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B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2008.

Fifth Semester

Computer Science and Engineering

CS 1302 — COMPUTER NETWORKS

(Common to Information Technology)

(Common to B.E. (Part–Time) Fourth Semester Regulation 2005)

(Regulation 2004)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Draw a hybrid topology with a star backbone and four ring networks?

2. What is the significance of twisting in twisted pair cable?

3. What is the main purpose of the second ring in the FDDI protocol?

4. Assume a Go-Back-N protocol is used with a window size of 4 and that the ACK for packet 2 gets lost. Show the events until packet 2 is acknowledged at the sender side.

5. Is 3.54.81.76 a class A, B, C, or D IP address? What are the network ID and host ID in decimal notation? Assume that subnets are not used.

6. What are the two main reasons that hierarchical routing is employed in the Internet, rather than using a single link-state or distance vector protocol to route packets globally?

7. Suppose we are downloading a file over 1.5 Mbps link using a TCP connection under slow start with RTT of 100 milliseconds. What will be the window size when the link is fully utilized?

8. What field in the IP datagram header is used to avoid forwarding datagram's endlessly through routing loops? How is the header used to accomplish that?

9. Distinguish between iterative and recursive DNS queries?

10. Compare the way SMTP and HTTP transmit the images. Which one do you think is more efficient? Why?

PART B — (5 × 16 = 80 marks)

11. (a) What is the difference between a protocol and a service interface? Explain your answer in terms of a the ISO seven layer model. (16)

Or

(b) Explain how guided media differ from unguided media? Briefly explain any three methods used for data transmission using guided media and two methods used for data transmission using unguided media. (16)

12. (a) Go-back-n and selective-repeat are two basic approaches to deal with transmission errors.

(i) Compare the two approaches in terms of storage and bandwidth requirements.

(ii) With the aid of a packet sequence (timing) diagram, show the operation of go-back-n when a data-packet/ACK-packet/NAK-packet is corrupted. (16)

Or

(b) Station A has two frames in a queue ready to send. Station B has one frame ready to send at the same time. On an 802.3 CSMA/CD network, is it guaranteed that Station B's frame will be transmitted before the second frame of Station A is transmitted? Why? What is the answer for the same scenario on an 802.5 token ring network? Assume all frames have the same priority. (16)

13. (a) Given the network topology below, use a link-state algorithm to compute the shortest path from A to all other nodes. Make sure to show the results of the computation at each step. (16)
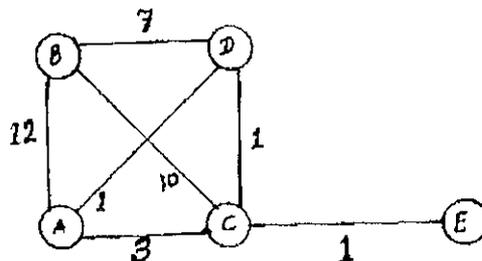
Or

(b) (i) How do *subnetting* and *supernetting* enhance scalability? What is the purpose of a subnet mask and a supernet (CIDR) mask? Is a subnet mask visible outside an IP network? Is a CIDR mask visible outside an IP network?

(ii) What are the network number, subnet number, and host number for address 135.104.192.100, mask 255.255.128.0?

(iii) How many addresses are spanned by the CIDR address 205.12.192.0/20, and what range do they span? (16)

14. (a) Compare and contrast the two TCP/IP transport protocols: TCP and UDP, in terms of demultiplexing, reliability, and flow control. How does TCP identify a connection? Is the information needed for this identification readily available to the TCP software in the received TCP segment? Explain. With the help of a diagram, explain how a connection is established in TCP. (16)

Or

(b) How many RTTs does it take until the sender's congestion window reaches 1 M bytes? Recall that the congestion window is initialized to the size of a single segment, and assume that the slow-start threshold is initialized to a value higher than the receiver's advertised window. If the time to send the file is given by the number of required RTTs times the RTT value, what is the effective throughput for the transfer? What percentage of the link bandwidth is utilized? (16)

15. (a) You are going to use a terminal of the host xyz.cse.edu to write an email from your email account to my email account, with the content "I wanna pass!" Write down in sequence the commands in SMTP, along with any necessary argument, that you need to use to send this email. (16)

Or

(b) Describe with an example how does a HTTP request retrieves the document usr/users/doc/doc 1. Use atleast two general headers, two request headers and one entity header. Show the response if the document has moved to usr/deads/doc 1 and if there is a syntax error in the request. (16)