DEPARTMENT OF INFORMATION TECHNOLOGY, NITK SURATHKAL

MID-SEMESTER EXAMINATION, NOVEMBER 2022

IT200 COMPUTER COMMUNICATION AND NETWORKING

Class: III SEM BTECH **Time: 1 ½ Hrs.**

Date: 28/11/22 **Marks: 50**

Register No.

2	1	1	0	0	9	3	

NOTE: 1. Answer all questions

2. Write necessary diagrams

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1. Describe the functions of each layer in the TCP/IP model. Consider 10 nodes that need to be connected for communication in a lab. Design any two typologies possible to connect these 10 nodes. Compare the topology with respect to its advantages and disadvantages. ?

[5+2+1= 08 marks]

2. Describe the role of DNS systems in the Internet. Explain the features of HTTP and Email Applications. **[4+2+2= 08 Marks]**

3. Consider a transmission link where the data needs to be sent as an analog signal. Show the various possible encoding techniques for sending following digital data over the given transmission link.

Data: 1 1 1 0 1 0 0 1 **[6 Marks]**

4. Consider that the 8-QAM uses 2 amplitude and 4 phase values for encoding. Consider that the bandwidth is 4000Hz. Calculate the following:
   - i. Write the constellation diagram for 8-QAM.
   - ii. What is the baud rate?
   - iii. Assuming the channel as a noiseless channel, what is the maximum bit rate possible?
   - iv. Assuming that the signal to noise ratio in the link is 3182, what is the maximum bit rate possible?

[2+1+2+2=7 Marks]

5. Consider that a server needs to send an image of 20MB to a client system. Consider that a point to point link is being set up between server and client and as two systems are in different networks a router is connected between server and client. Assume the distance between server to router is 2 km and Router to client is 3km. Bandwidth of the link is 5Mbps. The router needs 50 microseconds of processing time after receiving the packet. Calculate the total latency for this communication. (Speed of light = 2 x 10^8 m/s)

[7 Marks]

6. Consider the following data bits and encode using RZ, Differential Manchester and NRZ-I line coding techniques:
Data bits: 0 1 1 1 0 0 1 0 **[2+2+2=6 Marks]**

7. Consider that a network protocol uses Stop and Wait ARQ at the data link layer for flow control. Describe the protocol along with sequence diagram for following scenarios:
   1. When ACK is lost
   2. When Frame 1 is lost **[4+4=8 Marks]**

----Best Wishes-----