53 (IT 403) CPNW

2016

COMPUTER NETWORKS

Paper : IT 403 (Back)

Full Marks : 100

Time : Three hours

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

*Answer **any five** questions out of **eight**.*

1. *(a)* Which of the OSI layer handles each of the following functions ? Describe them briefly. 2+8

   (i) Framing

   (ii) Routing

   (b) Differentiate between Pure Aloha and Slotted Aloha. 4

   (c) What is the difference between physical address, logical address and port address ? Write with examples. 6

2. *(a)* What is a Subnet ? Explain in detail about need for subnet in a network. 2+4

(b) Define Hamming Code. Find out the code for the user data 1010110. 2+4

(c) Explain the Connection establishment, data transfer and connection termination processes in TCP connection with an example. 8

3. *(a)* A network transmits 200 *bit frame* on a Shared Channel of 200 *kbps*. For Aloha and Slotted Aloha, what is the

(i) requirement to make the frame collision free ?

(ii) throughput if the system produces 1000 *frames/sec* ? 6

(b) What is the difference between Repeaters, Gateways, Routers, Bridge and Hub ? 10

(c) Why bit stuffing is better than byte stuffing ? 4

4. *(a)* Explain phrase "TCP is a reliable transport layer protocol". 5

(b) Discuss IEEE 802.3 MAC frame format. Mention the restrictions imposed on minimum and maximum lengths of a 802.3 *frame*. 6+4

(c) Explain the principle of operation of CSMA/CD protocol in LAN. 5

5. (a) An organization is granted the block of address 130.34.12.64/26. The organization needs to have four subnets where the first subnet has 30 hosts, second subnet has 10 hosts and the third and fourth subnets needs only four addresses. Design the network and give the range of address in each of the subnets. 8

(b) What is Gigabit Ethernet ? Differentiate it with Fast Ethernet. 4+4

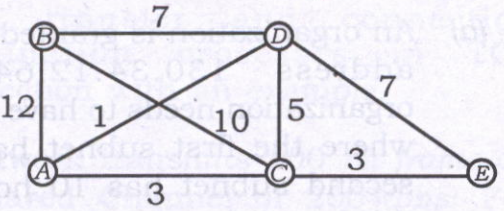
(c) How a NAT enabled ISP, can assign more address than actual addresses ? 4

6. (a) What do you mean by Count-to-infinity problem ? How it can be solved ? 5+3

(b) What do you mean by Congestion ? Describe the token bucket algorithm. What is the difference between token bucket and leaky bucket algorithm ? 2+5+5

7. *(a)* Explain IPv4 datagram header with explanation of each field. 7

(b) 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 computation at each step. 8



(c) Describe what are the main utilities of V-LAN. 5

8. *(a)* Discuss how Simple Mail Transfer Protocol (SMTP) works. Can multimedia messages be transmitted using SMTP ? 4+1

(b) Differentiate the following : ***(any three)*** 3×5

(i) Static and Dynamic routing

(ii) Connection-oriented and Connection-less Communication.

(iii) HTTP and HTTPS

(iv) IPv4 and IPv6

(v) Selective repeat ARQ and GO-back-N ARQ.