

Roll No.

B.Sc. (Hons.) SEMESTER VI EXAMINATION 2022-23

COMPUTER SCIENCE

CS - 109 : Data Communication

Time : Three hours

Max. Marks : 70

(WRITE YOUR ROLL NO. AT THE TOP IMMEDIATELY ON THE RECEIPT OF THIS QUESTION PAPER)

NOTE : ANSWER ANY FIVE QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

- 1) Write a short note on any four out of six techniques/protocols: 3.5x4=14
 - a) *Amplitude Modulation (AM)*
 - b) *Frequency-Division Multiplexing (FDM)*
 - c) *Delta Modulation (DM)*
 - d) *Cyclic Redundancy Check (CRC)*
 - e) *High Level Data Link Control (HDLC)*
 - f) *Direct Sequence Spread Spectrum (DSSS)*
- 2)
 - a) What is *wireless (unguided) transmission media*? What are the three major types of *wireless transmission media*, describe each in detail. 6
 - b) What are *circuit-switched* and *packet-switched* networks? Discuss differences among them. 8
- 3)
 - a) What is the result of scrambling the sequence 11100000000000 using one of the following scrambling techniques? Assume that the last non-zero signal level has been positive. 6
 - (i) *B8ZS*
 - (ii) *HDB3* (The number of nonzero pulses is odd after the last substitution)
 - b) What is the purpose of *Pulse Code Modulation (PCM)* technique? Describe the components of a PCM encoder with an example. 8
- 4)
 - a) Describe the following mechanisms for modulating digital data into an analog signal with examples: *Amplitude shift keying (ASK)*, *Frequency shift keying (FSK)*, *Phase shift keying (PSK)*, and *Quadrature amplitude modulation (QAM)*. 6
 - b) Station A needs to send a message consisting of 9 packets to Station B using a *sliding window* (window size 3) and *go-back-n* error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that A transmits gets lost (but no *acks* from B ever get

lost), then what is the total number of packets that *A* will transmit for sending the message to *B*? Explain through diagram.

8

5)

- a) Discuss *Frequency Hopping Spread Spectrum* (FHSS) with a suitable diagram. 6
- b) A sender needs to send the four data items given in hexadecimal: 3456, ABCC, 02BC, and EEEE.

Answer the following questions:

8

- i. Calculate the *checksum* at the sender site.
- ii. Calculate the *checksum* at the receiver site if the second data item is changed to ABCE.
- iii. Find the *checksum* at the receiver site if the second data item is changed to ABCE and the third data item is changed to 02BA.

6)

- a) What is *data link control*? Describe the key components of *data link control*. 6
- b) Why we need flow and error control? Discuss the *stop-and-wait* flow control technique with an example. 8

*****END*****