U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

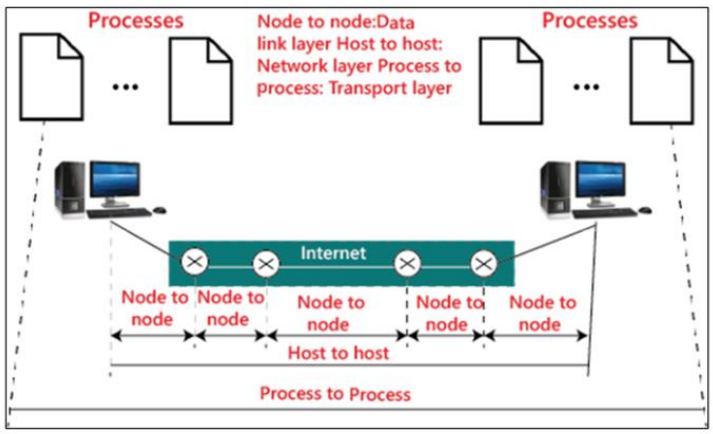
Autonomous Institute Affiliated to VTU

September / October 2024 Supplementary Examinations

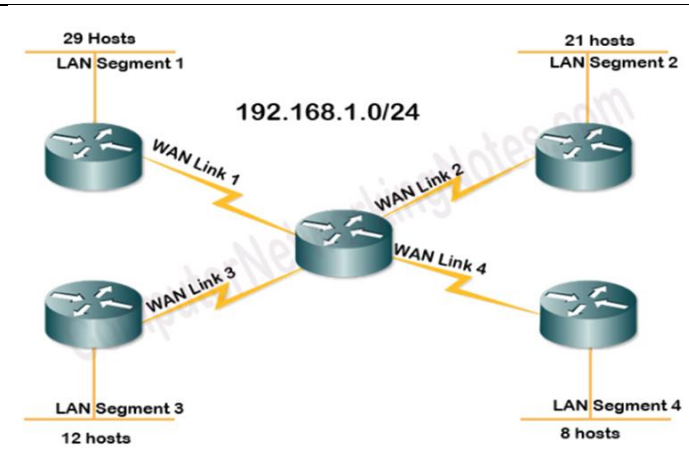
Programme: B.E. **Semester: V**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 22IS5PCCN1 **Max Marks: 100**
Course: Computer Networks-1

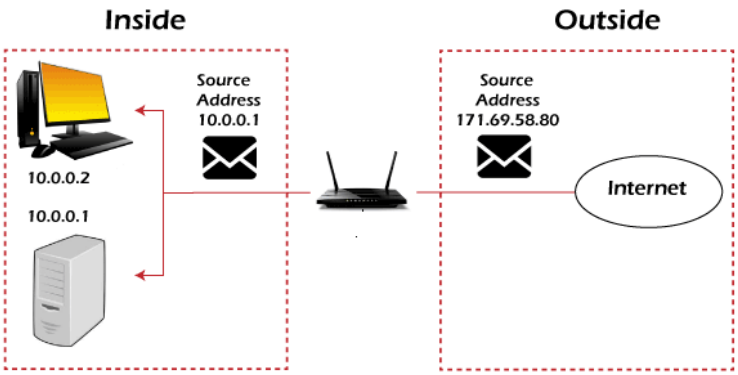
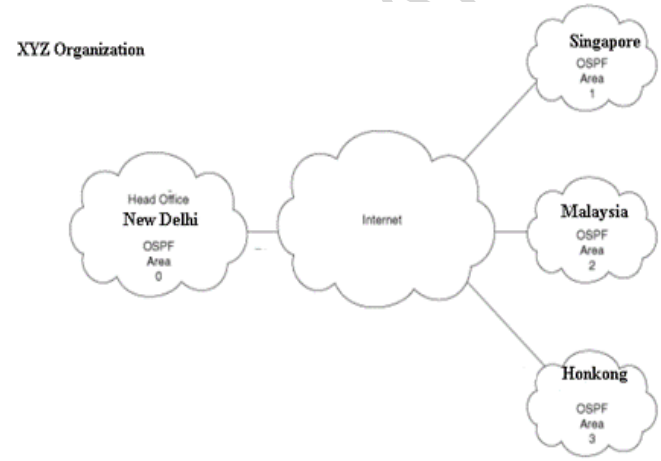
Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

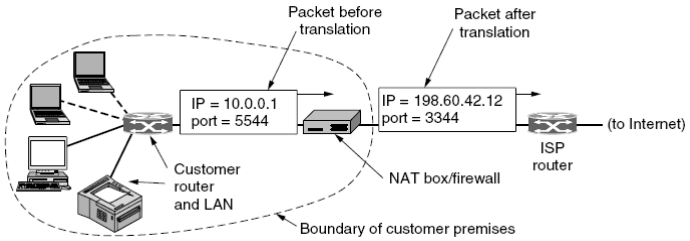
Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	 Identify the Layers at communication between 1.Node-to-Node 2.Host-to-Host 3.Process-to Process 4. Layer concerned with the actual protocols and services dealt with by end-users (ie HTTP, FTP, etc.) 5. Deals with Connectionless or Connection-Oriented Services.	CO2	PO1	**05**
	b)	For the bit stream 01001110, sketch the waveform for each of the following codecs:- Bipolar AMI, 2B1Q, Manchester, Differential Manchester, Assume that the signal level for the preceding bit was positive for 2B1Q, the most recent preceding bit (AMI) has a negative voltage;	CO2	PO1	**05**
	c)	Consider the requirements to encode the signal using a 4-bit PCM system. 1.Determine the quantization interval by observing the maximum and minimum voltage values -7V to +7 V 2.Build a table to show the levels and corresponding voltage values (Levels 0-15). 3.Determine the binary code for each PAM signal based on their levels.	CO3	PO2	**10**

			4.Based on the PCM coding table from step 2, determine the quantized value and PCM code for the following analog values: (a) 3.2 V (b) −1.8 V (c) 5.5 V (d) −2.7 V (e) 0.9 V Instructions: •You may assume that the analog signal varies between a minimum voltage of −7 V and a maximum voltage of 7 V •Show all calculations step by step. •Round off your answers to two decimal places where applicable.			
			UNIT - II			
	2	a)	Given 12-bit code word 0x7C1 message, determine bit error if any, and if so, correct it Assume right to left positioning.	*CO3*	*PO2*	**05**
		b)	Suppose we have a message m = 0101011010100001 to be transmitted across a network and to protect it from errors, we use the CRC generator polynomial $P(x) = x^7 + x^6 + x^2 + x$. Answer the following What is the binary form of CRC generator polynomial? What is the actual transmitted bit sequence including the CRC?	*CO2*	*PO1*	**10**
		c)	Station A needs to send a message consisting of 9 packets to Station B using a siding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no acks from B ever get lost), then what is the number of packets that A will transmit for sending the message to B?	*CO3*	*PO2*	**05**
			UNIT -III			
	3	a)	The 802.11 protocol can handle some hidden-terminal problems using the RTS-CTS mechanism. Explain the following: (a) Explain hidden-terminal problem? When and how does it occur? (b) How does the RTS-CTS mechanism help towards solving the hidden-terminal problem? (d) Explain with an example of four nodes how the RTS/CTS in the MACA protocol is a little different than the 802.11 protocol? (e) Identify the purpose of NAV?	*CO2*	*PO1*	**10**
		b)	A group of N stations shares a 56-kbps pure ALOHA channel. Each station outputs a 1000-bit frame on an average of once every 100 sec, even if the previous one has not yet been sent (e.g., the stations can buffer outgoing frames). What is the maximum value of N?	*CO2*	*PO1*	**05**
		c)	Give the steps to derive the throughput of slotted Aloha.	*CO2*	*PO1*	**05**
			UNIT - IV			
	4	a)	Consider sending a 3000 byte datagram into a link that has an MTU of 500 bytes. How many fragments are generated? What are	*CO2*	*PO1*	**10**

			their characteristics (i.e. what are the flags and offset values for each of the fragment)Assume 20 bytes of header in included in the datagram and MTU.			
		b)	A datagram of size 824 bytes has arrived in which the offset value is 100(decimal value). What is the number of the first byte and last byte? (Given HLEN=0110(binary value))	*CO3*	*PO2*	**05**
		c)	Suppose given an interface on a router with the IP address of 192.168.192.10/29. What is the broadcast address the hosts will use on this LAN?	*CO3*	*PO2*	**05**
			OR			
	5	a)	 Given the above network diagram with network id of 192.168.1.0/24 find the subnet id of all the four LAN segments considering the number of hosts as given in the figure above and also the four WAN links.	*CO3*	*PO2*	**10**
		b)	Consider an IP packet with a length of 4,500 bytes that includes a 20-byte IPv4 header. The packet is forwarded to an IPv4 router that supports a Maximum Transmission Unit (MTU) of 600 bytes. Assume that the length of the IP header in all the outgoing fragments of this packet is 20 bytes included. Assume that the fragmentation offset value stored in the first fragment is 0. Give the fragmentation offset value stored in the third fragment .	*CO3*	*PO2*	**05**
		c)	Router A at a University contains the following routing table *Prefix* | *NextHop* 10.210.30.0/28 | Interface0 10.1.120.0/21 | RouterC 192.168.74.0/24 | Interface1 172.16.243.0/27 | RouterB 192.168.74.192/28 | RouterD 10.1.125.32/27 | RouterE 0.0.0.0/0 | RouterZ For each of the following destination IP addresses, what does Router A do with the packet?	*CO3*	*PO2*	**05**

			(a) 10.1.123.74 (b) 192.168.74.195 (c) 10.210.30.17 (d) 192.168.74.200 (e) 10.1.125.28			
			UNIT - V			
	6	a)	 With reference to above figure explain 1.Suppose a Private network need to communicate with Public network give the steps to be followed in Natting. 2.Justify whether the static natting or Port address translation is more appropriate.	*CO2*	*PO1*	**05**
		b)	 An Organization named XYZ has a main office in New Delhi and satellite offices in Singapore and Malaysia. The Organization uses routing protocol OSPF. XYZ has a connection to the Internet from each site, over which it does all its business. The network administrator was advised to implement BGP to connect to the Internet. Figure below shows the network. i. With reference to above Figure justify is there a need for BGP for this network? Give reasons for your answer. ii. Under what scenarios BGP is recommended?	*CO2*	*PO1*	**10**

			iii. Can OSPF used to connect via internet to all the branch offices justify iv. Justify When we can propose an Autonomous system for an organization.			
		c)	 With reference to above figure explain the following 1. The Purpose of DHCP server 2. The Purpose of DHCP Agent.	*CO2*	*PO1*	**05**
			OR			
	7	a)	Compare the operation of NAT in with analogy a company with a single main telephone number. When people call the main number, they reach an operator who asks which extension they want and then puts them through to that extension 	*CO2*	*PO1*	**05**
		b)	Justify why is a Designated Router needed for OSPF? How does OSPF determine Designated Router and Backup Designated Router? Provide the five steps each router must do while adopting Link state routing by OSPF	*CO2*	*PO1*	**10**
		c)	Give the original form of the following abbreviated IPV6 address 1. 2001:1:2:3:4:5:6:7 2. 2041:0:140F::875B:131B 3. 0:AA::0 4. 123::1:2 5. 582F:1234::2222	*CO2*	*PO1*	**05**

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