UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, May 2022

Course: R&S Connecting Networks   Semester: VI
Program: BCA (Internet of Things)   Time   : 03 hrs.
Course Code: CSBC3007P   Max. Marks: 100
Instructions: Attempt all Questions

SECTION A
(5Qx4M=20Marks)

S. No.		Marks	CO
Q 1	Which of the following generator polynomial guarantees that a single bit error is caught? Explain your answer. • $x4$ • 1 • x+1	04	CO1
Q 2	An Ethernet host joins the multicast group 225.128.47.81. The arrival of a frame with what MAC address will cause the NIC to interrupt the CPU?	04	CO2
Q 3	A network on the Internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle?	04	CO3
Q 4	Illustrate the difference between flow control and congestion control? What are the reasons for which congestion may occur in a network?	04	CO4
Q 5	Demonstrate Cisco Enterprise Teleworker with the help of a suitable diagram.	04	CO1

SECTION B
(4Qx10M= 40 Marks)

Q 6	Demonstrate Diffie Hellman Key Exchange Approach for Data Security. In a Diffie-Hellman Key Exchange, Alice and Bob have chosen prime value q = 17 and primitive root = 5. If Alice's secret key is 4 and Bob's secret key is 6, what is the secret key they exchanged?	10	CO2
Q 7	Demonstrate PPP Authentication Protocol with suitable diagram. What is the maximum number of connections that can be multiplexed on a 1.544 Mbps T1 link with Frame Relay using the ANSI Frame Relay encapsulation standard?	10	CO3
Q 8	Discuss Tunneling and basic architecture of VPN in detail.	10	CO4
	OR		
Q 8	Demonstrate the functionality of NAT with suitable diagram. State 2 different problems associated with NAT.	10	CO4
Q 9	Consider a selective repeat sliding window protocol that uses a frame size of 1	10	CO1

	KB to send data on a 1.5 Mbps link with a one-way latency of 50 msec. To achieve a link utilization of 60%, the minimum number of bits required to represent the sequence number field is _____.		

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SECTION-C
(2Qx20M=40 Marks)

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Q 10	Consider a 30 station, 10 Mbps token passing bus system in which there are 15 active stations on average in any round of token passing. If the token is passed explicitly as a separate control packet with 10% size of the data frame, what are the channel utilizations and average token rotation time for the best and worst case of token passing? Consider the data frame to be 1500 bytes and the end-to-end propagation delay to be 10μs.	20	CO2
	OR		
Q 10	To understand the effect of window size on the performance of sliding window protocol, consider an error free channel of 1 Mbps with 20 msec propagation delay. The frame size is 256 bytes with negligible header. Acknowledgement frames can be ignored. Calculate the performance of sliding window protocol for window sizes varying from 1 to 32 in steps of 5 and plot them.	20	CO2
Q 11

Consider the scenario shown above. Host A is sending tiny packets to hosts B and C. R is a store-and-forward switch with an average arrival rate of 10Gb/s and a buffer that contains, on average, 8MBytes of packet data. Delays due to the packet size and packet-processing are negligible.

1. What is the average delay that packets will incur going through the switch?

2. Compute the latency of the shortest path between each pair of end-nodes: A to B, A to C, and C to B.

3. Without changing the network propose a solution to decrease the delay between A and B. | 20 | CO3 |