S.No. : 235 NPEC43922

No. of Printed Pages : 04

Following Paper ID and Roll No. to be filled in your Answer Book.

PAPER ID :43905 Roll No. 1 2 3 0 4 3 9 [redacted]

B. Tech Examination 2026

(Even Semester)

COMPUTER VISION

Time : Three Hours] *[Maximum Marks : 60*

Note :– Attempt all questions.

SECTION – A

1. Attempt all parts of the following : $1 \times 8 = 8$

   (a) What do you mean by Computer vision?.

   (b) What is Pixel?.

   (c) What is meant by Region of Interest (ROI)?

   (d) What is Noise in an Image?

   (e) What is Intensity level in an Image?

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(f) What is Image Formaton?

(g) What is Edge Detection?.

(h) Define Median Filter.

SECTION – B

2. Attempt any two parts of the following : $2 \times 6 = 12$

(a) Define Computer Vision . Explain the goals and applications of Computer Vision in details.

(b) Explain the Image formation process in a Computer Vision system. Describe the pinhole camera model with a neat diagram and derive mathematical relationship between a 3-D world point and its 2-D image projection.

(c) Define Fourier Transform in image processing. Explain in detail.

(d) Explain different types of noise in digital images. Describe mean filter , median filter, and Gaussian filter.

SECTION – C

Note:- Attempt all questions. Attempt any two parts from each question. $8 \times 5 = 40$

3. (a) What is difference between Orthographic and Perspective projection.

   (b) Define Hough transform . How Hough transform detects a line?.

   (c) Explain Sobel oprater used in linear filtering for edge detection with an example.

   (a) Gradient magnitude (b) Gradient Direction

4. (a) Explain Markov Random Fields (MRFs) & also its application.

   (b) What do you mean by feature extraction and also explain feature extraction algorithm like SIFT and SURF.

   (c) Explain image segmentation techniques in detail.

5. (a) Explain model fitting and optimization in details.

(b) What is the difference between supervised learning and unsupervised learning?

(c) Explain thresholding and also its types.

6. (a) Explain morphological image processing in detail.

(b) Explain image representation and description in details.

(c) Explain the steps involved in an image classification system.

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