

**B.E PRINTING ENGG EXAMINATION**

**4<sup>TH</sup> YEAR, 2<sup>ND</sup> SEMESTER EXAM, 2019**

**DATA COMMUNICATION & NETWORKING**

**Time : 3 hours**

**Full Marks: 100**

**Answer one question from each group**

**Group- I(Total Marks: 10)[CO1]**

1. a. What is data communication?  
b. What are the components of data communication system?  
c. What types of connections occur between two or more devices?

[2+5+3=10]

**Or,**

2. a. What are different modes of data communication between two devices?  
b. What are the fundamental characteristics of data communication system?

[5+5=10]

**Group- II(Total Marks: 30)[CO1 and C(2)]**

3. a. Discuss any two network topologies.  
b. Compare the OSI model with TCP/IP model.  
c. What is periodic signal?  
d. A periodic signal has a bandwidth of 30 Hz. The highest frequency is 60 Hz. What is the lowest frequency?  
e. A digital signal has sixteen levels. How many bits are required per level?  
f. Consider a noiseless channel with a bandwidth of 5000Hz transmitting a signal with two signal levels. Calculate the maximum bit rate.  
g. Write short note on PCM.

[6+6+2+3+3+5+5=30]

**Or,**

4. a. What are the bottlenecks of ring topology?  
b. What are the functionalities of physical layer?  
c. A network with bandwidth of 10Mbps can pass only an average of 6000 frames per minute with each frame carrying an average of 5000bits. What is the throughput of this network?  
d. A telephone line has a bandwidth of 3000Hz assigned for data communication. The signal to noise ratio is 3162. Calculate the capacity of this channel.  
e. A signal travels through an amplifier and its power is increased 10 times. Calculate the power gain in dB.  
f. Draw the digital to digital conversion for data (11001011) for the following schemes
  - I. RZ
  - II. NRZ-I
  - III. NRZ-L
  - IV. Manchester
  - V. Differential Manchester

[2+4+5+5+4+(2×5)=30]

**Group- III(Total Marks: 20)[CO3]**

5. a. The dataword is given as 10110101001 and the divisor is 10101. Show what data will be transmitted from the sender site and show the checking of the codeword at the receiver site assuming no error occurs.  
b. What should be the appropriate window size for Selective Repeat ARQ? Explain.

[10+10=20]

Or,

6. a. What is framing?  
b. What is bit stuffing?  
c. What is piggybacking?  
d. What are the limitations of Stop and Wait ARQ?  
e. Illustrate with example how Go-back-N ARQ works.

[3+2+2+3+10=20]

**Group- IV(Total Marks: 10)[CO4]**

7. a. Briefly explain different persistence methods.  
b. What is the minimum frame size for CSMA/CD to work?  
c. Compare FDMA and TDMA.

[6+2+2=10]

Or,

8. Explain with flow diagram how CSMA/CD works.

[10]

**Group- V(Total Marks: 30)[CO5]**

9. a. What is logical addressing?  
b. Briefly describe classful addressing.  
c. In a block of addresses, one host is 54.32.13.8/16. What are the first address and last address in this block?  
d. An organization is given the block 91.14.6.0/24. The organization wants to divide these addresses into four subblocks of 128, 64, 32 and 32. Find the new masks for each of the subblocks.  
e. Distinguish between static and dynamic address mapping.  
f. Write short note on ICMP error reporting messages.  
g. Briefly explain how TCP works?

[3+5+4+6+2+5+5=30]

Or,

10. a. Find the class of the following IP address.  
193.27.109.20  
b. What is mask?  
c. Why IP is called best effort delivery protocol?  
d. Draw IPv4 datagram format and oriefly illustrate any three fields of IPv4 datagram.  
e. How logical address is mapped to physical address using protocol?  
f. Write short note on ICMP query messages.  
g. What is port address?  
h. What does the value of acknowledgement field in a segment contain in case of communication in TCP?

[1+2+2+10+5+5+2+3=30]

**Course Outcomes:**

**CO1: Discuss the fundamentals of computer network.**

**CO2: Describe and illustrate the various network topologies and the functionalities of the physical layer.**

**CO3: Explain and analyze the data link layer protocols.**

**CO4: Discuss and describe the media access control protocols.**

**CO5: Demonstrate and analyze different routing protocols and network protocols.**