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UPES
End Semester Examination, May 2023

Course: Data Communication and Computer Networks   **Semester: 2nd**
Program: M.Tech CSE   **Time: 03 hrs.**
Course Code: CSEG7004   **Max. Marks: 100**

Instructions: All Questions are compulsory. Please attempt the questions in a serial order.

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Define IEEE802.11e specific functionality.	4	CO1
Q2	Write difference between packet routing and forwarding.	4	CO2
Q3	Define router, switch, hub and repeater.	4	CO3
Q4	Why cloud CSMA-CA gives effective performance in WLAN?	4	CO4
Q5	Differentiate stateless and stateful application.	4	CO5

SECTION B
(4Qx10M= 40 Marks)

Q6	For the following ip addresses;
	    150.0.150.150
	    200.1.10.100
	    220.15.1.10
	    250.0.1.2
	    300.1.2.3
	Identify the Class, Network IP Address, Direct broadcast address and Limited broadcast address of each IP Address.
		10	CO1

Q7	Explain transport layer security with handshake mechanism. (Use suitable diagram)	10	CO5
Q8	If a user is sending data from source to destination through a router and router have three interfaces possible then during sending a data packet from sender to receiver via router how many times the packet will go through data link layer?	10	CO3
Q9	Explain classful and classless IP addressing with example. **OR** Describe network scanning and packet filtering process with specific tool.	5+5	CO4

SECTION-C			
(2Qx20M=40 Marks)			

Q10	(a) A user complains that their web application Times Out after successfully connecting to a remote host, yet, an investigation with ping indicates the remote host is alive.
	Propose a cause of this fault and outline a test-strategy that could be used automatically to detect such a fault.
	
	(b) A user would like to infer the path between two hosts; they suggest using the utility ping. Make your argument for why traceroute is the more appropriate utility, comparing and contrasting their operation.
	
	(c) Consider the test network below; Y and Z are two unix IPv4 hosts, while nodes A through E represent fully-conformant IPv4 routers providing the only connectivity between the two hosts. Per-packet load balancing by A and E means packets may be sent on any valid path. No firewalls or packet filtering is used anywhere in the network.
	   (i) Using traceroute infers the following paths:
	   (Y-A-B-C-E-Z), (Y-A-D-E-Z), (Y-A-B-D-E-Z), and (Y-A-B-E-E-Z)
	   Explain (with diagrams as appropriate) why these results have occurred and identify the two true and two false results;
	
	   (ii) A firmware upgrade for routers A and E means they now do per-flow and not per-packet load balancing. Despite the functions of the flow-based load balancing, traceroute results have not changed; two false paths are inferred along with two true paths.
	Explain this outcome and a strategy to identify only true paths.
		4+4+8+4=20	**CO3**

Q11	Local area network may carry several different LANs simultaneously; such a network would be designated for known sets of HomePlug devices. Describe a physical line coding approach for the HomePlug devices that: allows two or more simultaneous virtual local area networks to fairly share the same physical channel, but does not permit trivial interception of network traffic. Outline your approach along with its benefits and drawbacks, comparing it with the simplest use of VLAN tags in Ethernet. **OR** Design a stateful application for an online shopping, which should provide provisions for registering, authenticating the customer who uses online payment gateway system as paypal or paytm. (Consider client service architecture model)	**20**	**CO5**