Data Communication & Networks

Summer 2008 Semester

Roll Number _____

Name _____

Section _____ Signature: _____

Final

Wednesday, 30th July 2008

_____

Signature of Invigilator

Total Time: 55 Minutes
Total Marks: 40

Course Instructors: Engr. Waleed Ejaz

	Q1	Q2	Total
Max Marks	**10**	**30**	**40**
Marks Obtained			

You are advised to READ these notes:

1. **Attempt the paper on the question paper. NO EXTRA SHEETS will be provided. Use the back of the page if more space is required. However, no extra sheet will be checked.**
2. After asked to commence the exam, please verify that you have **eight (8) different printed pages** including this title page.
3. There are **20 MCQs and 16 short questions**. Attempt all of them.
4. All short questions do not carry **equal marks**.
5. Exam is closed books, closed notes. Please see that the area in your threshold is clean. You will be charged for any material which can be classified as 'helping in the paper' found near you.
6. Calculator sharing is strictly prohibited.
7. Students who attempt the paper with **lead pencils** loose the right to get them rechecked.
8. The invigilator present is not supposed to answer any questions. No one may come to your room for corrections and you are not supposed to request to call anyone. Make assumptions wherever required and clearly mark them.

Question 1 **[10]**

1).The **checksum** filed in the IP header is used to calculate the checksum over:

(a) Data only **(b)** Both the data and the header

(c) Source and destination addresses only **(d)** Header only

2). Router operates at:

(a) Physical **(b)** Link Layer **(c)** Network Layer **(d)** All of these three layers

3). Router processes:

(a) Physical **(b)** Link Layer **(c)** Network Layer **(d)** All of these three layers

4). In distance vector routing protocol, each router receives information generated directly by:

(a) Every router in the network **(b)** Every router less than three hops away

(c) Directly connected neighbors only **(d)** none of above

5). In link state routing protocol, each router receives information generated directly by:

(a) Every router in the network **(b)** Every router less than three hops away

(c) Directly connected neighbors only **(d)** None of above

6).Assuming **classfull** addressing, what is the default subnet mask for the IP address **126.0.0.0**:

(a) 255.0.0.0 **(b)** 255.255.0.0 **(c)** 255.255.255.0 **(d)** 255.255.255.255

7).Assuming **classless** IP addressing, what is the subnet mask for the IP address **126.0.0.0/23**:

(a) 255.0.0.0 **(b)** 255.255.0.0 **(c)** 255.255.254.0 **(d)** 255.255.128.0

8).Assuming **classful** addressing, which of the following is true about the IP address **200.10.10.10**:

(a) The network Id is *200* **(b)** The host Id is *10.10*

(c) The network Id is *200.10.10* **(d)** The host Id is *10.10.10*

9).Consider the IP address **200.10.10.10/25**. Which of the following is true?

(a)default subnet mask is used **(b)** The subnet mask is *255.255.255.10*

(c) Super-netting with mask *255.255.128.0* is used **(d)** Sub-netting with mask *255.255.255.128* is used:

10). Consider the IP address **200.10.10.10/25**. What is the maximum number of interfaces (hosts)
supported by the network, of which this IP address is a part?
(a) 30 **(b)** 62 **(c)** 128 **(d)** 126

11). Which of the following is a default route?
(a) ip route 172.16.10.0 255.255.255.0 172.16.20.1
(b) ip route 172.16.10.10 172.16.10.10 172.16.10.10
(c) ip route 255.255.0.0 255.255.0.0 255.255.0.0
(d) ip route 0.0.0.0 0.0.0.0 172.16.20.1

12).Consider the following routing table entry: **ip route 160.16.10.0 255.255.255.0 160.20.20.1**. Which of the following is the best explanation of this entry?
(a) It is a default route **(b)** It is a static route
(c) It is a dynamic route **(d)** It is an invalid route.

13).Consider the following routing table entry: **ip route 160.16.10.0 255.255.255.0 160.20.20.1**. What is the ip address of the **network** advertised in this entry?
(a) 255.255.255.0 **(b)** 160.20.20.1 **(c)**160.16.10.0 **(d)**160.16.0.0

14).Consider the following routing table entry: **ip route 160.16.10.0 255.255.255.0 160.20.20.1**. What is the ip address of the **next hop** to reach the destination network?
(a) 255.255.255.0 **(b)** 160.20.20.1 **(c)**160.16.10.0 **(d)**160.16.0.0

15). Which of the following a distance vector routing algorithm?
(a) Dijkstra's algorithm **(b)**Bellman-Ford algorithm **(c)**Flooding **(d)**longest path algorithm

16). Which of the following a link state vector routing algorithm?
(a) Dijkstra's algorithm **(b)**Bellman-Ford algorithm **(c)**Flooding **(d)**longest path algorithm

17).In the Go-Back-N transmission protocol, the receiver handles out-of-order packets by
(a) Sending them back to the sender **(b)** Storing them in the buffer
(b) Discarding them **(d)** Duplicating them

18). Which of the following is true about the VC No. in the virtual circuits packet switching?
(a) VC No. should be changed on each link **(b)** VC No. should remain same on each link
(c) VC No. is globally unique **(d)** All of above

19). An IP packet is to be forwarded to a network with MTU (Maximum Transmission Unit) of 1550 bytes.

The total size of the packet is 4000 bytes. What will be the maximum size of the fragment?

(a) 1550 bytes **(b)**1548 bytes **(c)** 1528 bytes **(d)** 1552 bytes

20).RIP is a:

(a) Distance vector protocol **(b)** Link state protocol **(c)** Default protocol **(d)** None of the listed

Question 2

[30]

1. The performance of a client-server system is influenced by two network factors: the bandwidth of the network (how many bits/sec it can transport) and the latency (how many seconds it takes for the first bit to get from the client to the server).Give an example of a network that exhibits high bandwidth and high latency. Then give a low bandwidth and low latency. [2 Mark(s)]

2. For each of the following operations on a remote file, discuss whether they are more likely to be delay sensitive or bandwidth sensitive. [0.5 X 4= 2 Mark(s)]
    a. Open a file.

    b. Read the content of a file.

    c. List the content of a directory.

    d. Displays the attributes of a file.

3. The bit interval is the time required to send one single bit. The bit rate is the number of bit intervals per second. If a digital signal has a bit rate of 2000 bps. What is the duration of each bit? [1 Mark(s)]

4. A digital signal has a bit interval of 40 micro seconds. What is the bit rate? [1 Mark(s)]

5. An analog signal carries four bits in each signal element. If 1000 signal elements are sent per second, find the baud rate and the bit rate? [2 Mark(s)]

6. If a binary signal is sent over a 3-kHz channel whose signal-to-noise ratio is 20 dB, what is the maximum achievable data rate? [1 Mark(s)]

7. A modem is able to send four distinct symbols. How many bps can such a modem achieve at 1200 baud? [1 Mark(s)]

8. What is piggybacking? What are the advantages or disadvantages? [2 Mark(s)]

9. ARP and RARP both map addresses from one space to another. In one respect, they are similar. However, their implementations are fundamentally different. In what major way do they differ? [2 Mark(s)]

10. A router has the following (CIDR) entries in its routing table:

    For each of the following IP addresses, what does the router do if a packet with that address arrives? [0.5 X 5=2.5]

    a. 135.46.63.10

    b. 135.46.57.14

c. 135.46.52.2

d. 192.53.40.7

e. 192.53.56.7

11. Identify which layer of the OSI model each function is most likely to belong to. It is possible that one or more of the below cannot be mapped to an OSI layer. If this is the case, explain why. [0.5 X 9= 4.5 Mark(s)]
    a. Recovering lost packets between two directly connected nodes

    b. Recovering lost packets between two nodes separated by multiple hops

    c. Defining the pin-outs in a connector used to attach to a network cable

    d. Providing an interface to a visual packet monitoring program
    Network Layer

    e. Arbitrating between multiple nodes attached to a single medium

    f. Translating between text in messages from Dutch to English

    g. Generating error correction codes for packet error correction

    h. Maintaining connection semantics between two directly connected nodes

    i. Finding the shortest path between two nodes separated by multiple hops

12. Identify that applications listed below require connectionless service or connection-oriented service. [0.5 X 6= 3 Mark(s)]
    a. Web-browsing,

    b. Voice over IP,

    c. Email,

    d. Remote Login

e. File Download

f. Online Shopping

13. Why CSMA/CD is not possible in WLAN? [2 Marks(s)]

14. What is the key difference between distance-vector and link-state routing protocols in terms of how protocol messages are sent? [1 Marks(s)]

15. Give the names of a distance-vector algorithm and protocol. Give the names of a link-state algorithm and protocol. [2 Marks(s)]

16. What is the difference between a bridge and a router? [1 Marks(s)]