U.S.N.

BMS College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2018 Semester End Make Up Examinations

Course: Computer Networks   **Duration: 3 hrs.**
Course Code: 16CS5DCCON   **Max Marks: 100**
                                                             Date:13.01.2018

Instructions: **Answer any FIVE full questions, choosing one from each Unit.**

UNIT 1

1. a) List the four broad classes of services that a transport layer protocol can   06
            provide. For each of the service classes, indicate if either UDP or TCP (or
            both) provides such a service.

    b) Give the General format of HTTP request and response message.   08
        Answer the following questions:
        a. Explain the mechanism used for signaling between the client and server
            to indicate that a persistent connection is being closed. Can the client,
            the server, or both signal the close of a connection?
        b. Does HTTP provide encryption services.
        c. Can a client open three or more simultaneous connections with a given
            server?
        d. Either a server or a client may close a transport connection between
            them if either one detects the connection has been idle for some time. Is
            it possible that one side starts closing a connection while the other side
            is transmitting data via this connection? Explain.

    c) Suppose Alice wants to send a message to Bob. Illustrate the basic operation of   06
        SMTP for the above scenario. Construct the transcript of messages exchanged
        between SMTP client and SMTP Server as soon as a TCP Connection is
        established.

UNIT 2

2. a) Suppose a client wants to get the IP address of a new website www.abc.com.   06
            Design the sequence of events that take place to access the IP address and
            show the interaction of various DNS servers by considering appropriate
            example.

    b) Develop an application program for server side to count the number of   06
        characters from a file stored   in the client using connectionless, unreliable
   transport services.

c)   Illustrate the need for multiplexing/demultiplexing service in transport layer.   08
     Suppose that a Web server runs in Host C on port 80 and this Webserver uses
     persistent connections, which is currently receiving requests from two different
     Hosts, A and B. Justify whether all the requests are being sent through the
     same socket at Host C? If they are being passed through different sockets, do
     both of the sockets have port 80? Discuss and explain.

UNIT 3

3.   a)   Explain the Segment structure of UDP and give reasons for UDP providing a   08
          Checksum.
          For the following three 8-bit bytes: 01010011, 01100110, 01110100, Compute
          Checksum for the given bytes?(consider 8-bit sums.)

     b)   Describe the process of estimating the timeout period between sender and   06
          receiver.
     c)   Illustrate the need for Doubling the time interval and fast retransmit in TCP.   06

UNIT 4

4.   a)   Describe the causes and costs of congestion for the scenario where there are   06
          two senders and a router with finite buffer.
     b)   Illustrate the mechanism provided by ATM ABR for signaling congestion   06
          related information from the switches to the receiver.
     c)   For the given figure, Assuming TCP Reno is the protocol experiencing the   08
          behavior, answer the following questions. In all cases, provide a short
          discussion justifying your answer.
          a. Identify the intervals of time when TCP slow start is operating.
          b. Identify the intervals of time when TCP congestion avoidance is
              operating.
          c. After the 22nd transmission round, is segment loss detected by a triple
              duplicate ACK or by a timeout?
          d.   What is the value of ssthresh at the 18th transmission round?
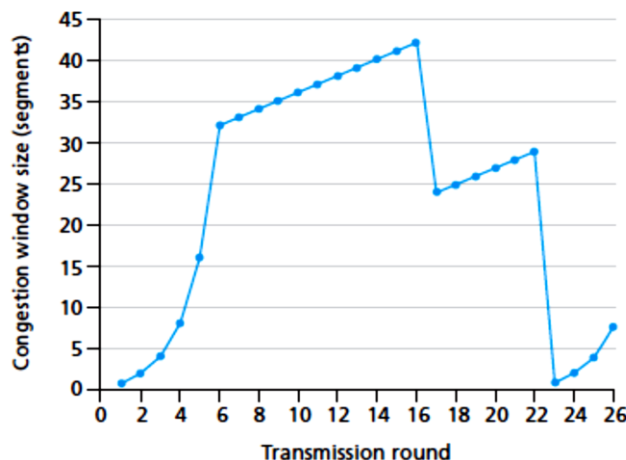
OR

5.   a)   Identify and explain the service models which substitute the Internet's best   06
   effort model.

b) List and briefly describe three types of swiching fabric.   08

Assume two packets arrive to two different input ports of a router at exactly the same time. And there are no other packets anywhere in the router.

a) If the two packets are to be forwarded to two *different* output ports. Is it possible to forward the two packets through the switch fabric at the same time when the fabric uses i) a *shared bus* ii)*crossbar*

b) Suppose the two packets are to be forwarded to the *same* output port. Is it possible to forward the two packets through the switch fabric at the same time when the fabric uses a *crossbar*?

c) Describe how packet loss can occur at input ports and how packet loss at input   06
ports can be eliminated.

UNIT 5

6. a) Depict the IPV4 datagram format. Explain the fields pertaining to 9th byte to   08
12th byte(3rd word).

b) Illustrate the difference between classful addressing and CIDR. Consider a   07
router that interconnects three subnets: Subnet 1, Subnet 2, and Subnet 3. All the interfaces in each of these three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12 interfaces. Provide three network addresses (of the form a.b.c.d/x) that satisfy these constraints.

c) Consider the Small office or Home Office network setup with three hosts   05
connected. Suppose that the ISP assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24.

a) Assign addresses to all interfaces in the home network.
b) Suppose each host has two ongoing TCP connections, all to port 80 at host 128.119.40.86. Provide the six corresponding entries in the NAT translation table.

OR

7. a) Compare and contrast the IPv4 and the IPv6 protocols.   05

b) Describe the Routing Algorithm that is iterative, asynchronous and distributed   10
in nature. Write the algorithm and apply it for the given network assuming that each node initially knows the costs to each of its neighbors.
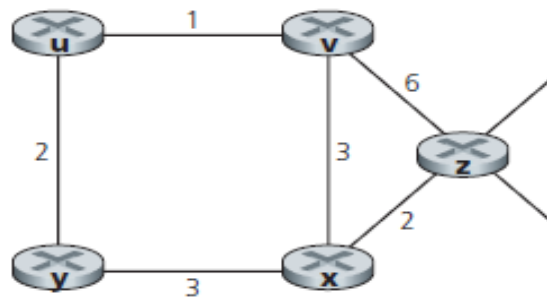
c) Explain the advances in the OSPF protocol.   05

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