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MCS–042

MASTER OF COMPUTER APPLICATIONS (REVISED) (MCA)

Term-End Examination

June, 2026

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) Differentiate among LAN, MAN and WAN. 6

   (b) Give the features of guided media and enlist different guided media. 4

   (c) Discuss the role of transmission media in OSI model. Give the name of layer in model where transmission media is present. 5

(d) A receiver receives the codeword 110101111 using the generator polynomial $G(x) = x^4 + x^2 + 1$. Did any error occur during transmission ? If yes, can it be corrected using CRC ? 5

(e) Explain the role of Spanning Trees in network routing protocols. 5

(f) Briefly describe FDM and TDM multiplexing techniques. 5

(g) Explain the different types of connecting devices in computer networks ? 5

(h) Explain Stop and Wait protocol with the help of a diagram. 5

2. (a) Discuss distance vector routing algorithm. Explain count to infinity problem with the help of an example. 10

(b) Draw the diagram of TCP header and explain source and destination port, address, sequence and acknowledgement numbers. Discuss TCP 3-way handshake process. 10

3. (a) Consider a network using the Pure ALOHA protocol with a frame transmission time of 1 ms. The network has a total of 5 stations, each generating frames at a rate of 100 frames per second. Calculate the total offered traffic (G), the throughput (S) of the network ? If the network switches to Slotted ALOHA, what would be the new throughput ? 10

(b) Describe the roles of encryption, decryption, and key management in ensuring secure communication over a network. Provide an example of a cryptographic protocol and explain how it contributes to network security. 10

4. (a) Describe the different switching techniques. Illustrate the working principles, advantages, disadvantages and one suitable application scenario for each switching technique. 10

   (b) Compare the following : 10

   (i) Upward and downward multiplexing

   (ii) Open and closed loop congestion control

5. (a) Explain the Diffie-Hellman key exchange protocol. Discuss the potential vulnerabilities of this protocol. 10

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

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