

U.G. 5th Semester Examination - 2020

COMPUTER SCIENCE

[HONOURS]

Discipline Specific Elective (DSE)

Course Code : COM.SC-H-DSE-L-501

(Digital Image Processing)

Full Marks : 60

Time : $2\frac{1}{2}$ Hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

GROUP-A

Answer any **ten** of the following questions : $2 \times 10 = 20$

1. a) Define Haar transform.
- b) State the need for data compression.
- c) Distinguish between local and global thresholding techniques for image segmentation.
- d) Give the advantages of Walsh over Fourier transform.
- e) What is the advantage of separable filters?
- f) Write the difference between image restoration and image enhancement.
- g) What is meant by image segmentation? Write its use in image processing.

[Turn Over]

- h) What is meant by digital image water marking?
- i) Explain how a point can be detected in an image.
- j) Write a situation where PNG file format is more preferable than JPEG.
- k) How much memory required for storing 500×500 binary image?
- l) Differentiate raster and bitmap data.

GROUP-B

Answer any **four** of the following questions: $5 \times 4 = 20$

2. a) Explain about Boundary Extraction and Region Filling Algorithm. 5
- b) Explain the periodic noise reduction by frequency domain filtering with respect to notch filter. 5
- c) Explain the following two properties of 2D-DFT:
 $2\frac{1}{2} \times 2 = 5$
(i) Convolution (ii) Correlation
- d) Consider a color image of 1024×1024 . If this image is transmitted across a channel of 2 Mbps, what will be the transmission time? What is the storage requirement of 1024×1024 , 8 level gray level image? $2\frac{1}{2} \times 2 = 5$
- e) An image is 2400 pixels wide and 1200 pixels high. The image was scanned at 300 dpi. What is the physical size of the image? What do you mean by 8-neighbors of pixel? How it can be represented? $2 + 2 + 1 = 5$

GROUP-C

Answer any **two** of the following questions: $10 \times 2 = 20$

3. a) What are the different image compression standards? Explain. 10
- b) What is the purpose of image restoration? Explain the model of image degradation and restoration process using suitable block diagram. $4 + 6 = 10$
- c) What are the advantages of Median filter? Specify the objective of image enhancement technique. Discuss the image smoothing filter with its model in the spatial domain. $2 + 2 + 6 = 10$
- d) Write short note on following (any **two**): $5 \times 2 = 10$
- i) LZW coding
 - ii) Image Morphing
 - iii) Boundary detection based techniques
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