No. of Printed Pages : 4 **MCS–042**

MASTER OF COMPUTER APPLICATIONS (REVISED) (MCA)

Term-End Examination

December, 2025

MCS-042 : DATA COMMUNICATION AND COMPUTER NETWORKS

Time : 3 Hours *Maximum Marks : 100*

Note : *Question No.* ***1*** *is compulsory. Attempt any* ***three*** *questions from the rest.*

1. (a) Explain the advantages and disadvantages of using a LAN in a corporate setting. 5

(b) Explain the characteristics of Broad Band Coaxial Cable. Give *one* application, where it is used. 5

(c) A sender has to transmit the message 1011 using $G(x) = x^3 + x + 1$. What is the codeword that should be transmitted ? If the receiver receives the codeword 1011000, did any error occur during transmission ? 5

(d) Enlist different sublayers of data link layer and explain their services. 5

(e) What are the common types of line encoding ? Briefly describe. 5

(f) Define point-to-point network and discuss *two* topologies for point-to-point subnet. 5

(g) Describe the categories of security threats. Define integrity and non-repudiation. 5

(h) Explain Delta Modulation Technique with the help of a diagram. 5

2. (a) Explain Sliding Window Protocol with the help of an appropriate diagram. 10

   (b) Draw TCP/IP model layers. Explain functions, protocols and services of each layer. 10

3. (a) Discuss the mathematical principles behind the RSA algorithm. Explain how these principles contribute to the security of the RSA algorithm. 10

   (b) Draw the TCP header format and describe the purpose of any *four* fields of this format. 10

4. (a) Explain the concept of IP addressing. Write the difference between IPv4 and IPv6. Why is this transition required ? 10

   (b) Differentiate between Manchester and differential Manchester encoding technique. Give *two* applications for both encoding techniques. 10

5. (a) Describe the different types of transmission media, their characteristics, advantages and disadvantages. Also give *one* real world example, where each type of transmission media is effectively used. 10

(b) Explain the concept of Subnetting and its importance. How does it improve network performance and security ? 10

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