BITS, Pilani-Dubai ,
International Academic city
III Year CS Second Semester 2011-12

Degree:B.E.(Hons) Branch:C.S

Computer networks CS C461

Compre exam Time:3 hrs Total marks :80 weightage :40%

Closed book Answer all the questions

Part-A (5*12=60M)

Q1. We want to implement subnetting in BITS,Pilani-Dubai. We want to have 14 subnets in our university. we have been allocated a class C network address whose value is 200.11.9.0.

a)Outline how many computers can we connect to the internet using the above subnets. (3m)

b)what are the subnet addresses allocated to the subnet ?(3M)

c)specify the range of IP addresses allocated to the computers in the first subnet.(2M)

d)with the help of an example outline the need for CIDR based IP addressing and the relative merits of the same compared to classful addressing.(4M)

Q2.a)Outline how flow control can be achieved using TCP based communication between a client and server ? (5M)

b)Outline how congestion control between the server and the client can be done when they use TCP type of transport layer (3M)?

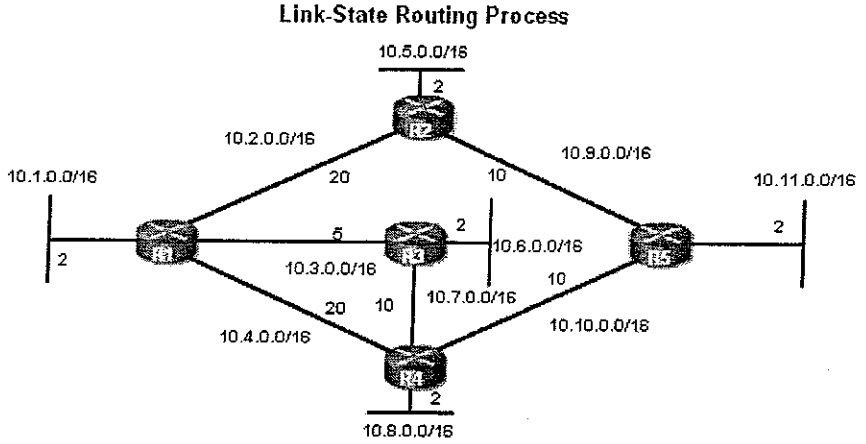
C) with a diagram how TCP connection gets established between the client and TCP server assuming that initial Sequence number for the client is 1500 and the server is 2000. (4M)

Q3a).Outline how using SNMP protocol the health of a router can be monitored ?[5M]

b)Outline briefly the significance of network management in any 3 areas ? [3M]

c)outline the need for Trap message and setRequest message in SNMP protocols (4M)?

Q4.

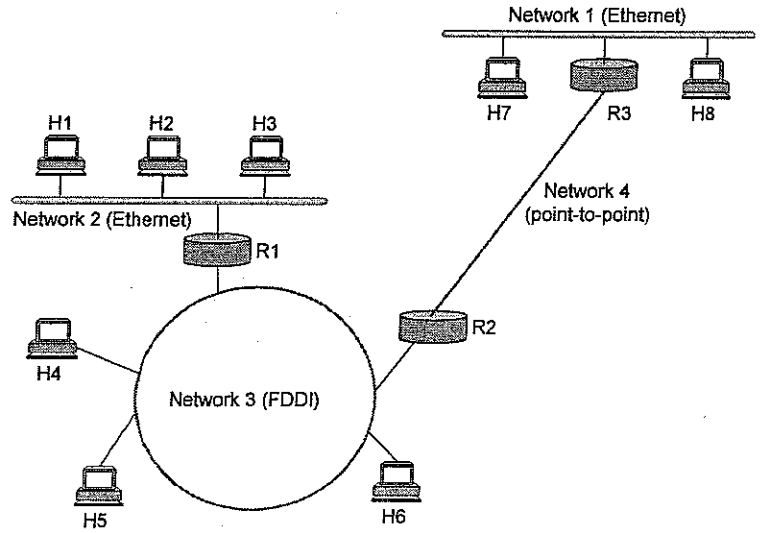


a)With the help of the above diagram outline step by step how using link state routing algorithm routing table gets formed in the router R5.(8M)

b) suppose the link from R3 to R4 got broken after the routing table completely established in R5?[4M]

What are the actions that will happen due to that ?

Q5.



Q5. I want to do routing of IP datagrams from the source computer H3 to the destination H8.

The size of the IP datagram is 1300 bytes.

Let MTU-1500 bytes for both ethernets

MTU-4500 bytes for FDDI

Let the MTU-512 bytes for point to point link.

a)Outline how it can be done when IPV4 is employed (8M)

b)How the same thing will be done in the case of IPV6?(4M)

Part-b(5*4=20M)

Q1. Consider a 100Mbps Ethernet using bus topology. In order to have an efficiency of 0.30 what should be the maximum distance between 2 nodes? Assume a min frame length. Does this maximum distance also ensure that a transmitting node A will be able to detect whether any other node transmitted while A was transmitting? Why or why not? Velocity of movement is 1.8 * 10 exp8 meters/sec.(4M)

Q2.what are the protocol enhancements that have to be done for IPV4 mobile routing compared to conventional IP routing ? (4M)

Q3.a)Calculate the bandwidth required to transmit in real time:

CD-ROM music assuming one CD holds 75 minutes worth and takes 650 Mbytes (2M)

b)Assume a fax transmits an 8 inch * 10 inch black and white image at a resolution of 72 pixels per inch. How long it will take to transmit over a modem of 14.4Kbitspersec.(2M)

Q4.outline briefly the function of the SMTP protocol ?(4M)

Q5. Outline with following scenario how a small packet improves queue behavior compared to large size packet in virtual circuit switching for

a)finer-grained preemption point for scheduling link

b)near cut-through behavior

- Size of large packet = 4KB
- link speed = 100Mbps
- size of small packet =53 bytes

BITS, Pilani-Dubai Campus
III rd Second Semester 2011-2012

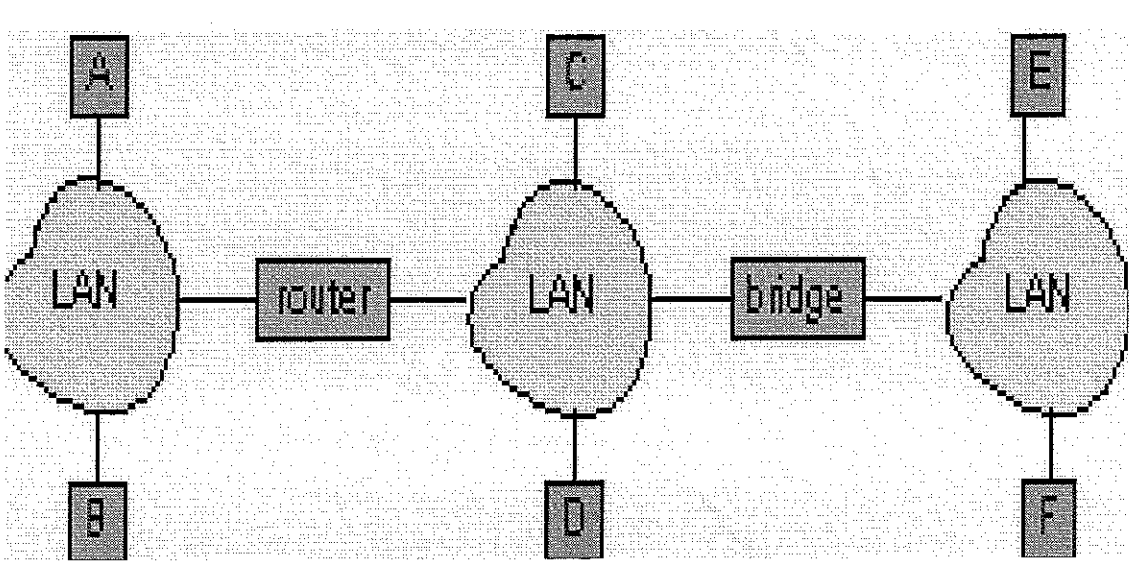
Degree:B.E.(Hons) Branch:C.S.

COURSE TITLE : Computer networks Course No:CS C461
Test:2(open book) Marks-20 weigtage 20%

Date:20-5-2012 Time-50 mts

Answer all the questions.

Q1.



Q1.a)Consider sending a datagram from host A to host F. Trace the steps assuming all the ARP tables are up-to-date.(2M)
b) Repeat a), but now assume that all ARP tables are up to date, except for the ARP tables in router,which are empty
Assume that nodes A,B,C,D,E,F and the router interfaces have been configured with proper IP addresses and Mac addresses.(2M)

Q2. Suppose nodes A and B are on the same 10 Mbps Ethernet segment, and the propagation delay between the two nodes is 300 bit times. Suppose A and B send

frames at the same time, the frames collide, and then A and B choose different values of K in the CSMA/CD algorithm.
Let A and B begin transmission at t=0 bit times. Suppose Ka=0 and Kb=1.
Proper jam signal is sent when a collision is detected.
At what time does B schedule its retransmission?(2 M)
At what time does A begins retransmission? (2M)
. Assuming no other nodes are active, can the retransmissions from A and B collide?(2M)

Q3 a)The AAL1 layer receives data at 2 Mbps. How many cells are created per second by the ATM layer ?(2M)

b) Using aal5 show the situation where we need 40 bytes of padding ?(2M)

c)Consider a situation where we want to send 100 bytes of datagram using AAL5.what is the total efficiency for the same ?(2M)

Q4.Consider three lans which are connected to each other using a switch

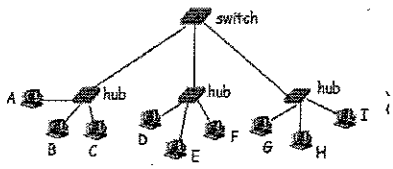
Assume that the switch table is initially empty. How the data packets are forwarded by switch in the following cases and how the entries for the switch table will be updated? (2M)

Let A send data to G

Let H send data to A

Let D send to F

Switch example



Let I sends to F

How will you compare collision domain of the above 3 interconnected lans through a switch vs hub?(2 M)

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III rd Second Semester 2011-2012

Degree:B.E.(Hons) Branch:C.S.

COURSE TITLE : Computer networksCourse No:CS C461
Test:1(closed book) Marks-25 weigtage 25%

Date:1-4-2012 Time-50 mts

Answer all the questions.

Q1.Suppose that a certain communication protocol involves a per packet overhead of 100 bytes for headers and framing. We can send 10 lakhs of bytes of data using this protocol. However one data byte is always corrupted and the entire packet containing it is thus lost.Give the total number of overhead + loss bytes when you split the data into units of of different formats as given below before adding headers

a)1000 bytes b)5000 bytes c)10,000 bytes and D)20000 bytes .Which size is optimal ?[1.5+1.5+1.5+1.5]

Q2

a).suppose I have 4 voice channels which are getting multiplexed using TDM and FDM. What is the total bandwidth of multiplexed line in each one of the above the cases.[3M]

b)With suitable illustration enumerate any 2 important advantages of packet switching compared to

TDM SWITCHING OF CHUNKS OF DATA.[2M]

c)For digital voice multiplexing how TDM scores over packet switching networks?[2M]

Q3.Suppose A is sending data to B via a communication link of BW = 100Kbps continuously.

Let the distance between the source to dest is 3,85,000 K.M. Assume a propagation speed of 3 * 10E8 metres/sec. Suppose B asks A to stop transmission. By the time A receives and stops the transmission how much bits still B has to consume.[2]

b) Suppose there is a 1 Mbps microwave link between a geo stationary satellite and its base station on earth. Let the satellite takes a digital photo and sends it to the base station. Let the distance between the satellite and the earth is 3,85,000 K.M. Assume a propagation speed of 3 * 10E8 metres/sec.

Let x denotes the size of image .what is the minimum value of x for which the microwave link should be continuously transmitting. [4M]

Q4.

You are supposed to develop the java code for a client to connect to www.microsoft.com

and download a web page called index.html with minimum headers , and display the contents of the web page. Make use of the template given below.[4M]

```
import java.io.*;

import java.net.*;

class ClienttoServer {


public static void main(String argv[]) throws Exception

  {

try

{




}

Catch(Exception e)

{

}

}

}
```

Suppose you are asked to send all the headers to the server for getting the web page. How the program gets modified?[2m]

Q.W3-2

BITS,Pilani-Dubai

Computer networks CS C461

Quiz2(closed book) Total marks : 7 Time :20 mts Date:1st may 2012

Q1. Suppose nodes A and B are on the same 10 Mbps Ethernet segment, and the propagation delay between the two nodes is 225 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.A chooses Ka=0 and B chooses Kb=1.at what time A will initiate resending of the frame. Let A and B begin transmission at t=0 bit times[2M]

Q2. Suppose nodes A and B are on the same 10 Mbps Ethernet segment, and the propagation delay between the two nodes is 225 bit times. Suppose node A begins transmitting a frame, and before it finishes station B begins transmitting a frame. Can A finish transmitting before it detects that B has transmitted?assume worst case collision and a minimum frame size.[2M}

Q3.What is a hidden node in wireless lan ?[1]

Q4. How a hidden node problem can be solved in WLAN?[1]

Q5.consider a broadcast channel of 10 nodes and a transmission rate of 1 Mbits/sec. suppose the broadcast channel uses polling for multiple access. Let the polling delay is 2 micro sec.(amount of time from when a node completes transmission until the subsequent node is permitted to transmit

).Suppose that within a polling round ,given node is allowed to transmit 100 bits. What is the max throughput of broadcast channel? [1]

BITS, Pilani-Dubai Campus

III rd Second Semester 2011-2012

Degree:B.E.(Hons) Branch:C.S.

COURSE TITLE : Computer networks

COURSE NO. : CS C 461

Date : 13-3-2012

Quiz1 Time=20 mts Total marks=8 (closed book) Weightage=8% (closed book)

Q1.How will you programmatically find out the UDP servers and via which ports they are running in your computer ?(assume that if at all any UDP server is there they can have port numbers only between 3000 to 5000). [1.5M]

Q2.How will you programmatically find out the TCP servers and via which ports they are running in your computer ?[1.5]

(Assume that if at all any TCP server is there they can have port numbers only between 5000 to 6000)

Q3.

import java.io.*;

```
import java.net.*;

class TCPServer {


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);

    }

 }}
```

Consider the above program. Before a client connects to the server in which line of code the server will be there. Immediately after a client connects to the server in which line of code the server will be there before the data comes from client? After the client send data in which line of code the server will be there.2M]

Q4.in what way a ring topology for a lan is better compared to bus topology ?[1]

Q5.wrt the below diagram outline how the addresses in the packet change as it is routed from the source computer whose IP address is A, and mac address 10 to the dest computer whose IP address is M and the Mac address 77.Assume the message is "India is great". Let the source port is 80 and the dest port is 90 [2M]