Time :2 ½ Hours   [**Total Marks: 50**]

N.B: (1)   **All questions are compulsory.**
            (2)   Figures to the **right** indicate full marks.
            (3)   **Assume additional data if necessary** but state the same clearly.
            (4)   Symbols have their usual meanings and tables have their usual standard design
                  unless stated otherwise.

Q.1   Attempt **any two** of the following   **(10)**
a)   Briefly discuss about various types of noise and its effect in Signal and Image   **05**
      processing.
b)   Define Correlation. How it useful in signal and image analysis.   **05**
c)   Write a note on representing image as signal.   **05**
d)   List and explain applications of digital signal processing.   **05**

Q.2   Attempt **any two** of the following   **(10)**
a)   Compare log and power law transformation on the image.   **05**
b)   Explain how histogram processing is useful in image processing. Explain the   **05**
      terms histogram equalization and histogram matching.
c)   Write a note on non-linear smoothing of images. Give example to explain the   **05**
      concept.
d)   Explain what is Contrast Stretching? How it is used to enhance images.   **05**

Q.3   Attempt **any two** of the following   **(10)**
a)   List and explain Sobel and Prewitt edge detectors.   **05**
b)   Briefly what are image pyramids? Also explain briefly Gaussian Pyramid.   **05**
c)   Explain morphological opening and closing operations. What are its merits over   **05**
      erosion and dilation operations?
d)   Briefly explain how we can extract boundary of an object in an image.   **05**

Q.4   Attempt **any two** of the following   **(10)**
a)   Briefly explain about scale-invariant feature transformations and its significance   **05**
      in image processing.
b)   What is Haar-like Feature? Discuss in detail its use in image processing and   **05**
      analysis.
c)   Write a brief note about the concept of using watershed algorithm for   **05**
      segmentation.
d)   Write a note on GrabCut algorithm in Image Processing.   **05**

Q.5   Attempt **any two** of the following   **(10)**
a)   What is the effect of applying Laplacian on an image? Where is it used?   **05**
b)   Write a note on LoG and DoG filters.   **05**
c)   Define Skeletonization. Explain the operations and use of structuring elements   **05**
      in skeletonizing the given object structure.
d)   Define Thresholding. Explain adaptive thresholding technique.   **05**

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