



**Daffodil International University**  
**Faculty of Science & Information Technology**  
**Department of Computer Science & Engineering**  
 64-K, CT-03, Spring 2026  
 Course Code: CSE411, Course Title: Computer Graphics

**Time: 45 Minutes**

**Marks: 15**

**Answer ALL Questions [Optional]**

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

|    |                                                                                                                                                                                                                                                                                             |     |     |
|----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|
| 1. | <div style="border: 1px solid black; padding: 5px; display: inline-block;">           12 12 15 15 18 18<br/>           12 12 15 15 18 18<br/>           20 20 12 12 15 15<br/>           20 20 25 25 30 30<br/>           20 20 25 25 30 30<br/>           12 12 25 25 30 30         </div> |     |     |
|    | A $6 \times 6$ grayscale image (36 pixels) is given below. Each pixel is represented using an 8-bit image.                                                                                                                                                                                  |     |     |
| a. | Construct the Huffman Tree step by step (show all intermediate merging clearly).                                                                                                                                                                                                            | [6] | CO3 |
| b. | Compute the following:<br>i) Original size<br>ii) Compressed size<br>iii) Compression Ratio<br>iv) Average bits per pixel<br>v) Relative Redundancy and<br>vi) Savings                                                                                                                      | [3] | CO3 |
| 2. | Consider two consecutive video frames:<br>A block moves from position (12, 8) in Frame 1 to (15, 11) in Frame 2.                                                                                                                                                                            |     |     |
| a. | Find the motion vector.                                                                                                                                                                                                                                                                     | [1] | CO2 |
| b. | Differentiate between I-frame, P-frame, and B-frame with respect to: <ul style="list-style-type: none"> <li>• Dependency</li> <li>• Compression efficiency</li> </ul>                                                                                                                       | [2] | CO1 |
| c. | Explain how this motion vector reduces data transmission in MPEG.                                                                                                                                                                                                                           | [1] | CO2 |
| d. | Explain why JPEG converts RGB to YCbCr instead of directly compressing RGB.                                                                                                                                                                                                                 | [2] | CO1 |