



Daffodil International University  
Faculty of Science & Information Technology  
Department of Software Engineering  
Final Examination, Fall 2025  
Course Code: SE-225

**Course Title: Data Communication & Computer Networking**  
Sections & Teachers: AMR(A,B), KBB(C,D), FT(E,F), FC(G,H), MNA(I), RT(J,L),  
NBA(K), MSP(M,N)

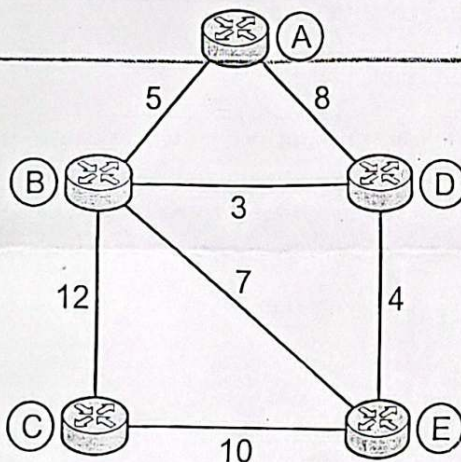
**Time: 2:00 Hrs**

**Marks: 40**

**Answer ALL Questions**

*[The figures in the right margin indicate the full marks and corresponding course outcomes. All portions of each question must be answered sequentially.]*

|    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                  |           |                  |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|------------------|
| 1. | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Examine the differences between TCP and UDP with respect to reliability, connection type, and common use cases.                                                                                                                                                                  | [Marks-2] | CLO-1<br>Level-3 |
|    | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Illustrate the HTTP request-response cycle.                                                                                                                                                                                                                                      | [Marks-3] |                  |
| 2. | <p>You are working on an upgraded file transmission system where data is transmitted in 6-bit chunks. As before, the system uses Hamming Distance to evaluate error detection/correction capability and Cyclic Redundancy Check (CRC) for error detection over the concatenated data.</p> <p>The file is divided into the following 6-bit data chunks:</p> <ul style="list-style-type: none"> <li>• Chunk 1: 101011</li> <li>• Chunk 2: 110010</li> <li>• Chunk 3: 011001</li> <li>• Chunk 4: 111100</li> </ul> |                                                                                                                                                                                                                                                                                  |           | CLO-3<br>Level-3 |
|    | a)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>Apply your knowledge on Hamming Distance to calculate:</p> <ul style="list-style-type: none"> <li>• The maximum number of bit errors that can always be detected by a block code</li> <li>• The maximum number of bit errors that can be corrected by such a code.</li> </ul> | [Marks-4] |                  |
|    | b)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>Derive the CRC generator polynomial (in binary) according to:</p> $x^2 + 1$                                                                                                                                                                                                   | [Marks-1] |                  |
|    | c)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <p>The data to be transmitted is formed by binary addition of Chunk 1 &amp; Chunk 4.</p> <p style="text-align: center;">Data = Chunk 1 + Chunk 4</p> <p>Using the generator polynomial obtained in part (b), Calculate the CRC bits for this data.</p>                           | [Marks-5] |                  |
| 3. | <p>You are designing an IPv4 addressing plan for a medium-sized office network. Your ISP has allocated the address block:</p>                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                  |           | CLO-4<br>Level-4 |

|                                                                                                                                    |                                                                                                                                                                      |           |
|------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| <p>11000000.10101000.00101000.00000000/26</p> <p>This block will be used to create multiple subnets for different departments.</p> |                                                                                                                                                                      |           |
| a)                                                                                                                                 | Transform the given IP address into its decimal representation.                                                                                                      | [Marks-2] |
| b)                                                                                                                                 | Identify the appropriate subnet mask.                                                                                                                                | [Marks-3] |
| c)                                                                                                                                 | Examine each subnet and identify the network ID, broadcast IP, and range of usable host IP addresses for every subnet.                                               | [Marks-8] |
| d)                                                                                                                                 | Investigate whether 192.168.40.70 is a valid host IP address; if it is valid, identify the subnet to which it belongs.                                               | [Marks-2] |
| e)                                                                                                                                 | Analyze the purpose of CIDR (Classless Inter-Domain Routing) in IPv4 networking, focusing on how it helps conserve address space and reduce routing table size.      | [Marks-3] |
| 4.                                                                                                                                 | <p>A Weighted Network Graph is given below:</p>                                    |           |
| a)                                                                                                                                 | Identify the initial routing table for each node in the network. Trace the Distance Vector algorithm to figure out the updated routing tables for Node C and Node E. | [Marks-7] |

CLO-4  
Level-4