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Question Paper Code : 21307

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 2013.

Fifth Semester

Computer Science and Engineering

CS 2302/CS 52/10144 CS 503 — COMPUTER NETWORKS

(Common to Information Technology)

(Common to PTCS 2302 – Computer Networks for B.E. (Part-Time) Fourth Semester CSE - Regulatuion 2009)

(Regulation 2008/2010)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Give the purpose of layering?
2. Mention the advantage and disadvantage of error correction by receiver, as compared to error detection.
3. How is the minimum size of an ethernet frame determined?
4. How does an FDDI node determine whether it can send asynchronous traffic and synchronous traffic?
5. Compare circuit switching and virtual circuit based packet switching, in respect of queueing and forwarding delays.
6. Differentiate between connection less operation and connection oriented operation.
7. Why is UDP pseudo header included in UDP checksum calculation? What is the effect of an invalid checksum at the receiving UDP?
8. How can the effect of jitter be compensated? What type of applications require this compensation?
9. What are the advantages of allowing persistent TCP connections in HTTP?
10. Is a cryptographic hash function, an irreversible mapping? Justify your answer.

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PART B — ($5 \times 16 = 80$ marks)

11. (a) (i) Discuss the framing technique used in HDLC. What is the effect of errors on this framing? (8)

(ii) The message 11001001 is to be transmitted, using CRC error detection algorithm. Assuming the CRC polynomial to be $x^3 + 1$, determine the message that should be transmitted. If the second left most bit is corrupted, show that it is detected by the receiver. (8)

Or

(b) (i) Discuss the principle of stop and wait flow control algorithm. Draw time line diagrams and explain how loss of a frame and loss of an ACK are handled. What is the effect of delay-bandwidth product on link utilisation? (8)

(ii) Assume that a frame consists of 6 characters encoded in 7-bit ASCII. Attach a parity bit for every character to maintain even parity. Also attach a similar parity bit for each bit position across each of the bytes in the frame. Show that such a 2-dimensional parity scheme can detect all 1-bit, 2-bit and 3-bit errors and can correct a single bit error. (8)

12. (a) (i) An IEEE 802.5 token ring has 5 stations and a total wire length of 230 m. How many bits of delay must the monitor insert into the ring? Calculate this for both 4 Mbps and 16 Mbps rings. The propagation speed may be assumed to be 2.3×10^8 m/s. (6)

(ii) Discuss the problems encountered in applying CSMA/CD algorithm to wireless LANs. How does 802.11 specification solve these problems. (10)

Or

(b) (i) Discuss the limitations of bridges. (6)

(ii) Determine the maximum distance between any pair of stations in a CSMA/CD network with a data rate of 10 Mbps, for the correct operation of collision detection process, assuming the minimum frame size to be 512 bits. What should be the maximum distance if the data rate is increased to 1 Gbps? 2 stations A and B, connected to the opposite ends of a 10-Mbps CSMA/CD network, start transmission of long frames at times $t_1 = 0$ and $t_2 = 3\mu s$ respectively. Determine the instants when A hears the collision and B hears the collision. Signal propagation speed may be assumed as 2×10^8 m/s. (10)

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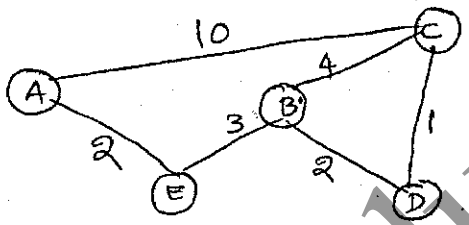
13. (a) (i) A 4480-byte datagram is to be transmitted through an ethernet with a maximum data size of 1500 bytes in frames. Show the values of Total Length, M Flag, identification and fragment offset fields in each of the fragments created out of the datagram. (10)

(ii) Discuss the principles of reliable flooding and its advantages and applications. (6)

Or

(b) (i) For the following network, develop the datagram forwarding table for all the nodes. The links are labelled with relative costs. The tables should forward each packet via the least cost path to destination. (10)



(ii) What is the need for ICMP? Mention any four ICMP messages and their purpose. (6)

14. (a) (i) Suppose TCP operates over a 1-Gbps link, utilising the full bandwidth continuously. How long will it take for the sequence numbers to wrap around completely? Suppose an added 32-bit timestamp field increments 1000 times during this wrap around time, how long will it take for the timestamp filed to wrap around? (8)

(ii) What is the need for Nagle's algorithm? How does it determine when to transmit data? (8)

Or

(b) (i) A TCP machine is sending full windows of 65,535 bytes over a 1-Gbps network that has a 10-ms one-way delay. What is the throughput achievable? What is the efficiency of transmission? How many bits are needed in the Advertised window field of a proposed reliable byte stream protocol (like TCP) running over the above network, for achieving maximum efficiency? (8)

(ii) Illustrate the features of TCP that can be used by the sender to insert record boundaries into the byte stream. Also mention their original purpose. (8)

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15. (a) Discuss the need for name resolution. Illustrate the domain name hierarchy and the steps in resolution.

Or

(b) (i) Illustrate the features of FTP and its operation. (8)

(ii) Illustrate the features of TELNET. What is the need for network virtual terminal? (8)

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