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Reg. No. : | | | | | | | | | | | | |

Question Paper Code: U4403

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2023

Fourth Semester

Electronics and Communication Engineering

21UEC403- DATA COMMUNICATION AND NETWORKS

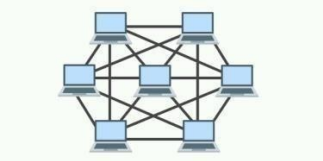
(Regulation 2021)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The number of cables/links required for the topology given below CO2-App



(a) 42 (b)21 (c)23 (d)25

2. A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit- string after stuffing is 01111100101, then the input bit-string is? CO1-U

(a) 0111110100 (b) 0111110101 (c) 0111111101 (d) 0111111111

3. Consider three machines M, N, and P with IP addresses 100.10.5.2, 100.10.5.5, and 100.10.5.6 respectively. The subnet mask is set to 255.255.255.252 for all the three machines. Which one of the following is true? CO1-U

(a) M, N, and P all belong to the same subnet

(b) Only M and N belong to the same subnet

(c) Only N and P belong to the same subnet

(d) M,N and P belong to three different segments

4. If the receiver window size is 12 MSS, then the SS_{thresh} will be CO2-App

(a) 5 MSS (b) 8 MSS (c) 6 MSS (d)12 MSS

5. What does an HTTP status code of "404" mean? CO1- U

(a) Document has moved (b) Successful document retrieval

(c) Protocol error (d) Document not found

PART – B (5 x 3= 15Marks)

6. Calculate the bandwidth of the light for the following wavelength ranges (assume a propagation speed of 2 x 10^8 m): 1000 to 1200 nm CO2-App

7. A slotted ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together) produces 250 frames per second? CO2-App

8. A host is sending 100 datagrams to another host. If the identification number of the first datagram is 1024, what is the identification number of the last (in IPV4)? CO2-App

9. Explain three way handshaking in TCP connection establishment. CO1-U

10. In symmetric-key cryptography, how do you think two persons can establish a secret key between themselves? CO1-U

PART – C (5 x 16= 80Marks)

11. (a) Discuss in detail about OSI model with neat sketch**.** CO1- U (16)

Or

(b) Discuss in detail about TCP/IP Protocol suite with neat diagram**.** CO1 -U (16)

12. (a) Analyze ARQ flow control mechanism and compare its link utilization with stop and wait protocol. CO3- Ana (16)

Or

(b) Analyze Sliding window flow control mechanism and compare its link utilization with stop and wait protocol. CO3- Ana (16)

13. (a) A router with IPv4 address 125.45.23.12 and Ethernet physical address 23:45:AB:4F:67:CD has received a packet for a host destination with IP address 125.11.78.10. Show the entries in the ARP request packet sent by the router and also ARP Packet sent in response. Assume no subnetting. CO3- Ana (16)

Or

	(b)	Show the autonomous system with the following specifications: There are eight networks (Nl to N8), eight routers (Rl to R8), Nl, N2, N3, N4, NS, and N6 are Ethernet LANs, N7 and N8 are point-to-point WANs, Rl connects Nl and N2, R2 connects Nl and N7, R3 connects N2 and N8, R4 connects N7 and N6, RS connects N6 and N3,R6 connects N6 and N4,R7 connects N6 and NS,R8 connects N8 and N5. Draw the graphical representation of the autonomous system as seen by Distance vector routing.	CO3- Ana	(16)
14.	(a)	Explain in detail about Transmission Control Protocol (TCP) segment format with a neat diagram.	CO1- U	(16)
		Or		
	(b)	Explain in detail about Congestion control techniques in transport layer.	CO1- U	(16)
15.	(a)	Assess the importance of Simple Network Management Protocol	CO5 -E	(16)
		Or		
	(b)	Interpret and assess how SMTP protocol is used in E-mail applications.	CO5 -E	(16)