53 (IT 403) CPNW

2017

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)* State which layers of the ISO OSI model the following device operates. 5

   (i) Repeaters

   (ii) Bridges

   (iii) Routers

   (iv) Gateways

   (v) Hub.

   (b) What do you mean by multiple access communication ? What is the role of MAC layer protocols ? 3+4

(c) Explain principles of operation of CSMA/CD protocol used in LAN. 8

2. (a) Discuss all the fields of IEEE 802·3 MAC frame format in detail. 9

(b) An ALOHA network user 19·2*Kbps* channel for sending message packets of 100 *bit* long size. Calculate the maximum throughput for pure ALOHA network. 5

(c) What is the difference between Physical address, Logical address and Port address with examples. 6

3. (a) What are the different types of error detection methods? Generate CRC code for 11010011101100, where $G(x) = x^3 + x + 1$. 3+7

(b) Draw the sender and receiver windows for a system using go-back-n ARQ for the following scenario ($n = 4$)

Frame 0 is sent, frame 0 is acknowledged.

Frame 1 & 2 are sent, and acknowledged.

Frame 3 & 4 are sent, NAK 4 is received.

Frame 4, 5 & 6 are sent, and all are acknowledged. 8

(c) What is a Domain Name Service? 2

4. (a) A router has the following (CIDR) entries in its routing table : 6

Address/Mask	Next HOP
135.46.56.0/22	interface 0
135.46.60.0/22	interface 1
192.53.40.0/23	Router 1
Default	Router 2

For each of the following IP addresses, what does the router do if a packet with that address arrive?

(i) 135.46.63.10

(ii) 135.46.57.14

(iii) 135.46.52.2

(iv) 192.53.40.7

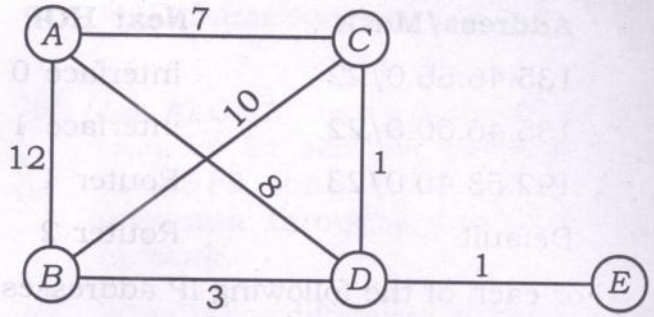
(v) 192.53.60.0

(vi) 192.53.56.7

(b) Differentiate between bridge and a repeater. 6

(c) What is NAT? What are the advantages of using NAT? 4+4

5. *(a)* What is the difference between static and dynamic routing? Given network topology below, use link-state algorithm to compute the route from node *A* to all the other nodes. 4+6



(b) Discuss how Simple Mail Transfer Protocol (SMTP) works. Can multimedia messages be transmitted using SMTP? 6

(c) What is the purpose of the Address Resolution Protocol (ARP)? 4

6. *(a)* What are the deficiencies of IPv4? How IPv6 was modified to overcome these deficiencies? What are the advantages of using IPv6? 3+3+4

(b) What do you understand by "three way handshake"? Explain TCP segment header. Differentiate between TCP and UDP protocols. 2+4+4

7. *(a)* What is the advantage of traffic shaping? Describe the token bucket algorithm. What is the difference between token bucket and leaky bucket algorithm? 2+4+4

(b) Define Hamming Code. Find out the code word for the user data 1010110. 2+5

(c) Define Piggybacking and its usefulness. 2+1

8. *(a)* A Stop-and-Wait protocol use 100*Kbps* link, which have round trip propagation delay 250*ms*. Find out the percentage of time the sender is blocked for acknowledgement, if the frame size is 100*bits*. 5

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

(i) Connection-oriented and connectionless

(ii) Selective repeat ARQ and Go-Back-N ARQ

(iii) HTTP and FTP

(iv) LAN and VLAN

(v) TDMA and FDMA.