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V 4141

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

Eighth Semester

Computer Science and Engineering

EC 1008 — HIGH SPEED NETWORKS

(Regulation 2004)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define cell switching.

2. Frame relay networks are faster than X.25 networks. Justify this statement.

3. Mention any four queuing models used to measure the performance of networks.

4. What is the purpose of choke packets in networks?

5. Write short notes on slow start process of congestion control.

6. What is the necessity of a 3-way handshake protocol to establish a transport layer connection?

7. Mention any four features of ABR traffic.

8. What types of applications require GFR in ATM networks?

9. What are the limitations of First Come First Served queuing discipline?

10. RSVP is based on the concept of soft state. Justify this statement.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the B-ISDN reference model with a neat diagram. (8)

(ii) Draw the format of an ATM cell at UNI and NNI. Explain the purpose of each field in the header. (8)

Or

(b) (i) Explain the protocol stack of IEEE 802.11 Wireless LAN with a neat diagram. (8)

(ii) Discuss about the different cabling and encoding schemes used in the fast Ethernet. (8)

12. (a) (i) Discuss the various reasons that lead to congestion in networks. (6)

(ii) Consider a configuration in which packets are sent from computers on a LAN to systems on other networks. All of these packets must pass through a router that connects the LAN to a wide area network and hence to the outside world. Let us look at the traffic from the LAN to a WAN and hence to the outside world. Let us look at the traffic from the LAN through the router. Packets arrive with a mean arrival rate of 5 per second. The average packet length is 144 octets, and it is assumed that packet length is exponentially distributed Line speed from the router to the wide area network is 9600 bps. The following question are asked.

(1) What is the mean residence time for the router? (2)

(2) How many packets are in the router, including those waiting for transmission and the one currently being transmitted for the 90^{th} percentile? (4)

(3) How many packets are in the router, including those waiting for transmission and the one currently being transmitted for the 95^{th} percentile? (4)

Or

(b) (i) Describe the techniques followed in the network layer to deal with congestion. (8)

(ii) Consider a LAN with 100 personal computers and a server that maintains a common database for a query application. The average time for the server to respond to a query is 0.6 seconds, and the standard deviation is estimated to equal the mean. At peak times, the query rate over the LAN reaches 20 queries per minute. We would like to answer the following questions.

(1) What is the average response time ignoring line overhead? (2)

(2) If a 1.5 second response time is considered the maximum acceptable, what percent growth in message load can occur before the maximum is reached? (3)

(3) If 20% more utilization is experienced, will response time increase by more or less than 20%? (3)

13. (a) (i) Explain the mechanisms followed by the early TCP specification to maintain the timer. (8)

(ii) Explain the refinements proposed by Karn Patridge and Jacobson/Karel to improve the basic timer management mechanism of TCP. (8)

Or

(b) (i) Explain the mechanisms followed by the early TCP specification to manage the window. (8)

(ii) Explain the refinements proposed by Nagle and Clark to avoid the silly window syndrome faced by the window management. (8)

14. (a) (i) Justify the need for Fair Queuing and explain the Weighted Fair Queuing scheduling discipline. (8)

(ii) Justify the need for the improvement in the basic drop tail mechanism and explain the Random Early Drop dropping policy. (8)

Or

(b) (i) Describe the various functional modules that must be present in a router of the Integrated Services Architecture. (10)

(ii) Discuss the limitations of the ISA framework. (6)

15. (a) (i) Discuss the labeling and label switched path of MPLS networks. (8)

(ii) Explain the stacking rules followed in the label switched path of MPLS networks. (8)

Or

(b) (i) Illustrate the different ways of placing the RTP in the TCP/IP reference model. (8)

(ii) Draw the RTP header and explain the various fields of RTP header in detail. (8)