E 8223

M.C.A. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2005.

Second Semester

CA 141 — COMPUTER COMMUNICATION AND NETWORKS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Mention any 2 functions of data link control.

2. What are the merit and demerit of manchester encoding technique?

3. A token ring (IEEE 802.5) has 4 stations and a total cable length of 200 m. The signal propagation speed in the cable is 2×10^5 *km*/sec and the data rate is 16 *Mbps*. How many bits of delay must be inserted into the ring by the monitor?

4. Consider a CSMA/CD network running at 1 Gbps over a 1 km cable without any repeater. Assume the signal propagation speed in the cable is 2×10^5 *km*/sec. What is the minimum frame size?

5. Why is circuit switching not suitable for data communication?

6. What is the draw back of flooding? How can it be overcome?

7. Assume that TCP operates over a 500 *Mbps* network. How long will it take for the TCP sequence number to wrap around completely?

8. How is UDP checksum calculated?

9. What are the 2 broad types of cryptography? How do they differ?

10. List the sequence of steps involved in SMTP connection setup.

PART B — ($5 \times 16 = 80$ marks)

11. (i) What are the steps involved in domain name resolution? (8)

(ii) Illustrate the steps performed by a web server (simple) upon receiving a client connection. How can the operation of the above server be made faster? (8)

12. (a) Derive an expression for the maximum efficiency of a half duplex point to point link using stop and wait flow control. Make necessary assumptions and state them clearly. What is the effect of the length of the link on the efficiency?

Or

(b) (i) What are the advantages of digital transmission? (10)

(ii) Draw the Manchester code for the bit pattern 10110110. (3)

(iii) Obtain an expression between modulation rate of an encoding technique and its data rate. (3)

13. (a) (i) Explain the problems involved in adopting CSMA/CD algorithm for wireless LANs. (8)

(ii) Compare and contrast the functions of data link layer and transport layer. (8)

Or

(b) (i) How long does a station connected to an ethernet LAN have to wait after a collision? (3)

(ii) Explain the algorithm involved in determining the waiting time. (7)

(iii) Consider a token ring network like FDDI in which a station is allowed to hold the token for a duration called THT (Token Holding Time). Let RL denote Ring Latency (ie) the time taken for the token to make one complete rotation around the ring when no station is active. Express the efficiency of the network, in terms of THT and RL, when only a single station is active. What setting of THT will be optimal in the case of a single active station? (6)

14. (a) (i) Compare the features of virtual circuit subnets and datagram subnets, with respect to various parameters. (10)

(ii) Differentiate between the operations of routing and forwarding. Explain any 2 desirable properties of routing algorithms. (6)

Or

(b) Suppose that a TCP message containing 2048 bytes of data and 20 bytes of TCP Header is passed to IP for delivery across 2 networks of the internet (ie. from the source host to a router to the destination host). The first network uses 14–byte headers and has an MTU of 1024 bytes. The second network uses 8–byte headers and has an MTU of 512 bytes. Each network's MTU gives the packet size that may be sent through the network, including the header. Find the sizes and offsets of the sequence of fragments delivered to the IP layer at the destination host. Assume that IP headers are of 20 byte size.

15. (a) Illustrate the transport layer connection establishment process, in the normal case and in the case of any one type of error.

Or

(b) Illustrate the sliding window flow control technique followed by TCP.
