CBCS SCHEME

USN ☐☐☐☐☐☐☐☐☐☐   **18EC733**

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022
Digital Image Processing

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1 a. Explain with block diagram the fundamental steps used in digital image processing.
                                                                             (10 Marks)
   b. Explain the image acquisition using sensor strips and sensor arrays.   **(10 Marks)**

OR

2 a. What is digital image processing? Explain the applications of image processing.   **(06 Marks)**
   b. With the help of neat diagram, explain the components of a general purpose image processing system.   **(08 Marks)**
   c. How image is formed in eye? Explain visual perception of eye.   **(06Marks)**

Module-2

3 a. Explain the process of image sampling and quantization in the digital image formulation.
                                                                             (08 Marks)
   b. With necessary graphs explain the log and power law transformation used for spatial image enhancement.   **(08 Marks)**
   c. Compute the lengths of the shortest 4, 8 and M path between p and q in the image segment shown in Table Q3(c) by considering $v = \{2, 3, 4\}$.

$$
\begin{array}{cccccc}
 & 3 & 4 & 1 & 2 & 0 \\
 & 0 & 1 & 0 & 4 & 2 \ (q) \\
 & 2 & 2 & 3 & 1 & 4 \\
(p) & 3 & 0 & 4 & 2 & 1 \\
 & 1 & 2 & 0 & 3 & 4
\end{array}
$$

Table Q3(c)   **(04 Marks)**

OR

4 a. Explain the adjacency, connectivity, regions and boundaries between pixels with examples.
                                                                             (10 Marks)
   b. What do you mean by histogram processing? Explain histogram equalization.   **(10 Marks)**

Module-3

5 a. Explain smoothing of images in frequency domain using ideal, Butterworth and Gaussian low pass filter.   **(12 Marks)**
   b. Explain the properties of 2-dimensional DFT.   **(08 Marks)**

OR

6 a. Explain the basic steps of filtering in frequency domain. Explain one method of sharpening frequency domain filters.   **(10 Marks)**
   b. Discuss the homomorphic filtering approach for image enhancement.   **(10 Marks)**

Module-4

7 a. Explain the importance of image restoration process in image processing with the basic model diagram. Explain any four noise probability density functions. **(10 Marks)**

b. Explain Weiner filtering and inverse filtering in image processing. **(10 Marks)**

OR

8 a. Explain the following methods to estimate the degradation function, used in image restoration.
   i)   Estimation by image observation
   ii) Estimation by experiment
   iii) Mathematic modelling. **(10 Marks)**

b. Discuss the importance of adaptive filters in image restoration system highlight its working of adaptive median filter. **(10 Marks)**

Module-5

9 a. Explain the following morphological operations :
   i)   Erosion
   ii) Dilation
   iii) Opening
   iv) Closing. **(12 Marks)**

b. Explain the RGB color model. **(08 Marks)**

OR

10 a. What is pseudo color image processing? Explain intensity slicing as applied to pseudo color image processing. **(10 Marks)**

b. Explain HSI color model and conversion from HSI to RGB colors. **(10 Marks)**

* * * * *