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**18EC603**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular/Supplementary) DEGREE EXAMINATION** | | | | | | | | |
| **June, 2022** | | | | **Electronics & Communication Engineering** | | | | |
| **Sixth Semester** | | | | **Digital Image Processing** | | | | |
| **Time:** Three Hours | | | | | **Maximum:**50 Marks | | | |
| *Answer Question No.1 compulsorily.* | | | | | | (10X1 = 10 Marks) | | |
| *Answer ONE question from each unit.* | | | | | | (4X10=40 Marks) | | |
| 1. | Answer all questions | | | | | (10X1=10 Marks) | | |
|  | a) | List the components in an image processing system. | | | | |  | |
|  | b) | Define grey level resolution. | | | | |  | |
|  | c) | Define 8- Connectivity in a Digital Image. | | | | |  | |
|  | d) | What is Euclidean distance between two pixels p and q? | | | | |  | |
|  | e) | Give the expression for power-law transform when input pixel is “r” and output pixel after transform is “s”. | | | | |  | |
|  | f) | Give the expression for 2-D DFT and IDFT. | | | | |  | |
|  | g) | Draw the block diagram of image degradation Process. | | | | |  | |
|  | h) | Define Saturation. | | | | |  | |
|  | i) | Define compression ratio. | | | | |  | |
|  | j) | Give the expression for Erosion. | | | | |  | |
| **UNIT I** | | | | | | | | |
| 2. | a) | Describe about sampling and quantization process used in DIP. | | | | | 5M | |
|  | b) | i. Explain the various types of connectivity in a digital image.  ii. Mention the different mathematical operations used in DIP. | | | | | 3M  2M | |
| **(OR)** | | | | | | | | |
| 3. | a) | Explain in detail about spatial and grey level resolution with suitable example | | | | | 5M | |
|  | b) | In a digital image of size 600X 450, if 6 bits of memory is allocated per sample, i) How many quantization levels are possible? What is the total amount of memory required to store a video of 30 frames/sec? | | | | | 5M | |
| **UNIT II** | | | | | | | | |
| 4. | a) | Describe Histogram Matching process with an appropriate example | | | | | 5M | |
|  | b) | Give a brief note on different gray level transformation techniques. | | | | | 5M | |
| **(OR)** | | | | | | | | |
| 5. | a) | Illustrate the steps in Histogram equalization of the following image.  4 4 4 4 4  2 4 5 4 3  3 5 5 5 2  3 4 5 4 3  4 6 6 6 4 | | | | | 5M | |
|  | b) | Distinguish between spatial filtering and frequency domain filtering. Describe the smoothing and sharpening filter masks of size 3 X 3 | | | | | 5M | |
| **P.T.O**  **18EC603**  **UNIT III** | | | | | | | | |
| 6. | a) | Discuss about different mean filters used in image restoration. | | | | | 5M | |
|  | b) | Explain about different filter used for removal of periodic noise. | | | | | 5M | |
| **(OR)** | | | | | | | | |
| 7. | a) | Write short notes on pseudo colour image processing | | | | | 5M | |
|  | b) | Explain the process of converting colors from RGB to HIS and vice versa | | | | | 5M | |
| **UNIT IV** | | | | | | | | |
| 8. | a) | Find Code redundancy and code efficiency using Huffman coding scheme for a set of input gray levels with probabilities as given below.   |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | Gray level | a1 | a2 | a3 | a4 | a5 | a6 | | Probability | 0.2 | 0.2 | 0.06 | 0.2 | 0.04 | 0.3 | | | | | | 5M | |
|  | b) | Explain the following  i) Coding redundancy  ii) Inter pixel redundancy  iii) Psycho visual redundancy | | | | | 5M | |
| **(OR)** | | | | | | | | |
| 9. | a) | Describe about opening and closing operations used in morphological image processing | | | | | 5M | |
|  | b) | Discuss about thinning and boundary extraction in basic morphological algorithms | | | | | 5M | |

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