

(Please write your Enrollment Number)

Enrollment No. 01704092023

**MID-TERM EXAMINATION**  
**(Course Name: MCA) (Semester: 2)**  
**(March, 2024) OFF LINE mode**

Subject Code: MCA 108	Subject: Data Communications and Computer Networks
-----------------------	--

Time : 1 ½ Hours

Maximum Marks : 30

Note: Q. 1 is compulsory.

Q1	(2.5*4)	
(a) How do Web servers operate, and what is their role in handling incoming requests? Additionally, explore the distinctions between Web Servers and Application Servers.		
(b) Why should the MAC address be unique in the LAN network? What is the reason to have both IP and MAC address?		
(c) A pure ALOHA network transmits 100-bit frames on a shared channel of 500 kbps. What is the requirement to make this channel collision free? Explain the non-persistent mechanism in CSMA.		
(d) Given a 4-bit dataword 1101, calculate the Hamming Code for C(7,4) code for error detection and correction. Provide the details of the calculation of parity bits at sender side and syndrome at receiver side.		
Q2	(5,5)	
(Attempt any Two Parts ) UNIT-1		
(a) Compare the TCP/IP protocol suite with the OSI Reference Model, emphasizing their similarities and differences. Suppose there are 4 interconnected switches, each having 6 ports. Calculate the total number of collision domains and indicate them on the diagram.		
(b) Compare and contrast packet-based switching and circuit-based switching, highlighting scenarios where each is more suitable. Suppose there is a network with 3 hubs, each having 8 ports, interconnected in a star topology. Calculate the total number of collision domains.		
(c) How do guided media differ from unguided media? Illustrate a network with 2 hubs, each having 2 ports, 4 Switches with 2 ports each, and 2 routers with 5 ports each interconnected in a Mesh topology. Calculate the total number of collision domains and broadcast domain and provide a visual representation.		
Q3	(5,5)	
(Attempt any Two Parts ) UNIT-2		
(a) What are Hamming Codes? Are Hamming Codes, Error Detecting or Error Correcting Codes? If the transmitted message is 110101 with a CRC generated using the polynomial 1011 and one bit is flipped during transmission, determine if the CRC check will catch the error.		
(b) Suppose a network with IP address 192.16.0.0 is divided into 2 subnets, find the number of hosts per subnet. Also, for the first subnet, find subnet address, First host ID, Last Host ID, and Broadcast address.		
(c) What is Random Access in Data Link Layer? Explain Pure ALOHA and SLOTTED ALOHA. A network using CSMA/CD has a bandwidth of 20 Mbps. If the maximum propagation time is 20 ms (including all the delays involved). What is the minimum size of the frame?		