Department of Computer Science and Engineering
University of Barishal
4th Year 2nd Semester Final Examination-2020
Course Title: **Digital Image Processing**   Course Code: CSE-4201

Time: 3 Hours   Full Marks: 60

*There are **Four (8)** questions. Answer any **Five (5)** of them. Do not write anything in the question paper. The figures in the right margin indicate the full marks.*

1. a) What do you mean by Digital Image processing (DIP)?   [2]

   b) "DIP has diverse application areas in our modern life". Give your opinions regarding this   [4]
   fact.

   c) Draw the sequence of fundamental steps of Digital image processing. Also elaborately   [6]
   explain.

2. a) Describe basic relationships between pixels using Neighborhood (N_4, N_8), Adjacency,   [4]
   Connectivity and paths.

   b) Explain in short sampling and quantization method for digital image?   [4]

   c) Describe components of a general purpose image processing system.   [4]

3. a) What is color model? Describe in brief RGB, CMYK and HIS color models.   [5]

   b) Explain color model conversion using mathematical calculation from RGB to HSI and   [4]
   HSI to RGB.

   c) What is image acquisition? Briefly describe the process of image acquisition.   [3]

4. a) Perform Histogram Equalization on Gray level distribution shown in the table. Draw the   [4]
   histograms of the original and equalized images. Comment on the contrast of the image
   before histogram equation and after histogram equalization.

Gray Levels	0	1	2	3	4	5	6	7
No. of Pixels	0	100	400	50	200	50	200	0

[3]
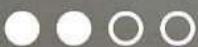
b) Shortly mention the relation between intensity transformation and spatial filtering. [5] Discuss any two intensity transformation function among Linear transform, Log transform, Power law transform for an eight bit image.

c) What is Histogram processing? Mention various application of Histogram Processing? [3]

5 a) What are the necessity image smoothing and image sharpening in DIP? [4]

b) Shows first order derivative and Laplacian filtering for DIP. [5]

c) Write short note on Robert operator. [3]

6 a) Why need structuring element in morphological image processing? [3]

b) Explicate morphological image processing fundamental operation Dilation and Erosion [6] with suitable diagram.

c) Make a comparative analysis of opening and closing operation in morphological [3] processing.

7 a) What is the objective of image enhancement? [3]

b) Explain model of image degradation/restoration process with a block diagram. [5]

c) Briefly explain image interpolation techniques. [4]

8 a) Define segmentation. [2]

b) Explain the concept of thresholding in image segmentation and write its merits and [6] demerits.

c) Briefly describe the Canny edge detection technique for image segmentation. [4]

Have a good day!