



IMAGE PROCESSING

SEMESTER - 6



Time : 3 Hours]

[Full Marks : 70

GROUP - A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following : 10 × 1 = 10
- i) Sampling of an image is required for
- | | |
|-----------------|------------------|
| a) Quantization | b) Sharpening |
| c) Smoothing | d) Digitization. |
-
- ii) An Image of size 1024×1024 pixels in which the intensity of each pixel is represented by 8 bit. The storage required for uncompressed image is
- | | |
|---------|-------------------|
| a) 1 kB | b) 1 MB |
| c) 2 kB | d) none of these. |
-
- iii) Which of the following is a common technique for enhancing the appearance of image ?
- | | |
|---------------------------|----------------------------|
| a) Splitting and Merging | b) Region growing |
| c) Watershed segmentation | d) Histogram equalization. |
-
- iv) Region growing is a process used in
- | | |
|-----------------|-------------------|
| a) segmentation | b) edge detection |
| c) thinning | d) noise removal. |
-



v) Intensity range of 8-bit pixel image is

- a) 0 to 7
- b) 0 to 15
- c) 0 to 31
- d) 0 to 255.



vi) FFT is based on

- a) Convolution
- b) Correlation
- c) Scaling
- d) None of these.

vii) An image is a 2D array of

- a) digital data
- b) electrical signals
- c) photographic objects
- d) light signals.

viii) Smoothing filters are used for

- a) Blurring
- b) Enhancing contrast
- c) Blurring and noise reduction
- d) Blurring and enhancing contrast.

ix) A wavelet transform is a special case of

- a) Laplace transform
- b) Z-transform
- c) Fourier transform
- d) none of these.

x) We have an image is EPS and JPEG formats

- a) the JPEG file will be larger in size
- b) the EPS file will be larger in size
- c) both files will be equal in size
- d) none of these.



xi) Which of the following is not a kind of filtering ?

- | | |
|-----------------|------------|
| a) Least square | b) Inverse |
| c) Kalman | d) Canny. |



xii) Image averaging is used for

- | | |
|------------------------|------------------------|
| a) Smoothing an image | b) Segmenting an image |
| c) darkening and image | d) none of these. |

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

- | | | |
|----|--|---|
| 2. | a) Write down a name of an image capturing technique/device. | 1 |
| | b) Briefly explain the working principle of the image capture by that technique/device. | 3 |
| | c) How can the captured images be transferred to a PC ? | 1 |
| 3. | a) What do you mean by image enhancement ? | 2 |
| | b) Write about a transform or operation that can be used for image enhancement. Explain. | 3 |
| 4. | a) How do you represent a gray scale image ? | 2 |
| | b) How do you represent a colour image ? | 3 |
| 5. | a) Define entropy. | 1 |
| | b) What is information redundancy ? | 1 |
| | c) Distinguish between lossy and lossless compressions. | 3 |
| 6. | Discuss Huffman coding with example. | |



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GROUP – C

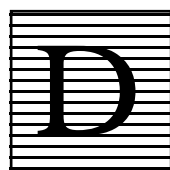
(Long Answer Type Questions)

Answer any *three* of the following.



3 × 15 = 45

7. a) What do you mean by brightness and contrast of an image ? 3
- b) Write an algorithm to compute the histogram of an image. 4
- c) Discuss the need of histogram equalization. 3
- d) What are the effects of negation to a binary image ? 2
- e) What is least square error restoration ? 3
8. a) What is meant by image segmentation ? $2\frac{1}{2}$
- b) What is meant by image compression ? $2\frac{1}{2}$
- c) Name a transform that can be used for image compression and explain how it can be used for image compression. 10
9. a) What do you mean by image recognition ? 2
- b) What is meant by classification of images ? 3
- c) Describe any image recognition technique. How is it used for image classification ? 10
10. a) What do you mean by smoothing and sharpening of an image ? $2\frac{1}{2} + 2\frac{1}{2}$
- b) Somebody has captured a photograph as shown in figure below :
- i) If we want to remove the horizontal lines and get a clear image of the letter "D", what we have to do ?
- ii) Can you get an image of the lines and remove the letter "D" ? Explain your answers with flow diagrams wherever appropriate. 5 + 5





11. Write short notes on any *three* of the following :

- a) Quad tree
- b) JPEG compression
- c) Frequency domain filtering
- d) Hadamard transforms
- e) Frequency Domain Filtering.



END