53 (IT 403) CPNW

2017

COMPUTER NETWORKS

Paper : IT 403

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)* State which layers of ISO OSI model the following device operates and explain their working principle   2+8

   (i) Switch

   (ii) Hub

   (b) Name different types of HDLC frames and give a brief description of each.

   6

   (c) What are the advantages of CDMA protocol over TDMA and FDMA protocol ?   4

Contd.

2. *(a)* Discuss the 802·3 MAC frame format. Discuss why restriction is imposed in minimum and maximum frame length.

6+4

(b) How CSMA/CD improves the performance of CSMA protocol ? Latest versions of Ethernet do not use CSMA/CD, why ? 4+2

(c) What is the purpose of ARP ? What is proxy ARP ? 2+2

3. *(a)* Differentiate between Go-Back-N and Selective-Repeat-ARQ protocols. Show the sequence number for 20 packets in which they are transmitted using Selective-Repeat ARQ, if packet 5 is damaged and acknowledgement for packet 12 is lost. Assume that the sliding window size is 7 and acknowledgement for every packet is sent. 4+6

(b) Frame bursting and carrier extensions are needed with Gigabit Ethernet when hubs are used. Why ? 4

(c) What is the limitation of TCP that SCTP's multi-stream feature intends to solve ? 6

4. (a) What is the advantage of traffic shaping? Explain the leaky bucket algorithm to congestion. Explain, how the drawbacks of this are overcome in a token bucket algorithm. 2+4+4

   (b) Describe the main utilities of V-LAN. 4

   (c) How NAT enabled ISP, can assign more address than actual addresses? 6

5. (a) What is a Count-to-infinity problems? How is it solved in Link State algorithm? 4+4

   (b) An organization has been assigned the prefix 212·1·1·0/24 and wants to form subnets for four departments, with as follows: 8+2

   A=75 hosts, B=35 hosts, C=20 hosts, D=18 hosts.

   There are 148 hosts in all.

   (i) Give a possible arrangement of subnet masks to make this possible.

   (ii) Suggest what the organization do if department D grows to 32 hosts.

(c) What is a DNS ? 2

6. *(a)* Discuss connection establishment and connection release in TCP. 8

(b) A window holds bytes 2001 to 6000. The next byte to sent is 3001. Draw a figure to show the situation of the window after the following two events

(i) An ACK segment with the acknowledgement number 3500 and window size advertisement is 4000 received.

(ii) A segment carrying 1500 bytes is sent.

3+3

(c) How many addresses are spanned by CIDR address 205·12·192·0/20 and what range they span ? 6

7. *(a)* What is the difference between static and dynamic routing ? Differentiate between Link state and Distance vector routing algorithm. 4+4

(b) For the network topology given below, use 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. 10

O=Router
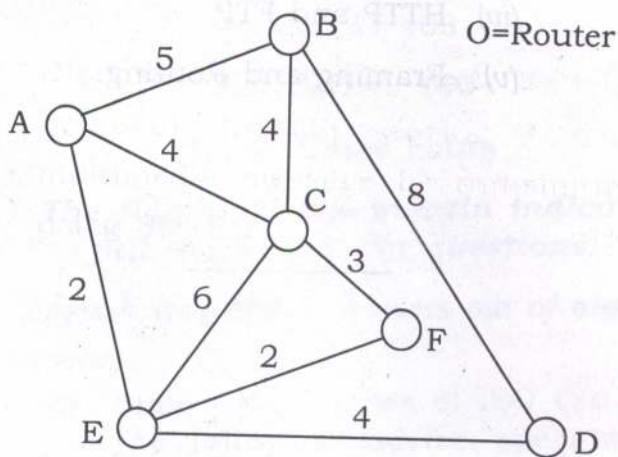
(c) What is DHCP ? 2

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

(b) Differentiate the following : *(any three)*

3×5

(i) IPv6 and IPv4

(ii) TCP and UDP

(iii) Flow Control and Error Control

(iv) HTTP and FTP

(v) Framing and Routing.

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