53 (CS 402) CPNT

2018

COMPUTER NETWORKS

Paper : CS 402

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Explain the layered architecture of OSI reference model. Briefly compare it with the TCP/IP model. 7+3=10

   (b) What is the role of topology in Computer Networking? Discuss the different network topologies with their merits and demerits. 2+8=10

2. *(a)* Suppose an 8-bit dataword transmitted is 11000010. Using the Hamming algorithm, determine what check bits would be sent with the dataword. Show that this method correctly detects and corrects a single bit error. 10

(b) Discuss any two types of transmission media taking one from each group (guided and unguided). 6

(c) A bit stream 10011101 is transmitted using standard CRC method. The generator polynomial is $x^3 + 1$. Find the actual bit stream transmitted. 4

3. (a) Suppose that the stop-and-wait protocol is used on a link with a bit rate of 64 kilobits per second and 20 milliseconds propagation delay. Assume that the transmission time for the acknowledgement and the processing time at nodes are negligible. What should be the minimum frame size in bytes to achieve a link utilization of at least 50% ? 6

(b) What are the demerits of pure ALOHA ? Explain how slotted ALOHA improves channel throughput. 2+7=9

(c) What is framing ? Explain *any one* method of framing with a suitable example. 1+4=5

4. (a) An organization is granted the block 16.0.0.0/8. The administrator wants to create 512 fixed length subnets.

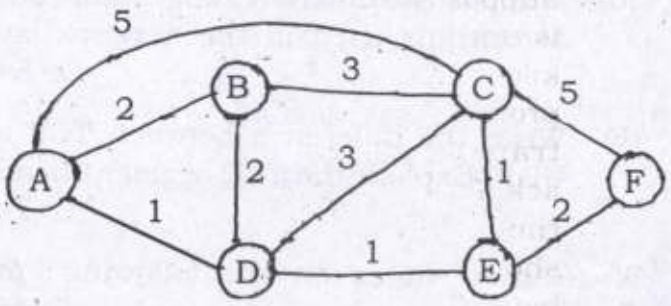
(i) Find the subnet mask

(ii) Find the number of addresses in each subnet

(iii) Find the first and last address in subnet 1

(iv) Find the first and last address in subnet 512. 10

(b) Consider the following topology :



Apply Link-state routing algorithm to find the shortest path tree and routing table for node A. 10

5. (a) A pure ALOHA network transmits 200-bit frames on a shared channel of 200*kbps*. What is the throughput if the system produces

(i) 1000 frames per second

(ii) 500 frames per second ?

6

(b) Explain the Go-Back-N protocol. What is its drawback? Discuss how the Selective Repeat Protocol overcomes it. 4+2+6=12

(c) What is the difference between HTTP and HTTPS? 2

6. (a) What do you mean by congestion? Discuss the different congestion control algorithms used in the network layer. 2+8=10

(b) Write the difference between TCP and UDP. Explain the TCP segment header. 3+7=10

7. Write short notes on the following: ***(any four)*** 5×4=20

(i) Three-way handshaking in TCP connection establishment

(ii) DNS

(iii) CSMA/CD

(iv) POP3 and IMAP

(v) SMTP

(vi) NAT.
