



Course Title: Elective 4 (Internetworking)
Date: Jan 21, 2012 (First term)

Course Code: C 3415
Allowed time: 3 hrs

Year: 4th
No. of Pages: (2)

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

Question No. (1) 3 points each (18 Marks)

- Q1-A)** Find the relation between the following terms (B.W, Data bit rate , and Frequency)
- Q1-B)** List the different protocol within Transport Layer , then compare between their Functions (i.e similarities and difference)
- Q1-C)** Compare between the different types of data interchange methods within LAN , according to (speed, nature of the data, reliability, suitable technology, shared channel, and protocol)
- Q1-D)** For a given internetworking system assume that you have 7 routers on the border of 10 LANs; 9 of these LANs are wired as Bus topology while the last one is wired as Star topology. State the whole topology of the system (Star – Bus – Hybrid – Mish). Explain your answer?
- Q1-E)** What is meant by Converged networks, ARP Cache, and Packet Buffer?
- Q1-F)** State the Dynamic Routing Advantages and Disadvantages

Question No. (2) (24 Marks)

Q2-A) (2 points) You happen to intercept a packet at a router in the Internet with two headers and as shown below. If you know that these two are the transport layer and the network layer headers, which do you think is the transport layer header and which the network layer header?

Header X	Header Y	Packet Data
----------	----------	-------------

Q2-B) (3 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?

Q2-C) (4 points) Refer to the exhibit. What information can be determined from the output that is shown?

```

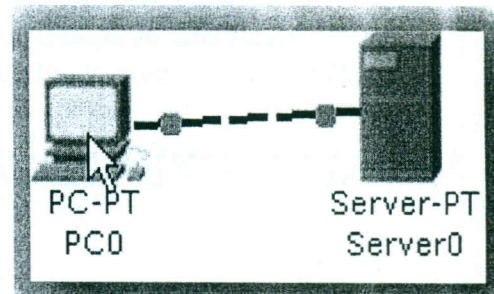
C:\> netstat -n

Active Connections

Proto Local Address           Foreign Address         State
TCP   192.168.1.101:1031      64.100.173.42:443      ESTABLISHED
TCP   192.168.1.101:1037      192.135.250.10:110     TIME_WAIT
TCP   192.168.1.101:1042      128.107.229.50:80      ESTABLISHED
    
```

Q2-D) Node A (IP address: 111.111.111.111) connects to router R (IP address: 222.222.222.222). The store-and forward router R connects to node B (IP address: 123.123.123.123). All links have 40kbps bandwidth and have propagation delay 0.75ms. A sends packets, each of which is 50 bytes, to B. B sends an ACK to A each time it receives a packet. The size of the ACK packet is 5 bytes. The protocol is stop-and-go. (i.e. The sender sends a new packet only after the previous packet has been acked.) You can assume that there is no loss during the transmission and the connection A to B is the only connection for the links. You can ignore the processing delay and queuing delay of a packet, but not the transmission time. A sends a packet to B through R. (a) What are the source IP address and destination IP address of the header of the packet when node A sends the packet to the router? (b) What are the source IP address and destination IP address of the header of the packet when the router sends the packet to node B? (c) What is the throughput of the flow from A to B? (d) Are the terms bandwidth and throughput the same? If not, why not?

Q2-E) (3 points) Refer to the exhibit. All router interfaces are configured with an IP address and are operational. If no routing protocols or static routes are configured, what information will be included in the show ip route command output for router A?



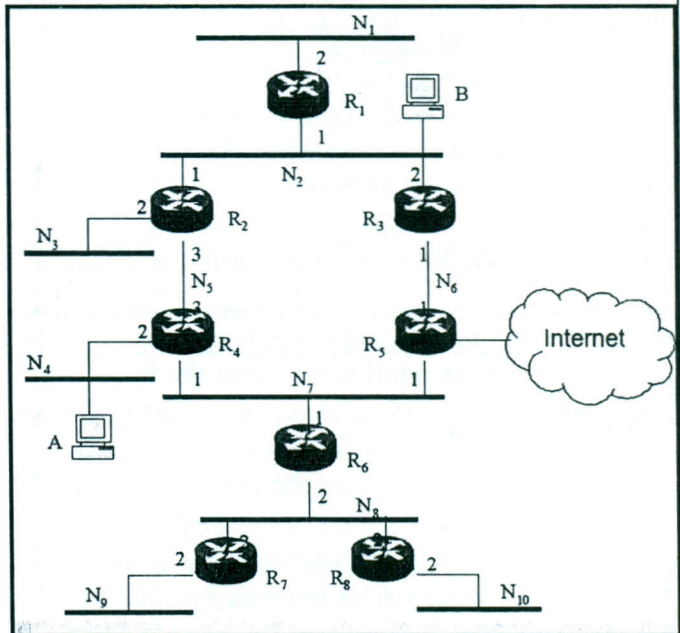
Q2-F) (2 points) What is the main difference between RIP , IGRP, and EIGRP

Question No. (3) (24 Marks)

3-A) Regard the network in the figure. It consists of eight routers (R1-R8), with ten networks (N1-N10). Ethernets are denoted with horizontal bold lines. Hosts are not shown, except for hosts A and B. There are two point-to-point links connecting R2-R4 and R3-R5. R5 is connected to the rest of the Internet. Each router runs OSPF. The whole network belongs to the backbone area: Area 0. The costs are shown in the figure.

a) (4 points) Perform a shortest path calculation (such as by the Dijkstra's algorithm) with router R2 as root, and draw the resulting directed tree of the network shown in the figure.

The tree should include routers and designated routers and costs on each link. **b) (5 points)** The OSPF protocol really consists of three separate sub-protocols. Which are these protocols? Describe the purposes of each sub-protocol.



Q3-B) (3 points) State the data link communications protocol that can provide secure data delivery and support compression?

Q3-C) (3 points) What packet switching connection allows bandwidth to be used on demand?

Q3-D) (3 points) Which of the following WANs (X .25, ISDN, Frame Relay, and ATM) can run at more than 100 MBit/s?

Q3-E) (3 points) Name two protocols which are suitable for Dialup connection

Q3-F) (3 points) Write a short note about TDM, STDM, PAP, and CHAP

Question No. (4) (24 Marks)

Q4-A) What packet switching connection allows bandwidth to be used on demand?

Q4-B) Does the term 'point-to-point' necessarily refer to *serial* line communication?

Q4-C) Does the term 'intranet' refer to an internet formed from point-to-point serial links?

Q4-D) When two routers use a routing protocol to exchange routing information, must they share a common network?

Q4-E) Do the other ends of the phone lines (connected to residences) connect to T1 lines.

Q4-F) Can a standard T1 line transport more than one phone call.

Question No. (5) (24 Marks)

Q5-A) Compare between the Several options which are available for WAN connectivity?

Q5-B) "wireless node is addressed by a protocol called Mobile IP" discuss the previous statement and depicts the problem that it will solve?

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

Q5-C) State Adv of serial connections

Q5-D) List the Wireless Network Categories, for each give a brief discussion and the type applications that will be suitable of such category?

Q5-E) Write a short note about The Hidden Node Problem, then specify the different way of solution?

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

Question No. (1) (30 Marks)

- A) Network can be classified according to many parameters? State these parameters; Then categorize network according to each one of these parameters? (3 Marks)
- B) You happen to intercept a packet at a router in the Internet with two headers and as shown below. If you know that these two are the transport layer and the network layer headers, which do you think is the transport layer header and which the network layer header? (4 Marks)
- | | | |
|----------|----------|-------------|
| Header X | Header Y | Packet Data |
|----------|----------|-------------|
- C) 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. (3 Marks)
- D) On which layers do the following protocols operate ? SLIP, SNMP, ARP, ICMP, HTTP, IGMP- Give special comments on ARP, ICMP and IGMP (5 Marks)
- E) How many bits are designated for addressing in (IPv6 & IPv4). If there is a difference specify how to overcome such difference when two applications are communicated with each other one of the uses IPv6 and the other uses IPv4? Propose a solution. (4 Marks)
- F) List 5 end devices, 6 intermediate devices, and 3 forms of networking media (5 Marks)
- G) List the main steps necessary steps to apply a basic configuration to the router?
A router may be considered as computerized device (i.e. has the same components of PC) if this right give one feature that describe the difference? (4 Marks)

Question No. (2) (30 Marks)

- A) What are the main characteristics for Class A, B and C networks? (3 Marks)
- B) What is a port? Which layer in 7 layer and TCP/IP model support (4 Marks)
- C) What is the relationship between IP, TCP, UDP, Telnet and FTP? Draw a diagram relating the protocols. (4 Marks)
- D) What is the Time to Live field used for? (4 Marks)
- E) Specify the reasons (give three at lasts) for developing a packet-switched connectionless data communication technology, name one of such technology? (6 Marks)
- F) Compare between the following terms
 Static routing and dynamic routing
 Distance vector and link state
 Routing table and forwarding table (9 Marks)

Question No. (3) (30 Marks)

A) Describe the internal and external router HW components and the purpose of each? What are the important features of the router? (5 Marks)

B) List three commands used to display interface configuration information? (5 Marks)

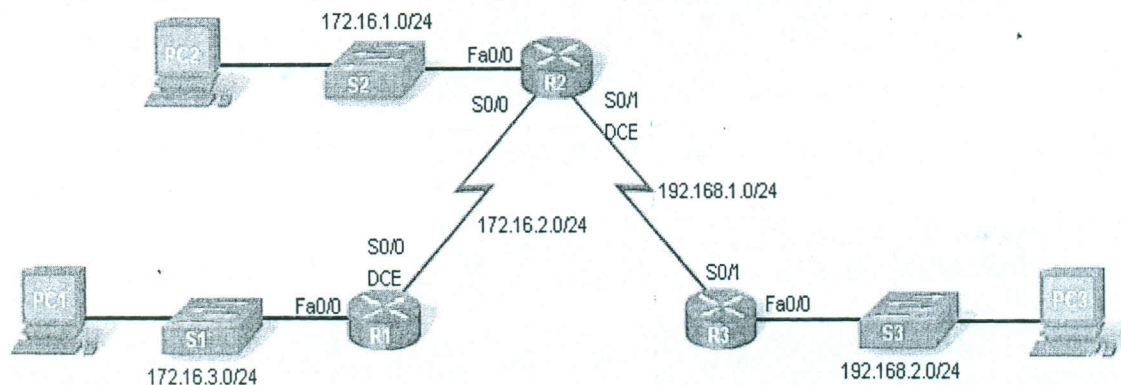
C) List the different criteria used to compare routing protocols, for each give a brief notes and example? (5 Marks)

Give some example of the WAN then State the most important Characteristics of WANs? Then state Why Are WANs Necessary? (5 Marks)

D) Write a short note about the following terms
 WANs Connectivity devices
 WANs Connectivity Channels
 WANs linking technology
WAN Linking Option (10 Marks)

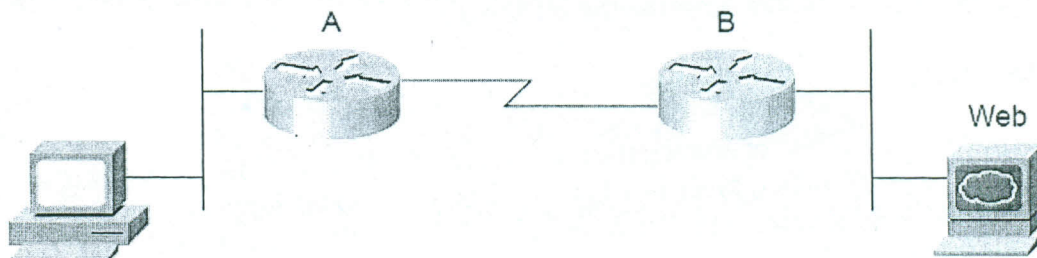
Question No. (4) (25 Marks)

A) For the next figure PC1, PC2, and PC3 have full connectivity, Ping from R1 to R2 and R3 are successful. However, although pings from R3 to R2 are successful, R3 cannot ping either on R1. Identify the problem, explain why ping fail and suggest a solution.



(13 Marks)

B) Refer to the Figure above. 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.



(12 Marks)

←----- Best wishes -----→