C – D E

Daffodil International University
Faculty of Science & Information Technology
Department of Computer Science and Engineering
Final Examination, Spring-2024
Course Code: CSE427, Course Title: Digital Image Processing
Level: 4 Term: 2 Batch: 56

Time: 2 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)	0 0 1 1 0 0 0 1 0 1 0 1 1 1 0 1 1 1 1 1 0 1 1 1 0 ***Apply*** opening and closing morphological operations in the above image and also show the differences between the two output images where the structural element is 1 1 1 1	5	CO4
	b)	Consider a sample image, **Examine** different morphological image operations to the image and explain the resultant effect.	5	
2.	a)	***Apply*** Huffman coding and generate the optimal code for the source symbols. Also find the average number of bits needed to represent the code. P(A)=0.3, P(B)=0.2, P(C)=0.3, P(D)=0.06, P(E)=0.04, P(F)=0.1	5	CO4
	b)	The social media platform hosts millions of images uploaded by users daily. However, due to limited server capacity and the need for efficient data transfer, there's a requirement to compress these images without significant loss of quality. Now **Construct** a general image compression model for the platform.	3	
	c)	Which compression is better "Lossy" or "Lossless"? ***Explain*** in your own words.	2	
3.	a)	You're a software engineer working for a security company tasked with developing an automated system for facial recognition in surveillance footage. The system aims to identify and track individuals of interest in real-time from a large volume of video data captured by security cameras in public spaces, such as airports, train stations, and shopping malls. ***Explain*** the phases of pattern recognition in digital image processing within the context of developing an automated facial recognition system for surveillance footage.	4	CO2
	b)	***Explain*** the fuzzy based algorithm and hybrid algorithm in terms of pattern recognition.	4	

4.	a)	7	8	8	8	9	9	8	8	7	
		8	9	8	9	7	7	6	9		
		8	8	6	6	5	4	7	8		
		7	6	7	6	4	5	6	8		
		2	5	4	5	5	4	6	9		
		2	2	2	2	4	4	7	8		
		3	3	2	3	2	5	6	6		
		3	2	3	2	4	5	7	6		
		Apply Region Split and Merge segmentation technique on above image. Assume the thresholding values as 3.After that also apply Region Growing Techniques.									
	b)	***Show*** the use of thresholding technique in image segmentation based on following image.								3	**CO3**
		5	4	6	2						
		7	8	6	3						
		8	7	6	1						
		6	7	8	2						
	c)	***Define*** *segmentation* and mention four different segmentation techniques.								2	