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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.

$$\begin{bmatrix} 12 & 12 & 15 & 15 & 18 & 18 \\ 12 & 12 & 15 & 15 & 18 & 18 \\ 20 & 20 & 12 & 12 & 15 & 15 \\ 20 & 20 & 25 & 25 & 30 & 30 \\ 20 & 20 & 25 & 25 & 30 & 30 \\ 12 & 12 & 25 & 25 & 30 & 30 \end{bmatrix}$$

A 6 × 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: i) Original size ii) Compressed size iii) Compression Ratio iv) Average bits per pixel v) Relative Redundancy and vi) Savings	**[3]**	**CO3**

2. Consider two consecutive video frames:
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: • Dependency • Compression efficiency	**[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**