BRAINWARE UNIVERSITY

Term End Examination 2024-2025
Programme – B.Tech.(CSE)-DS-2021/B.Tech.(CSE)-DS-2022
Course Name – Computer Networks
Course Code - PCC-CSD502
(Semester V)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A
(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Identify the term that defines a set of rules governing data communication.
   a) Protocols b) Standards
   c) RFCs d) Servers

(ii) Choose the type of connection where three or more devices share a link
   a) Unipoint b) Multipoint
   c) Point to point d) Simplex

(iii) Identify the device that forwards packets between networks by processing the routing information included in the packet.
   a) bridge b) firewall
   c) router d) hub

(iv) Find the method that temporarily delay ongoing acknowledgement frames eventually needed to be merged with next data frame while transmission.
   a) piggybacking b) cyclic redundancy check
   c) fletcher's checksum d) parity check

(v) Closed-Loop control mechanisms try to _____
   a) remove packets after congestion occurs b) remove packets after time-out time
   c) prevent congestion before it occurs d) prevent congestion before sending packets

(vi) Choose the appropriate error detection technique that uses a polynomial division method to generate a codeword.
   a) Hamming code b) CRC (Cyclic Redundancy Check)
   c) Block coding d) Parity bit

(vii) Identify the error control protocol that retransmits only corrupted or lost frames during transmission.

a) Stop-and-Wait ARQ
b) Go-Back-N ARQ
c) Selective Repeat ARQ
d) Sliding Window

(viii) Identify how Hamming code with parity bits can be used in error detection.

a) By counting the number of bits set to 1 in a data frame
b) By identifying the positions of flipped bits in a received frame
c) By generating a polynomial checksum for data frames
d) By using block coding to correct errors

(ix) Select the transport layer protocol if the value in protocol field is 17

a) TCP
b) UDP
c) ICMP
d) IGMP

(x) Select the size of an IP address in IPv6

a) 4 bytes
b) 128 bits
c) 8 bytes
d) 100 bits

(xi) You have an IP address of 172.16.13.5 with a 255.255.255.128 subnet mask. Select your class of address, subnet address, and broadcast address?

a) Class A, Subnet 172.16.13.0, Broadcast address 172.16.13.127
b) Class B, Subnet 172.16.13.0, Broadcast address 172.16.13.127
c) Class B, Subnet 172.16.13.0, Broadcast address 172.16.13.255
d) Class B, Subnet 172.16.0.0, Broadcast address 172.16.255.255

(xii) Trace the protocol that gives a full route table update every 30 seconds?

a) IEGRP
b) RIP
c) ICMP
d) IP

(xiii) Identify which of the following statement is false.

a) UDP is Connection-oriented
b) UDP is Unreliable
c) UDP is Transport layer protocol
d) UDP has Low overhead

(xiv) "Total length" field in UDP packet header is the length of _____

a) Only UDP header
b) Only data
c) Only checksum
d) UDP header plus data

(xv) Select the correct transmission medium used for wired LANs.

a) Coaxial cable
b) Infrared signals
c) Microwave
d) Bluetooth

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Calculate the CRC for the data 101110 using the divisor 100101. (3)
3. Define the OSI model and list its layers. (3)
4. Explain the Leaky Bucket algorithm in the context of Quality of Service (QoS) and how it helps in smoothing traffic flows within a network? (3)
5. Discuss the primary function of the Internet layer in the TCP/IP model. (3)
6. Compare and contrast the congestion control mechanisms used in TCP and SCTP, highlighting their advantages and limitations. (3)

OR

Evaluate the effectiveness of the Token Bucket algorithm versus the Leaky Bucket algorithm in managing network traffic for different types of applications. Include scenarios where one might be more suitable than the other. (3)

Group-C
(Long Answer Type Questions) 5 x 6=30

7. Describe the header format of IP with a diagram. (5)

8. Distinguish between circuit switching and packet switching (5)
9. Explain the working of DHCP with BOOTP protocol in dynamic address allocation. (5)
10. Establish a network with an IP address of 192.16.0.0 that is divided into two subnets, and calculate the number of hosts per subnet. Additionally, for the first subnet, determine the Subnet Address, First Host ID, Last Host ID, and Broadcast Address. (5)
11. Evaluate the role of firewalls in network security. Discuss the differences between packet-filtering, stateful, and application-layer firewalls, and provide examples of scenarios where each type is most effective. (5)
12. Describe the operations of outgoing and incoming protocols for email operations. (5)

OR

Compare and contrast SNMP (Simple Network Management Protocol) and HTTP (Hypertext Transfer Protocol) in terms of their applications and how they are used for managing network devices and services. (5)

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