

BITS, PILANI-DUBAI
DUBAI INTERNATIONAL ACADEMIC CITY, DUBAI
II SEMESTER 2011

COURSE : CS C461 Computer Networks III YEAR
COMPONENT : Comprehensive Examination
DURATION : 3 hours.
WEIGHTAGE : 40% (80 Marks)
Date : 26-05-2011

Note: Answer Part A and Part B in separate answer sheets.

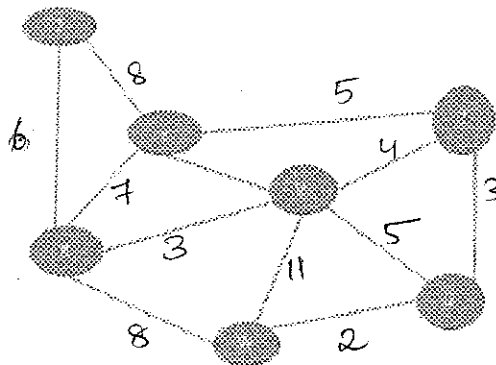
PART-A

5*10=50 M

1a. Explain with a neat diagram, the messages involved in connection establishment and connection termination in TCP protocol between sender and receiver.

1b. How the flow control is achieved between sender and receiver in TCP socket communication.

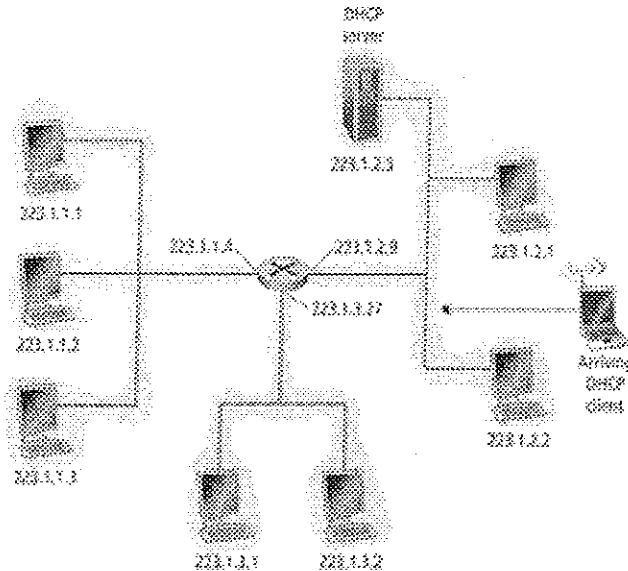
2. For the following network with indicated link cost compute the routing from x to all network nodes using distance vector or link state vector. Explain how the table get modified if the link between X and V fails.



3. In organization that needs 2560 ip addresses for connection connecting 2560 computers to the internet. Let the computer are arranged in the form of LANS where each LAN can have 256 computers. Outline how it can be done with CIDR. Let the network address for the first LAN is 200.10.0.0 when you go for CIDR.

Outline how using CIDR, I can minimize the number of entries in routers outside the organization for routing packets that are meant for computers into my networks. In the above case how router inside and outside the organization does routing of the packet for a node whose IP address is given by 200.10.7.15.

4. Referring to the diagram below, assume that a DHCP client enters via the network of node 223.1.2.1. Outline the steps involved in discovering the DHCP server by the client and how the IP address is assigned.



5. Suppose an organization called CISCO has installed routers in the internet. It wants to maintain the health of routers.
- Outline a protocol using which the health of the routers can be maintained. MIB's parameters needed from the routers and the commands supported by the protocol to get the parameters.
 - Suppose a sudden fault takes place in the router, than what sort of message will be used by the router to notify the monitoring authority immediately.

PART-B

6*5=30

- Suppose a point to point link is being set up between earth and a new lunar colony. The distance from the moon to earth is approximately 385000 km and data travels over the link at the speed of light 3×10^8 m/s. A camera on the lunar takes pictures of Earth and saves them in digital format to disk. Suppose mission control on earth wishes to download the most current image which is 25MB. What is the minimum amount of time that will elapse for the transfer to complete assuming a three way handshake is initiated by mission control on earth to initiate the data transfer?

2. a) Why we need hybrid cryptography. What way it is different from symmetric and asymmetric cryptography.
b) What is digital signing of a document and why it is needed?
3. What is the hidden node problem in wireless lan. Briefly explain how it can be solved in wireless lan.
4. a) Justify under what circumstances the Ethernet efficiency is maximum.
b) Consider a 100 Mbps Ethernet using bus topology, in order to have an efficiency of 0.5 what should be the maximum distance between nodes. Assume a frame length of 80 bytes and speed of propagation is that of light.
5. Write the advantages of IPV6 over IPV4.
6. Answer the questions below for the given code.

```
public static void main(String argv[]) throws Exception
{
    String clientSentence;
    String capitalizedSentence;
    ServerSocket welcomeSocket = new ServerSocket(6789);

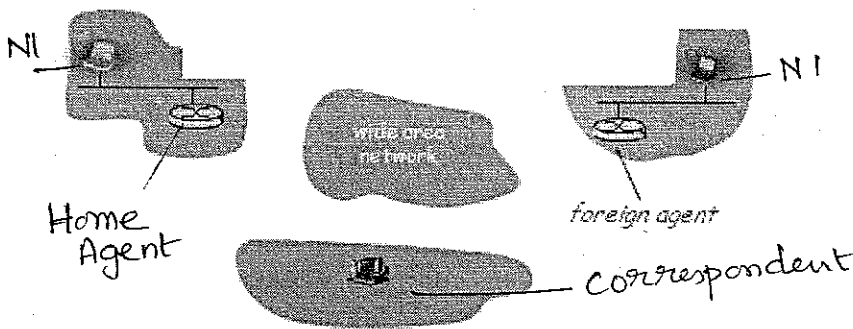
    while(true) {
        Socket connectionSocket = welcomeSocket.accept();
        BufferedReader inFromClient =
            new BufferedReader(new
        InputStreamReader(connectionSocket.getInputStream()));
        DataOutputStream outToClient =
            new DataOutputStream(connectionSocket.getOutputStream());
        clientSentence = inFromClient.readLine();
        capitalizedSentence = clientSentence.toUpperCase() + '\n';
        outToClient.writeBytes(capitalizedSentence);
    }
}
```

- a) Suppose there is no client connection, what will the server do?
- b) As soon as the client gets connected what will happen?
- c) What is the necessity for close()?

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II SEMESTER 2010-2011

COURSE : CS C461 Computer Networks III YEAR
 COMPONENT : TEST – II (OPEN BOOK)
 DURATION : 50 MINS
 WEIGHTAGE : 20% (40 Marks)
 Date : 08-05-2011

1. An organization is granted the site address 201.70.64.0. The organization needs 30 subnets with each subnet having 6 nodes. Design the subnets with the help of block diagram showing subnet addresses and ip address assignment for nodes in every subnet . [15 M]
2. When a mobile node moves from its home network to foreign network, how the uninterrupted communication takes place between mobile node and the correspondent. [5 M]



200.70.20.0 is the network address for the home network. Assign appropriate IP addresses for the home agent and home address for node n1. Similarly the network address for foreign network is 210.80.10.0 and using that allocate ip address for foreign agent and care of address for node n1 when it moves to foreign network.

3. Suppose nodes A and B are on the same 1 Mbps Ethernet segment, and the propagation delay between the two nodes is 400 bit times. Suppose A and B send frames (for the first time) at the same time, the frames collide, and then A and B choose different values of K in the CSMA/CD algorithm. Assuming no other nodes are active, can the retransmissions from A and B collide? For our purposes, it suffices to work out the following example. Let $K_a=0$, $K_b=1$ Suppose A and B begin transmission at $t=0$ bit times. Choose a frame size of minimum frame of 72 bytes. [10 M]
4. Consider sending a 3000 byte datagram including 20 bytes of ip header into a link that has MTU of 500 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? What are their characteristics? [10 M]

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II SEMESTER 2010-2011

COURSE : CS C461 Computer Networks III YEAR
COMPONENT : TEST – I (CLOSED BOOK)
DURATION : 50 MINS
WEIGHTAGE : 25% (50 Marks)
Date : 20-03-2011

Q1. Suppose a 128-Kbps point to point link is set up between earth and a rover on Mars. The distance from earth to mars is approximately 55×10^9 meters and data travels over the link at the speed of light 3×10^8 m/sec. [15 M]

- a) Calculate the minimum RTT for the link
- b) A camera on the rover takes pictures of its surroundings and sends these to earth. How quickly after a picture is taken can it reach Mission control on earth? Assume the image size is 5MB

Q2. Suppose host A and B are apart by 4 hops (with 3 switches in between) on a datagram packet switched network where each link is 10 km. packets are 1500 bytes long. All links have a transmission speed of 1 M bps and the speed of propagation is 2×10^8 m/s. if A sends 10 packet message to B, how long will it take for B to receive the message up to the last bit. [15 M]

Q3. Consider the snippets of code given below:

```
try {
    System.setProperty("http.proxyHost", "172.16.13.17");
    System.setProperty("http.proxyPort", "8080");
    int c;
    URL url = new URL("http://java.sun.com/");

    URLConnection urlConnection = url.openConnection();
    DataInputStream dis = new DataInputStream(urlConnection.getInputStream());
    String inputLine;

    while ((inputLine = dis.readLine()) != null) {
```

```
        System.out.println(inputLine);
    }
dis.close();
```

Outline the sequence of actions take place when a java program containing the above code gets executed. [10 M]

Q4. What is meant by UDP port scanner?

Using java or equivalent code outline how a UDP port scanner can be devised? [5 M]

Q5. In satellite communication, when earth station wants to send message to the satellite, whether CSMA/CD is preferred or CSMA/CA is preferred and why? [5 M]

**BITS, PILANI – DUBAI
SECOND SEMESTER – 2010**

Course Code: **CS C461**
Course Title: Computer Networks
Duration : 20 minutes
Quiz2(Closed book)

THIRD YEAR

TYPE-B

Date: 13.04.2011
Max Marks: 14

Weightage: 7%

Name:	ID No:	Sec :
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Q1. Write one difference between switch and hub.

[2 M]

Q2. A virtual connection is established between A and D in the following figure. Show the corresponding entries in the tables of each switch. [3 M]

Q3. A host with IP address 180.45.23.20 and physical address 1233AADE5678 has a packet to send to another host with IP address 180.45.23.145 and physical address CEDF4567A234. The two hosts are on the same Ethernet network. Show the ARP request packet encapsulated in Ethernet frames. [3 M]

Q4. Explain how frames are sent from A to G and C to F for the switch with the table entries as given in the diagram [2 M]

Q5. Using AAL5, show the situation where we need 47 bytes of padding.

[2 M]

Q6. In AAL1 layer receives data at 5 Mbps. How many cells are created per second by the ATM layer.

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II SEMESTER 2010-2011
SET A

COURSE : CS C461 Computer Networks III YEAR
COMPONENT : QUIZ – I (CLOSED BOOK)
DURATION : 20 MINS
WEIGHTAGE : 8% (16 Marks)
Date : 09-03-2011

ID No:

Name:

1. Consider two hosts A and B, connected by a single link of rate R bps and separated by m meters. Suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B. [2 M]

a) Suppose (propagation delay) d_{prop} is greater than d_{trans} (transmission delay). At time $t = d_{trans}$, where is the first bit of the packet?

b) Suppose (propagation delay) d_{prop} is less than d_{trans} (transmission delay). At time $t = d_{trans}$, where is the first bit of the packet?

2. What is the difference between port address, IP address and physical address?

[3 M]

3. Under what circumstances UDP based communication is better than TCP or TCP based communication is better than TCP.

[2 M]

4. Suppose two host A and B, are separated by 10,000 Kilometers and are connected by a direct link of $R = 1\text{Mbps}$ and the speed over the link is 2.5×10^8 meters/sec. Consider sending a file of 400,000 bits from host A to host B and file is sent continuously as one large message. What is the maximum number of bits that will be in the link at any given time? **[2 M]**

5. What are the activities done by transport layer, Ip layer and session layer?**[3 M]**

6. Assume a fax transmits an 8×10 inch black and white image at resolution of 72 pixels per inch. How long would this take over a 14.4 Kbps modem? **[2 M]**

7. Draw the diagram outlining various fields in a data frame output of data link layer in internet protocol stack. **[2 M]**