

No. of Printed Pages : 4

MCS-230

**MASTER OF COMPUTER
APPLICATIONS (MCA)
(NEW)**

Term-End Examination

June, 2023

**MCS-230 : DIGITAL IMAGE PROCESSING AND
COMPUTER VISION**

Time : 3 Hours

Maximum Marks : 100

Note : *Question No. 1 is compulsory. Attempt any three questions from the rest. Use of Scientific calculator is allowed.*

1. (a) Explain the term “Image Acquisition.” Compare optical image processing, analog image processing and digital image processing. 8
- (b) Explain the term “Image transformation”. Also, give its importance in context of digital image processing. Write key steps for image transformation from the spatial domain to frequency domain. 8

P. T. O.

- (c) Explain Discrete Cosine Transform (DCT). Give advantage of DCT over DFT. Compute DCT matrix of order 2. 8
- (d) What are smoothening filters ? How do they differ from the sharpening filters ? Briefly discuss the role of low pass filters and high pass filter in image restoration. 8
- (e) Explain Bayes' theorem with suitable example. Also, discuss the role of Bayes' theorem in Bayes' classifier. Give the properties of Bayes' classifier. 8
2. (a) What is image digitization ? Explain the role of quantization in the image digitization, with the help of an example. 7
- (b) Given, the dimension of an image as 5×8 inches² and the frequency of 500 dots per inch exists in each direction. Determine the number of samples required to preserve the information in the image. Also, discuss the term 'Pixelization error.' 5
- (c) What do you understand by the term image enhancement ? Specify the objectives of image enhancement techniques. Explain the types of image enhancement techniques with a suitable example for each. 8

3. (a) How do wavelets differ from waves ? Explain the properties, possessed by a function to be called as wavelet. Compare wavelet transform with the Fourier transform. 8
- (b) Explain image degradation model with suitable block diagram. How noise relates to image degradation ? Explain any *one* noise model. 7
- (c) Explain HSI colour model with suitable diagram. 5
4. (a) Explain Linear Discrimination Function. How does it relate or differ from piecewise linear discriminant functions ? Write properties of Linear Discriminant Analysis (LDA). 7
- (b) Explain the following : 8
- (i) Partition based clustering
- (ii) K-means clustering
- (c) Describe the following quantities, used to represent any colour : 5
- (i) Hue
- (ii) Saturation

5. Write short notes any *five* of on the following : 4×5=20

- (a) Image representation using vector model
- (b) True colour images
- (c) Spatial resolution
- (d) Ideal low pass filter
- (e) Gaussian noise
- (f) Band Pass filter