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

Autonomous Institute Affiliated to VTU

September / October 2023 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Information Science and Engineering **Duration: 3 hrs.**
Course Code: 20IS5PCDCN **Max Marks: 100**
Course: COMPUTER NETWORKS - 1 **Date: 16.09.2023**

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

UNIT - I

1 a) Encode the bit-pattern 1010000101 using the following digital encoding schemes. **10**

i) NRZ-I; Need to assume previous state of signal as negative.
ii) Manchester; Need to assume previous state of signal as negative.
iii) AMI; Need to assume polarity of last pulse as negative.
iv) 2B1Q; Need to assume polarity of previous state of signal as positive.

b) A telephone line normally has a bandwith of 3000HZ (300 to 3300 Hz) assigned for data communication. The SNR is usually 3162. What will be the capacity for this channel? **05**

c) Compare OS1 and TCP/IP model. **05**

UNIT - II

2 a) Suppose we want to transmit the message 1011 0010 0100 10110000 and protect it from errors using the CRC Generator polynomial $x^8 + x^2 + x^1 + 1$. **10**
(i) Use polynomial long division to determine the message that should be transmitted.
(ii)Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred?

b) Assume that a 12-bit hamming codeword of 8 bit data and 4 check bits is $d_8d_7d_6d_5c_8d_4d_3d_2c_4d_1c_2c_1$, where the data bits and the check bits are given in the following tables. **10**

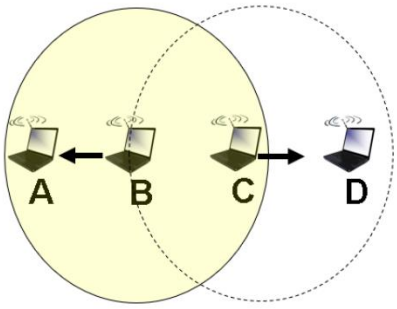
Data bits							
d_8	d_7	d_6	d_5	d_4	d_3	d_2	d_1
1	1	0	x	0	1	0	1

c_8	c_4	c_2	c_1
Y	0	1	0

Find the value of X and Y.

UNIT - III

3 a) **10**



With Reference to above figure

i. Explain the exposed terminal problem and its solution.
ii. Why do we use RTS/CTS for IEEE 802.11?
iii. Explain the procedure of communication between A to D.

b) Derive with neat figure the maximum efficiency achieved by slotted Aloha and pure aloha. **10**

UNIT - IV

4 a) An ISP is granted a block of addresses starting with 190.100.0.0/16 (65,536 addresses). The ISP needs to distribute these addresses to three groups of customers as follows: **10**

i. The first group has 64 customers; each needs 256 addresses.
ii. The second group has 128 customers; each needs 128 addresses.
iii. The third group has 128 customers; each needs 64 addresses.

Design the subblocks and find out how many addresses are still available after these allocations.

b) Consider the Class C IP address 195.1.1.0 Design a subnetwork having at least 2 subnets each subnet must accommodate with 48 hosts. Identify the two possible subnet masks, CIDR, network address for subneting? **05**

c) Consider sending a 3000 byte datagram into a link that has an MTU of 500 bytes. How many fragments are generated? What are their characteristics (i.e. what are the flags and offset values for each of the fragments). **05**

OR

5 a) An IP router with a Maximum Transmission Unit (MTU) of 200 bytes has received an IP packet of size 520 bytes with an IP header of length 20 bytes. Determine the total length of fragment, number of fragments, header length and flags. Assume identification bit as 4200x. **08**

b) Compare virtual circuit switching and datagram switching. **04**

c) An organization has a class C network 200.1.1.0/24 and wants to form a subnet for four departments where requirement is A – 72 hosts, B – 35 hosts, C – 20 hosts, D – 18 hosts. Calculate the subnet mark, CIDR, first IP address, last IP address network address, broadcast address for all the subnets. **08**

UNIT - V

6 a) Illustrate the Address resolution protocol with packet format **06**

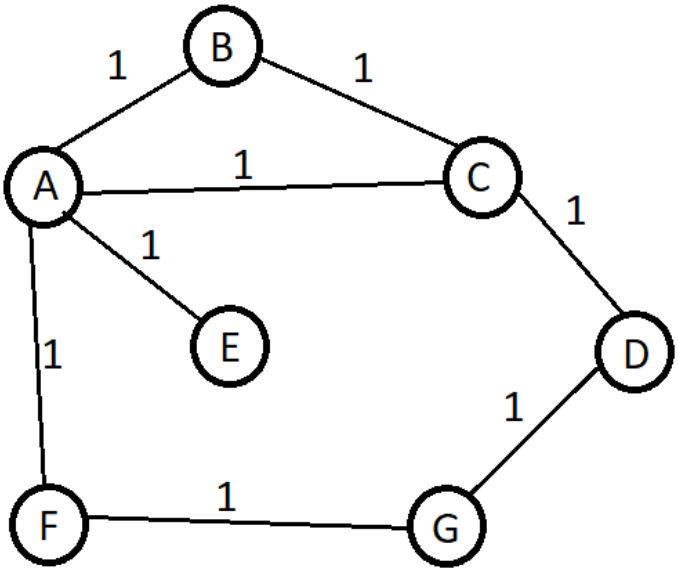
b) Compare IPV4 and IPV6 addressing schemes and identify the benefits of IPV6 addressing. **07**

c) A computer "X" in the organization is having the private IP 10.0.0.5/24 and the organization's global IP is 150.1.5.7 /24. Computer X wants to send the request to Google server. Illustrate how NAT takes place for this scenario. **07**

OR

7 a) List all the ICMP error message types and illustrate with neat diagram. **08**

b) Consider the figure given below. Update distance vector routing table details for each node and find the least cost to reach from A to G node. **06**



c) Compare between Routing Information Protocol (RIP) and Open Shortest Path First (OSPF) Protocol **06**

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