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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SECOND SEMESTER M.TECH DEGREE EXAMINATION, MAY 2016

Computer Science and Engineering /Interdisciplinary

(Computer Science/Translational Engineering)

01CS6106 Advanced Computer Networks

Max. Marks : 60 **Duration: 3 Hours**

Answer any two questions from each part

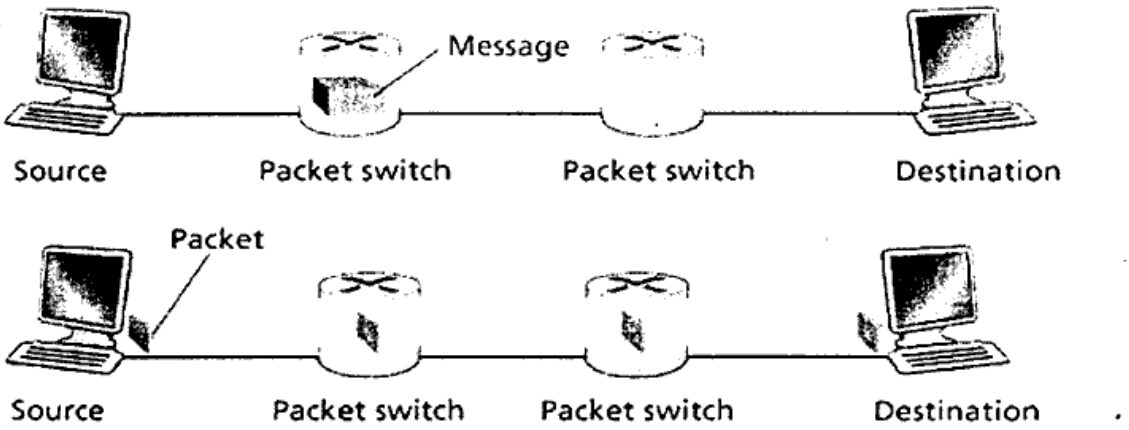
Part A

1 (a) Explain the TCP/IP refernce model. (5)

(b) Define bandwidth-delay product in the context of network performance. What is the importance of the bandwidth-delay product for networks? Does the bandwidth-delay product equally affect all protocols? Give an example of a system that has a large bandwidth-delay product. (4)

2. (a) Explain concepts of subnetting and supernetting with examples (3)

(b) In packet switching networks, the source host segments long application layer messages (for example an image or a music file) into smaller packets and sends the packets into the network. The receiver re-assembles the packets back into the original message. Figure 1 illustrates the end-to- end transport of a message with and without segmentation. Consider a 7.5 ∗ 10 6 bits long message that is to be sent from the source to the destination as shown in the figure. Suppose that each link in the figure is 1.5 Mbps. Ignore propagation, queuing and processing delays. You can assume that you do not have to wait for ACKs when sending the message with segmentation.



End-to-end message transport (a) without message segmentation; (b) with message segmentation

(i) Consider sending the message from source to destination without message segmentation. How long does it take to move the message from the source host to the first packet switch? Keep in mind that each packet switch uses a store and forward packet switching. What is the total time to move the message from the source host to the destination host? (2)

(ii) Now suppose that the message is segmented into 5,000 packets, with each packet being 1500 bits long. How long does it take to move the first packet from the source host to the first packet switch? (2)

(iii) How long does it take to move the file from the source host to the destination host when message segmentation is used? (1)

(iv) Discuss the drawbacks of message segmentation. (1)

3. (a) Explain the four categories of routers in the context of OSPF areas. (3)

(b) An organization has been assingned the prefix 212.1.1.0/24 and wants to form subnets for four departments, with hosts as follows:

A : 75 hosts
B : 35 hosts
C : 20 hosts
D : 18 hosts
Total of 148 hosts

(i) Give a possible arrangement of subnet masks to make this possible (4)

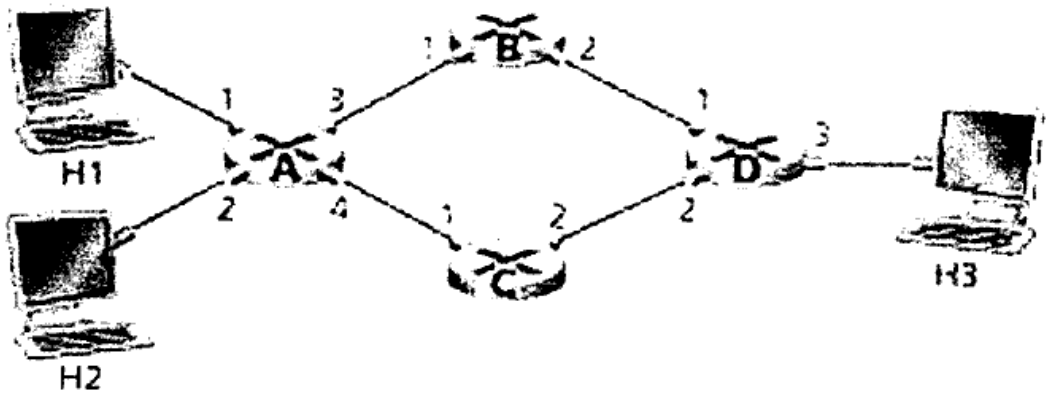
(ii) Suggest what the organization might do if department D grows to 32 hosts.

(2)

Part B

4. (a) Explain the silly window syndrome with proper example. What is the solution for the SWS problem. (6)

   (b) (i) Suppose this is a datagram network. Show the forwarding table in router A, such that all traffic from H1 to H3 is forwarded through interface 3 and all traffic from H2 to H3 are forwarded through interface 4 (3)



5. (a) Explain slow start, fast retransmit and fast recovery congestion control mechanisms. (6)

   (b) Consider sending a 2400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 422. How many fragments are generated? what are the values in the various fields in the IP datagram(s) generated related to fragmentation? http://www.ktuonline.com (3)

6. (a) Explain BGP protocol. (5)

   (b) Consider sending a large file from a host to another over a TCP connection that has no loss.

   (i) Suppose TCP uses additive increase/multiplicative decrease for its congestion control w/o slow start. Assuming cwnd increases by 1MSS every time a batch of ACKs is received and assuming approximately constant round-trip times, how long does it take for cwnd increase from 6MSS to 12MSS (Assuming no loss events)? (2)

   (ii) What is the average throughout (in terms of MSS and RTT) for this connection up through time = 6RTT ? (2)

Part C

7. (a) Exlpain RSVP protocol. (6)

(b) List three disadvantages of UDP streaming. (3)

(c) Explain ADPCM. (3)

8. (a) Explain peer to peer networks. Explain how gnutella work?What is the difference between end- to-end delay and packet jitter? What are the causes for packet jitter. (6)

(b) Multimedia applicaitions can be classified into three categories. Name and describe each category. (6)

9.(a) Explain the LZ and LZW coding techniques. (6)

(b) A sender begins sending packetized audio periodically at t = 1. The first packet arrives at the receiver at t=8.

(i) What are the delays (from sender to receiver, ignoring any playout delays) of packets 2 through 8? (2)

(ii) If audio playout begins at t=9, which of the first eight packets sent will not arrive in time for playout (2)

(iii) What is the minimum playout delay at the receiver that results in all of the first eight packets arriving in time for playout. (2)