LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **COMPUTER SCIENCE**

THIRD SEMESTER – APRIL 2023

PCS 3502 – DIGITAL IMAGE PROCESSING

Date: 04-05-2023 Dept. No. Max: 100 Marks

Time: 09.00 AM – 12:00 NOON

Part – A

Answer ALL the questions **(10 × 2 = 20 marks)**

1. Define Sampling and Quantization
2. How analog image can be converted into digital image?
3. Define spatial domain Image enhancement.
4. What is filtering? Write the basic types of filtering.
5. Draw the diagram of image degradation and restoration model.
6. Define image restoration.
7. Write the goals of compression.
8. Draw the block diagram of a compression model.
9. Write the steps in region representation.
10. Write the steps in region description.

Part – B

Answer ALL the questions **(5 × 8 = 40 marks)**

11. a) Explain the fundamental steps in image processing with a neat diagram.

(Or)

b) Describe Hadamard transformation. Perform Hadamard transformation on the following 2-dimensional image.

$$\begin{bmatrix} 1 & 2 & 2 & 1 \\ 2 & 1 & 2 & 1 \\ 1 & 2 & 2 & 1 \\ 2 & 1 & 2 & 1 \end{bmatrix}$$

12. a) Discuss the ideal low pass and the butter worth low pass filters.

(Or)

b) What is Histogram? Explain the histogram equalization techniques.

13. a) What is blind image restoration? Discuss the indirect measurement approach to blind image restoration.

(Or)

b) Explain the different types of restoration filters.

14. a) Draw the block diagram of a compression system. Describe each and every blocks in the compression system.

(Or)

b) Explain the Huffman coding with example.

15. a) Discuss the Polygonal approximation.

(Or)

b) Explain the simple regional descriptors.

Part – C

Answer ANY TWO questions **2 × 20 = 40 marks**

16. a) Describe the basic relationship between pixels.

b) Explain the piece-wise transformation technique and its types.

17 a) What is a noise model? Explain the different types of noise models.

b) Explain the Lossless Predictive coding technique with example.

18 a) Explain the following

i) Simple Boundary descriptors.

ii) Fourier Boundary descriptors.

b) What is sharpening in frequency domain? Explain the types of high pass filters used in image sharpening.

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