Daffodil International University

Department of Computer Science and Engineering

Faculty of Science & Information Technology

Midterm Examination, Spring 2023

Course Code: CSE 427, Course Title: Digital Image Processing

Level: 4 Term: 2 Batch: 54

Time: 1.5 Hrs **Marks: 25**

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)***	An automobile manufacturer is automating the placement of certain components on the bumpers of a limited-edition line of sports cars. The components are color coordinated, so the robots need to know the color of each car in order to select the appropriate bumper component. Models come in only four colors: blue, green, red and white. You are hired to propose a solution based on imaging. **Describe** the different parts of the image processing system that you may propose for automatically determining the color of each car.	**[1.5]**	CO1
	b)	**Explain** the effect on increasing (i) sampling frequency and (ii) quantization levels of image. Also find the number of bits required to store a 256 X 256 image with 32 gray levels.	**[3.5]**	CO1
2.	***a)***	**Illustrate** RGB, CMY and YIQ color models with proper example.	**[2.5]**	CO2
	b)	**Make use of** color space transformation formula's to convert an 8 bit RGB image [55, 38, 128] to HSI color model in the range [0,1]	**[3.5]**	
3.	***a)***	**Distinguish** histogram equalization and histogram specification with necessary example and mathematical details.	**[6]**	CO3
	b)	Gaussian filters are usually used to reduce "noise" in images. **List** down the significance of bell-shaped Gaussian kernel in noise smoothing.	**[4]**	
4.		Assume that you are given a set of image generated by an experiment dealing with the analysis of stellar events. Each image contains a set of bright, widely scattered dots corresponding to stars in a sparsely occupied section of the universe. The problem is that the stars are barely visible, due to superimposed illumination resulting from atmospheric dispersion. **Infer** the usefulness of homomorphic filtering procedure in this case to bring out the image components of stars.	**[4]**	CO3