## 4TH SEM./AE&IE/AI & ML/CS&E./ ETC & COMM. / E&TC/IT./ MEACHTRONICS ./ 2024(S)
### Th-2    Data Communication and Computer Network

**Full Marks: 80**                                                      **Time- 3 Hrs**

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.  Answer **All** questions                                            2 x 10
    a.  Why we need protocol in data communication.
    b.  What are the responsibilities of network layer?
    c.  Name different techniques used for Digital to Analog Conversion
    d.  Define jitter.
    e.  Define piggy backing.
    f.  Define congestion.
    g.  Mention the function of go-back N-ARQ.
    h.  Define transmission impairments.
    i.  How many cables required if we are connecting 30 nodes in a mesh topology
    j.  Define gateway.

2.  Answer **Any Six** Questions                                        6 x 5
    a.  Write down the difference between asynchronous and synchronous transmission
    b.  Discuss about different transmission mode.

    c.  Discuss about packet switching method.
    d.  Discuss about any two networking device.
    e.  Discuss about different types of TDM.
    f.  Explain Nyquist theorm for channel capacity. Consider a noiseless channel with a bandwidth of 4000 Hz with four signal levels (for each level, we send 2 bits). Calculate the maximum bit rate.

    g.  Define error and its type. Discuss about checksum error detection method with example.

3.  Illustrate Unipolar NRZ, NRZ-L, NRZ-I with example                  10
4.  Explain briefly about star ring and bus topology used in computer network with their advantages and disadvantages.                          10
5.  Discuss about OSI model and compare it with TCP/IP model.           10
6.  Discuss about different guided transmission medium used in data transmission.                                                         10
7.  Write short notes (any two)                                         10
    i.    Fibre channel.
    ii.   Stop and wait protocol.
    iii.  Ethernet.
    iv.   IPV6.

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Answer any five Questions including Q No.1& 2

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1.      Answer All questions                                                      2 x 10
   a.   Classify different types of Computer Networks.
   b.   In which layer of OSI Model data can be transmitted from source to destination in the form of Frames?
   c.   Compare between Star topology and Ring topology.(any two)
   d.   Write down the various causes of transmission impairments.
   e.   Differentiate between bit rate & baud rate.(any two)
   f.   Write down the formula of Shannon capacity.
   g.   Define amplitude shift key technique used for Digital to Analog conversion.
   h.   Define checksum error detection scheme. Give an example.
   i.   Write down the various types of networking devices used in computer networking.
   j.   How many bits are used in IPv6 address?

2.      Answer Any Six Questions                                                 6 x 5
   a.   What do you mean by modes of data transmission? Discuss various data transmission mode
   b.   Differentiate between Guided Media and Unguided Media with example.(any five)
   c.   Define data encoding. Summarise the various mechanism that are used to convert digital data into digital signal.
   d.   Compare circuit switching and packet switching network.(any five)

   e.   Define piggybacking. Explain the working principle of piggybacking with an example.
   f.   Explain Synchronous and Asynchronous mode of data transmission.
   g    Describe Manchester encoding technique.

3       Elaborate the layers of TCP/IP Model with a neat diagram and also mention the role of various protocols in this Model.                                10

4       Define Topology. Briefly explain about different types of Topologies in Computer Network.                                                          10

5       Define Flow Control. Describe about the techniques used in flow control.      10

6       Explain the Principles of Internetworking. Briefly Explain about IPv6 with a neat diagram.                                                        10

7       Write the short notes on                                                  5
        i.     Stop-and-wait protocol                                             5
        ii.    X.25

Full Marks: 80                                                    Time- 3 Hrs

Answer any five Questions including Q No.1& 2
Figures in the right hand margin indicates marks

1.      **Answer All  questions**                                 2 x 10
   a.   What do you mean by subnet mask?
   b.   Differentiate between physical address and logical address of a node in a network.
   c.   Compare between star and ring topology.
   d.   What is the role of protocol in networking?
   e.   Write the functional difference between STP and UTP cable.

   f.   What do you mean by line and block coding?
   g.   Explain Nyquist theorm for channel capacity.

   h.   Write the need of multiplexing in a communication channel.

   i.   Distinguish between bit rate and baud rate.
   j.   Give two examples of half duplex and full duplex mode of communications.

2.      **Answer Any Six Questions**                             6 x 5
   a.   Illustrate different services provided by application layer in OSI model.
   b.   Describe the TCP/IP layering model.
   c.   List the difference between FDMA, TDMA and CDMA channelization techniques.

   d.   What are the transmission impairments in communication medium?

   e.   Classify synchronous and asynchronous mode of communication?

   f.   List the functions of switch, bridge and gateway.
   g    Explain the working principle of CSMA/CD.
3       Discuss different types of physical topologies in the network with      10
        diagram.

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4       Describe different protocols work in each layer of OSI model             10

5       Explain different transmission medium used in data communication.        10

6       Illustrate NRZ and RZ coding techniques with examples.                   10

7       Write Short notes on (ANY TWO)                                           2X5
        a) Bluetooth
        b)WLAN
        c) Parity bit
        d) Frame Relay