

M.E. Second Semester (Electrical & Electronics) (New - CGS)
13294 : Elective - II : Digital Image Processing : 2 EEEME 5

P. Pages : 2

Time : Three Hours



AU - 3407

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
 2. Due credit will be given to neatness and adequate dimensions.
 3. Assume suitable data wherever necessary.
 4. Illustrate your answer necessary with the help of neat sketches.
 5. Use of slide rule logarithmic tables, Steam tables, Moller's Chart, Drawing instrument is permitted.
 6. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. a) Discuss any two properties of Fourier transform. 6
b) What is the need of image transform? Explain Discrete cosine transform. 8

OR

2. a) Draw and explain the monochrome image model of human eye. 8
b) Find a singular value decomposition of 6
$$A = \begin{bmatrix} 1 & -2 & 3 \\ 3 & 2 & -1 \end{bmatrix}$$
3. a) Suggest and explain in detail the method for image enhancement when the input image is darker than desired. 7
b) Explain the effects of Discrete cosine transform applied to the image. How to reduce the undesired effects? 6

OR

4. a) Perform histogram equalization of the image given below. 7
$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

b) Suppose that an image is subjected to a histogram equalization. Show that a second pass of histogram equalization will produce exactly the same results as the first pass. Support your answer with suitable example. 6
5. a) Explain the Maximum Likelihood method of image restoration. 7
b) Explain the iterative method of image restoration. 6

OR

6. a) A blur filter is given by 7
- $$h(m,n) = \begin{bmatrix} 0 & 0.05 & 0.05 & 0 \\ 0.15 & 0.1 & 0.1 & 0.15 \\ 0 & 0.1 & 0.1 & 0 \\ 0 & 0.1 & 0.1 & 0 \end{bmatrix}$$
- Find the deblur filter using wiener filter approach with $\sigma_x^2 = 200$ and $\sigma_w^2 = 100$.
- b) Explain Greedy snake algorithm and its problems. 6

SECTION – B

7. a) Explain in detail chain code. Also give its drawbacks. 7
- b) What is Edge linking? Explain Iterative End-point fitting algorithm. 6

OR

8. a) Explain region splitting and merging techniques for image segmentation with suitable examples. 7
- b) Discuss and explain Laplacian and Gaussian edge detector. 6
9. a) Construct the shannon-fano code for the PAPPA. 7
- b) Explain in detail vector quantization. Also differentiate between scalar quantization and vector quantization. 7

OR

10. a) Explain the following. 7
- i) Entropy and mutual information.
 - ii) Shannon's source coding theorem.
- b) Explain the need of image compression standard. 7
11. a) Explain in detail watermarking in the spatial domain with flow chart. 7
- b) Explain wavelet transform. 6

OR

12. a) Discuss the desirable characteristics of a filter bank with respect to wavelet based image compression. 7
- b) Explain multi resolution analysis using wavelet transforms. 6
