

No. of Printed Pages : 5

MCS-230

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

Term-End Examination

June, 2026

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

Time : 3 Hours

Maximum Marks : 100

Note : (i) *Question no. 1 is compulsory.*

(ii) *Attempt any **three** questions from
the rest. Use of non-scientific
calculator is allowed.*

1. (a) Discuss in brief about image acquisition. Explain the types of image processing. 5
- (b) Describe the classification of images on the basis of attributes. Determine the storage space required to store 2048×2048 pixels of a binary image. 5
- (c) Define 1-dimensional and 2-dimensional signals with the help of a diagram for each. 5
- (d) If the physical size of a medical image is 4×4 inches and the sampling resolution is 5 cycles/mm, then how many pixels per cycle are required to have a better-quality image ? An image of size 256×256 be enough ? 5

- (e) Explain agglomerative hierarchical clustering with the help of a suitable example. 5
- (f) Describe the following quantities, used to represent any colour : 5
- (i) Hue
- (ii) Saturation
- (g) Find and draw normalized histogram with the help of image table : 5

0	0	0	0
0	1	2	3
0	2	4	6

- (h) Explain how deep learning techniques are used for feature extraction. 5

2. (a) What is an orthogonal matrix ? Prove an orthogonal matrix is a square matrix if and only if its transpose is as same as its inverse. 10
- (b) Define aspect ratio. An image is a gray scale image with aspect ratio of 6 : 2 and pixel resolution of 640000 pixels, calculate the following : 10
- (i) Resolve pixel resolution to calculate the dimensions of image.
- (ii) Calculate the size of the image.
3. (a) How do wavelets differ from waves ? Give properties of wavelets. Also compare wavelet transform with Fourier transform. 10

- (b) Explain in detail about an image degradation model. Draw the block diagram of degradation model. 10
4. (a) Discuss the minimum mean square error filtering. Explain with help of different types of cases. 10
- (b) Describe the concept of optical flow in computer vision. Explain the Lucas-Kanade method and its applications. 10
5. Write short notes on the following : $4 \times 5 = 20$
- (i) Bayesian Classification
 - (ii) Supervised Learning Approach
 - (iii) Boundary Detection
 - (iv) K-means Clustering

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