state these parameters and the types belongs under this types of classifications)

(Q1-E) [4 points] Compare between TCP and UDP?

(Q1-F) [4 points] What is the default subnet mask for Class C network?

Question No. (2) (30 Marks)

(Q2-A) [5 points] List two applications for which a connection oriented protocol would make sense and two applications for which a connection-less protocol would make the most sense.

(Q2-B) [5 points] State the different Linking technology for the WAN?

(Q2-C) [5 points] A network on the Internet has a netmask of 255.255.240.0. How many hosts can it have?

(Q2-D) [15 points] Suppose Host A wants to send a large file to Host B. The path from Host A to Host B has three links, of rates $R_1=500\text{kbps}$, $R_2=2\text{Mbps}$, and $R_3=1\text{Mbps}$.

a. Assuming no other traffic in the network, what is the throughput for the file transfer.

b. Suppose the file is 4 million bytes. Roughly, how long will it take to transfer the file to Host B?

Repeat (a) and (b), but now with R_2 reduced to 100kbps.

Question No. (3) (30 Marks)

Q3-A) [5 points] "As you know within the data computer network each node may have N types of addresses," Specify them then state the maximum and minimum number of each one.

Q3-B) [5 points] "Flash memory is used as permanent storage for the Network operating system", If this statement is right, specify why do we use Flash instead of ROM, RAM or NVRAM?

Q3-C) [5 points] "Asymmetric routing may be considered as suitable routing policy in most internal networks," Specify its advantages and disadvantages.

Q3-D) [5 points] "Routing tables contain a combination of static routes and dynamic routes" - "routing tables contain a static routes or dynamic routes", Which of the previous two statements is correct?

Q3-E) [10 points] Describe the process used by IP routers to perform fragmentation and reassembly of packets.

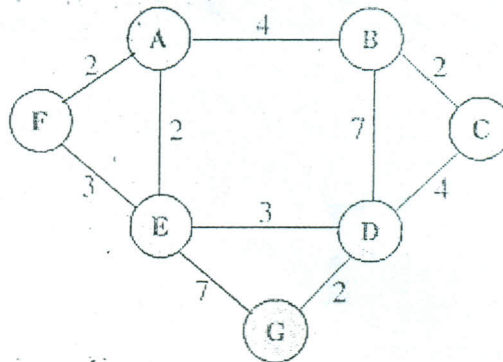
Suppose that: (record size $R=150$ bytes - block size $B=512$ bytes - $r=30000$ records); Assume also. (primary index on the SSN field, the field size $V_{SSN}=9$ bytes, the record pointer size $P_R=7$ bytes); Calculate the total no of Access to block To locate a record in the table.

Question No. (3) (30 Marks)

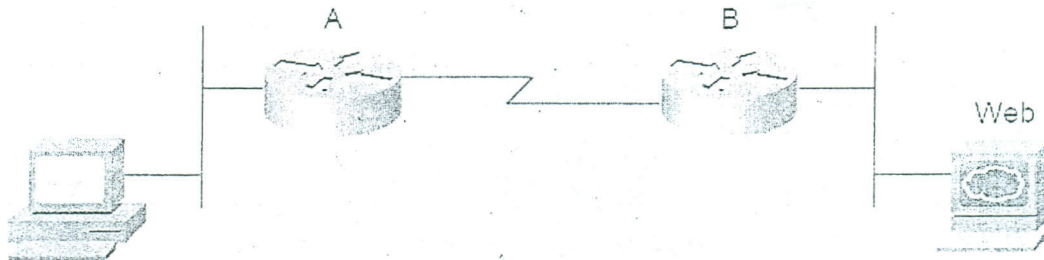
Q4-A) [5 points] Describe why ARP requests use an Ethernet broadcast address instead of an Ethernet unicast address.

Q4-B) [15 points] For the following graphical representation of routers and associated link cost fill the routing table for node B, then determine the number of round required convergence

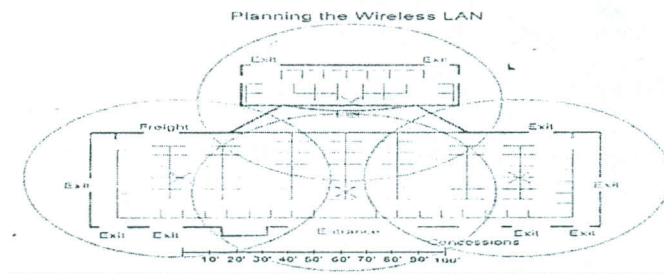
B	Next Node	Cost
A		
C		
D		
E		
F		
G		



Q4-C) Refer to the Figure below. Osama is configured with IP address 10.1.1.1. Router A's Ethernet interface is configured with 10.1.1.100. Router A's serial interface uses 10.1.1.101. Router B's serial interface uses 10.1.1.102. Router B's Ethernet uses 10.1.1.200. The web server uses 10.1.1.201. Mask 255.255.255.192 is used in all cases. Is anything wrong with this network? What is the easiest thing you could do to fix it? You may assume any working interior routing protocol.



Q4-D) [10 points] For the next figure is approximately 20,000 square feet. Network requirements specify that there must be a minimum of 6 Mb/s 802.11b throughput in each BSA, With access points, 6 Mbps can be achieved in open areas like those on the map, with a coverage area of 5,000 square feet in many environments. The 5,000 square foot coverage area is for a square. The BSA takes its radius diagonally from the center of this square. Let us determine where to place the access points



no subnetting or CIDR). Compute the minimum number of routing entries required by a router in AS3.

b. Perform the same computation for a host (i.e., not a router) in AS3.

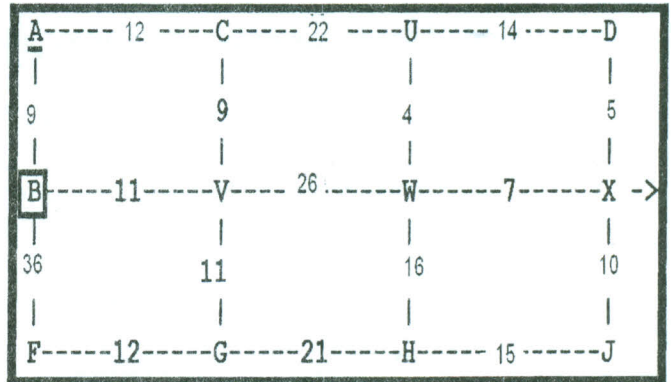
c. Perform the same computation for a router in AS1.

d. Perform the same computations as in parts a and c, assuming CIDR is used.

e. Perform the same computation as in parts a, b, and c, assuming flat addressing. (Recall that flat addressing means there is no network component of the address, as opposed to IP hierarchical addresses which have both a network and a host component.)

Question No. (4) (36 Marks)

Q4-A) 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. For simplicity, we assume the costs are the same in each direction of a link.



These nodes are all routers (no networks) and for simplicity routes have the same cost in both directions.

A. Using Dijkstra's technique, calculate the minimum cost values of routes from node "B" to the following.

F-[], G-[], D-[], X-[], J-[]

B. Cross out (X) the links that are not on the sink tree for node B.

C. Fill in the Routing Table for Node B (* indicate Port by the node to which it connects).

Node B table	
Destination	Port*

Q4-B) State the different layers within Hierarchical Network Design, then specify Benefits of a Hierarchical Network?

Q4-C) State the Wireless Network Categories, for each write a short note?

"wireless node is addressed by a protocol called Mobile IP" discuss the previous statement and depicts the problem that it will solve?

Q4-D) Discuss the different types of media access control within the Wireless LAN, for each give a brief discussion?

Q4-E) List the different types of the WAN Technologies, for each specify the Typical Uses?

Q4-F) List the different Benefits of Using VPN?



Course Title: Network design
Date: Jan 21, 2012 (First term)

Course Code: CSE 3412
Allowed time: 3 hrs

Year: 4th
No. of Pages: (3)

Question No. (1) (32 Marks)

Q1-A) Complete the following the sentence

- When is the ID number used? _____.
- What field in the IP header changes when a datagram is forwarded by a simple router? _____
- What other field always changes when a IP datagram if forwarded by a NAT router? _____
- What other field may or may not change, depending on the NAT implementation? _____

Q1-B) [Wireless Host]---- [WAP]---- [Hub]--- [Switch]---- [Router]--- Internet -> cnn
Link: 1 2 3 4 5 6

Suppose that you have the previous scenario; A packet is sent by the Wireless Host to cnn.com. Each unit involved in carrying a MAC layer frame has a MAC address. Complete the following the sentence

- What links (1 to 6) see the Wireless Host MAC as the source address? _____
- What links (1 to 6) see the Wireless Access Point MAC as a destination address? _____
- What links (1 to 6) see the Hub MAC as a destination address? _____
- What links (1 to 6) see the Switch MAC as a destination address? _____
- What links (1 to 6) see the Router MAC as a destination address? _____

Q1-C) Choose the best answer from the list. Answers may be used 0, 1, or more times.

- ___ Buffer with packets stored in order to be sent on a link
- ___ Available bandwidth is divide into channels of different frequency and nodes allocate a particular frequency.
- ___ Store and forwards link-layer (MAC) frames
- ___ Has a range of IP addresses, and an authoritative DNS server
- ___ Lets users time-share circuits, greatly lowers cost per user.
- ___ Forwards datagrams along the route with least-delay
- ___ Uses dedicated links directly connected from end-to-end
- ___ Internet backbone system
- ___ Connects customers to the Internet for a fee
- ___ routing protocols, normally used for small networks,
- ___ Allows you to assign IP addresses to your private home network.
- ___ Broadcasts information only about delays on links connected to itself
- ___ Sends network neighbors information about hop-counts to all nodes in network
- ___ routing protocols, normally used for Inter-AS routing.
- ___ field in the IP header changes when a datagram is forwarded by a simple router?

- a. Internet Protocol
- b. Packet switching
- c. OSPF
- d. Circuit switched
- e. NAT
- f. RIP
- g. Autonomous System
- h. BGP
- i. Switch
- j. Router
- k. Tier-3 ISP
- m. Tier-1 ISP
- n. Queue
- o. URL
- p. TTL
- q. Wi-Fi
- r. FDMA

Q1-D) List TWO limitations on the size of an internetwork using RIP. For each, explain how the limitation is eliminated or reduced in OSPF. (Note: we will only grade your first two answers.)

Q1-E) List TWO reasons why BGP does not attempt to advertise the cost of paths. (Note: we will grade only your first two answers.)

Question No. (2) (21 Marks)

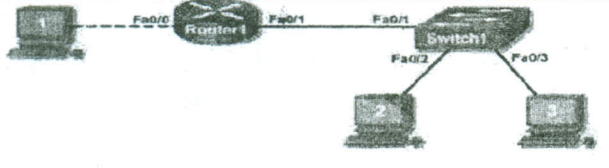
Q2-A) Can you tell from their names computer1.company.com and computer2.school.edu are in the same autonomous system (routing domain)? If so, how can you tell? If not, why not?

Q2-B) Answer the following with: **H** for hub, **S** for switch, **B** for both, **N** for neither **Ethernet** device.

- Send most Ethernet frames out only one port.
- Sends all Ethernet frames out every port, except the arrival port.
- Learns which port addresses are on by looking at frame source addresses.
- For WiFi connected hosts, a Wireless Access Port behaves like a (H or S).
- Sends MAC-layer broadcast frames out every port, except the arrival port.
- Sends ARP packets to link IP addresses with Ethernet addresses.
- Cheapest way to connect several computers in a room to a single Ethernet wall socket.
- Can be used to partition an Ethernet network into multiple collision domains.
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- Cheapest way to connect several computers in a room to a single Ethernet wall socket.
- Can be used to partition an Ethernet network into multiple collision domains.

Q2-C) An RIP router A receives the following distance-vector updates from neighbors (B and C: B says: X is 6 hops away, Y is 6 hops away, C says: X is 5 hops away, Y is 6 hops away. D says: X is 15 hops away, Y is 5 hops away. (I). What is A's routing port to X: _____ (II). What is A's routing port to Y: _____

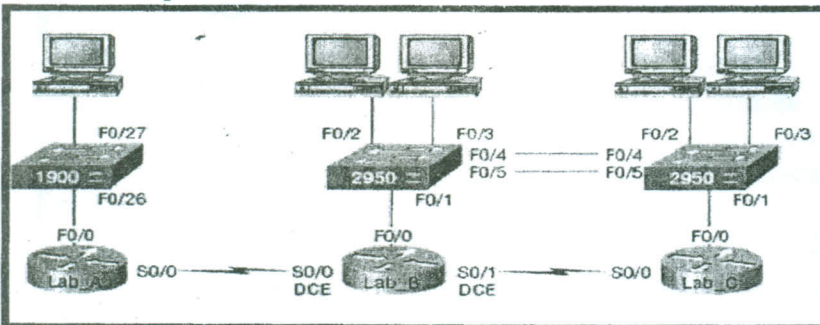
[A to C] : (III). X is (_____) hops away, (IV). Y is (_____) hops away.



#	IP Address		Subnet mask	
	Subnet	First host address	Last host address	Broadcast
0				

Q2-C) Please perform the following configuration tasks on the previous topology: 1. Given an IP address of 198.133.219.0/24, with 4 bits borrowed for subnets, fill in the following information in the table below.

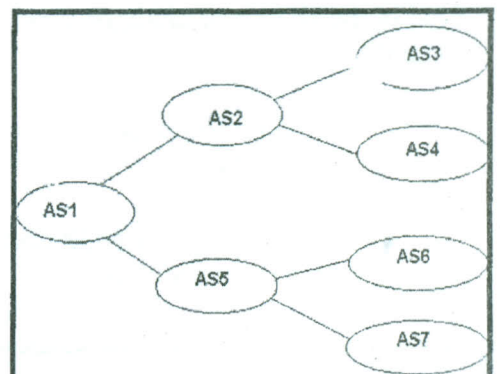
(II) Configure Cisco router password access. (III) Configure Cisco router interfaces. (IV). Save the router configuration file.



Q2-D) 1. Configure and activate interfaces.

2. Configure static routing on all routers.

3. What is the command you can use to drop the static routes.



Question No. (3) (24 Marks)

Q3-A) In the internetwork shown below, each autonomous system (AS) contains N subnets and each subnet contains H hosts. Perform the computations below. You must indicate where each part of your answer comes from.

a. Assume the internetwork uses the original IP addressing and