

Bharati Vidyapeeth's
Institute of Computer Applications and Management (BVICAM)
A-4, Paschim Vihar, New Delhi-63

THIRD SEMESTER [MCA] Internal Examination, November 2023

Paper Code: MCA-103

Subject: Computer Networks

Time: 2 Hours

Maximum Marks: 45

Note: Attempt THREE questions in all. Question No. 1 is compulsory, and attempt one question from each unit.

1. Answer all the following questions briefly: - 1.5 × 10 = 15
- (a) With neat sketch, explain twisted pair cable. CO1
 - (b) Distinguish between data rate and signal rate CO1
 - (c) Illustrate the topology used for Bluetooth wireless technology. CO2
 - (d) Identify the category of network used in our college. List other categories of network. CO1
 - (e) Calculate the required bit rate, assuming 8 bits per sample, for digitizing the human voice. CO2
 - (f) In the Hamming code, for a data unit of 11 bits, identify and compute the number of redundant bits needed. CO2
 - (g) Enlist the transmission impairment techniques with their one-line definition. CO1
 - (h) Discuss the various type of satellites available in the orbit. CO1
 - (i) Explain the concept of even parity for the sending data 10110 at sender side & receiver side. CO2
 - (j) Distinguish between stop-and- wait and stop-and-wait ARQ error control mechanism. CO2

UNIT - I

2. (a) Construct NRZ-I, NRZ-L encoding of the digital data: 00110101000111. 5 CO2
- (b) Explain TCP/IP model in detail. 5 CO1
- (c) Suppose you want to set up a network in your area and you require high speed transmission, long distance transmission, higher bandwidth and low interference. Identify the guided transmission media you will prefer in this case. Discuss it with illustration and advantages over other guided medias. 5 CO1
3. (a) Discuss the various techniques used for converting analog signal to digital signal. 5 CO2
- (b) Five channels, each with a 100-KHz bandwidth, are to be multiplexed together. Determine the minimum bandwidth of the link if there is a need for a guard band of 10KHz between the channels to prevent interference? Also, differentiate between time division multiplexing and frequency division multiplexing. 5 CO1

- (c) Explain the line encoding techniques. Given the digital data: 00110101000111, 5 CO1 illustrate the Unipolar and Bipolar encoding.

UNIT - II

4. (a) Discuss and elaborate an appropriate technology which senses the medium and avoid collision, but also respond correctly if a collision does happen. 5 CO2
- (b) Describe Go-Back-N ARQ error control mechanism. Discuss the widow size at sender size and properly illustrate it. 5 CO2
- (c) Identify and explain the switched network that need end-to-end addressing during setup and teardown phases and no address is needed during data transfer phase. Compare message-switched network with packet-switched network. 5 CO2
5. (a) Suppose you want to transmit a message 11001001, protect it from error using CRC polynomial x^3+1 . Use the polynomial long division to determine the message that should be transmitted. Corrupt the left most third bit of the transmitted message and show that the error is detected by the receiver using CRC technique. 5 CO2
- (b) Suppose you are designing an ethernet frame with payload length of 48 bytes and destination address is 1A:2B:3C:4C:5E:6E. Identify the type of address (unicast, multicast or broadcast) and maximum frame length with proper illustration of each field size in ethernet frame. 5 CO2
- (c) Judge the pure aloha and slotted aloha random access protocols based on the following parameters: transmission technique, Vulnerable time, throughput and efficiency. A pure aloha network transmits 200-bit frames on a shared channel of 200kbps. Determine the requirement to make this frame collision free. 5 CO2