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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: Computer Science And Engineering **Duration: 3 hrs.**
Course Code: 20CS5PCCON **Max Marks: 100**
Course: Computer Networks **Date: 15.09.2023**

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) Explain the functionalities of Transport layer and Application layer **6**

b) Explain the process of Interleaving in TDM. **6**

c) Draw the graph of the Manchester scheme using each of the following data streams, assuming that the last signa11evel has been positive. Explain. **8**

i) 00000000
ii) 11111111
iii) 01010101
iv) 00110011

UNIT - II

2 a) A sender needs to send the four data items Ox3456, OxABCC, Ox02BC, and OxEEEE. Give explanation for each case. Answer the following: **10**
i) Find the checksum at the sender site.
ii) Find the checksum at the receiver site if there is no error.
iii) Find the checksum at the receiver site if the second data item is changed to OxABCE.
iv) Find the checksum at the receiver site if the second data item is changed to OxABCE and the third data item is changed to Ox02BA.
v) Does Internet checksum detects error in case d? If not justify your answer.

b) Draw the flow diagram of CSMA/CA. Explain hidden and Exposed station problem. **10**

OR

3 a) Compare byte stuffing with bit stuffing **5**

b) List out different persistent methods and illustrate their behaviors with a neat diagram **9**

c) Given the dataword 1010011110 and the divisor 10111, use polynomials **6**

i) Show the generation of the codeword at the sender site.
ii) Show the checking of the codeword at the receiver site

UNIT - III

4 a) Consider sending a 3400-byte datagram into a link that has an MTU of 700 bytes. Suppose the original datagram is stamped with the identification number 510. How many fragments are generated? What are the values in the various fields in the IP datagram(s) generated related to fragmentation? **6**

b) A classless address is given as 167.199.170.82/27. **6**

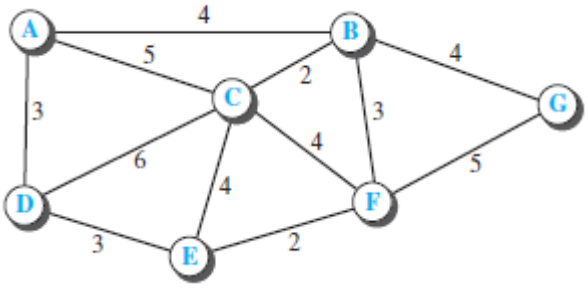
i) Find the number of addresses in the block
ii) Find the first address
iii) Find the last address

c) Illustrate the operation of DHCP **8**

OR

5 a) Illustrate the different strategies for transition from IPV4 to IPV6 with a neat diagram. **12**

b) Use Dijkstra's algorithm to find the shortest path tree and the forwarding table for node B in the Figure **8**



UNIT - IV

6 a) In a network using the Go-Back-N protocol with m = 3. Calculate the window size. The values of variables are $S_f = 74$, $S_n = 78$, and $R_n = 76$. **10**
Assume that the network does not duplicate or reorder the packets.
i) What are the sequence numbers of data packets in transit? Explain
ii) What are the acknowledgment numbers of ACK packets in transit? Explain
iii) Draw a diagram depicting the above scenario.

b) In TCP, assume a client has 100 bytes to send. The client creates 10 bytes at a time in each 10 ms and delivers them to the transport layer. The server acknowledges each segment immediately or if a timer times out at 50 ms. **10**

i) Show the segments and the bytes each segment carries if the implementation uses Nagle's algorithm with maximum segment size (MSS) of 30 bytes. The round-trip time is 20 ms, but the sender timer is set to 100 ms. Does any segment carry the maximum segment size? Is Nagler's algorithm really effective here? Why?

ii) Also let the server transport layer acknowledge a segment when there is a previous segment that has not been acknowledged (every other segment) or a timer times out after 60 ms. Show the time line for this scenario.

UNIT - V

7 a) In SMTP, **6**

i) a non-ASCII message of 1000 bytes is encoded using base64. How many bytes are in the encoded message? How many bytes are redundant? What is the ratio of redundant bytes to the total message?

ii) a message of 1000 bytes is encoded using quoted-printable. The message consists of 90 percent ASCII and 10 percent non-ASCII characters. How many bytes are in the encoded message? How many bytes are redundant? What is the ratio of redundant bytes to the total message?

iii) Compare the results of the two previous cases. How much is the efficiency improved if the message is a combination of ASCII and non-ASCII characters?

b) Differentiate between Recursive Resolution and Iterative Resolution with a neat diagram **8**

c) Explain the need for two port numbers in FTP Protocol and role of NVT in FTP **6**

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