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Daffodil International University

Faculty of Science & Information Technology

Department of Computer Science and Engineering

Final Examination, Spring 2026

Course Code: CSE411, Course Title: Computer Graphics

Level: 4 Term: 1 Batch: 64

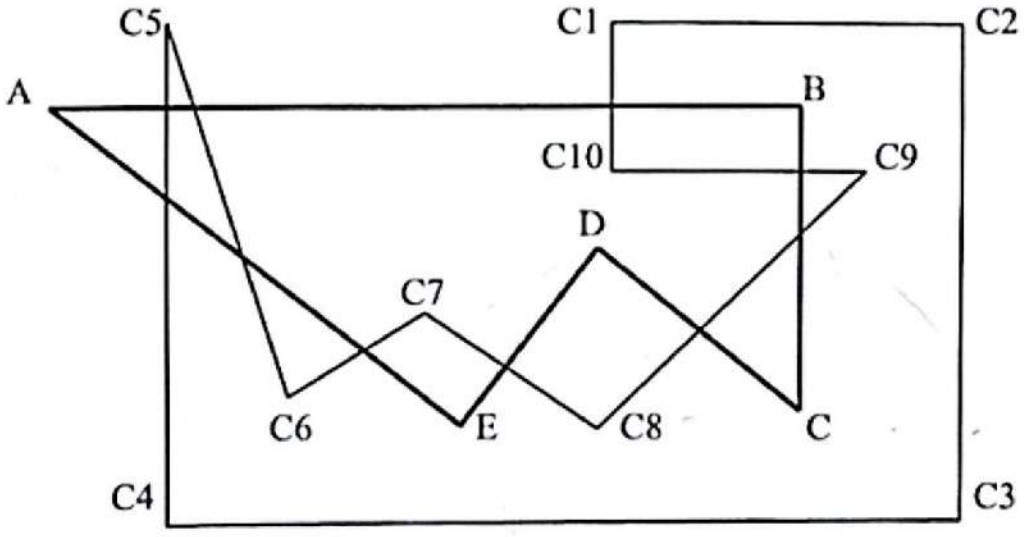
Time: 02:00 Hours **Marks: 40**

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 student is assigned to create a short animation of a car moving on a road for a magazine advertisement. Before starting, he carefully plans the animation sequence step by step. Since the final output will be printed in a magazine that only supports black ink, the designer also applies a technique using small dots of varying sizes to represent different shades in the images. **a)** List and **Explain** the steps for designing an animation sequence? **b) Identify** which technique is being used for printing? **c) Explain** how do varying dot sizes represent intensity levels?	**[9]**	**CO1**
2.	A grayscale image is represented by the following 8×8 matrix of intensity values: 12 12 45 45 45 78 78 90 12 12 45 45 78 78 90 90 12 34 34 45 78 90 90 90 12 34 34 45 78 90 120 120 34 34 45 45 78 90 120 120 34 45 45 78 78 120 120 120 45 45 78 78 90 120 120 120 45 78 78 90 90 120 120 120 a) Identify and list all unique gray levels and calculate their frequencies from the matrix. Then **Apply** the Huffman coding technique by constructing a Huffman Tree. Based on the tree, determine the Huffman codes for different symbols [gray level].	**[7+5]**	**CO3**

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	b) Calculate the average bit length using Huffman coding and find it's efficiency by comparing it with fixed-length coding to determine the bits saved per symbol. Then calculate compression ratio and relative redundancy.		
3.	Consider a rectangular clipping window with corner coordinates: (100,50), (300,50), (300,200), (100,200) Four line segments are given: • AB : (50,100) to (180,150) • CD : (200,120) to (200,5) • EF : (150,180) to (250,180) • GH : (150,220) to (250,220) Using the Cohen–Sutherland Line Clipping Algorithm: a) Analyze and classify each line segment as Trivially Accepted, Trivially Rejected, or Clipping Candidate based on their region codes. b) **Apply** the Cohen–Sutherland clipping procedure to the line segments that intersect the clipping window. c) Determine the final visible line segment coordinates after clipping.	**[9]**	**CO3**
4.	In the following Figure: 1, C1 C2 C3 C4 C5 C6 C7 C8 C9 C10 is the clipping window and A B C D E is the Subject polygon. Now **Apply** Weiler Atherton Polygon Clipping Algorithm for constructing the clipped polygon. Show all the steps.  Figure: 1	**[10]**	**CO3**