**18EC603**

**Hall Ticket Number:**

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| **III/IV B.Tech (Regular) DEGREE EXAMINATION** | | | |
| **July, 2021** | **Electronics & Communication Engineering** | | |
| **Sixth Semester** | **Digital Image Processing** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer Question No. 1 Compulsorily.* | | | (10X1 = 10 Marks) |
| *Answer* ***ANY ONE*** *question from each Unit.* | | | (4X10=40 Marks) |

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| 1. | a) | What is chess board distance in an image | CO1 | |  |
|  | b) | Define histogram | CO2 | |  |
|  | c) | What is the meaning of Image Negative? | CO2 | |  |
|  | d) | What is inverse filtering | CO3 | |  |
|  | e) | Define Spatial Resolution | CO1 | |  |
|  | f) | Draw the model of Image Degradation process | CO3 | |  |
|  | g) | What is meant by error free compression? | CO4 | |  |
|  | h) | Define Compression Ratio | CO4 | |  |
|  | i) | What is the relationship between RGB and CMYK Color models? | CO3 | |  |
|  | j) | Give the expression for morphological opening. | CO4 | |  |
| **Unit - I** | | | | | |
| 2. | a) | Write a brief note about the components of image processing systems | CO1 | **5M** | |
|  | b) | Discuss about sampling and quantization process of an image. | CO1 | **5M** | |
|  |  | **(OR)** |  |  | |
| 3. | a) | What is meant by digital image processing? What are the applications of it? How an image is represented digitally? | CO1 | **5M** | |
|  | b) | Differentiate Path, connectivity and adjacency with an example. | CO2 | **5M** | |
| **Unit – II** | | | | | |
| 4. | a) | Write a short note on different gray level transformation techniques. | CO2 | **5M** | |
|  | b) | Illustrate the steps in Histogram equalization of the following image.  4 4 4 4 4  3 4 5 4 3  3 5 5 5 3  3 4 5 4 3  4 4 4 4 4 | CO2 | **5M** | |
|  |  | **(OR)** |  |  | |
| 5. | a) | Discuss about the image smoothing and sharpening in the spatial domain. | CO2 | **5M** | |
|  | b) | Explain the following filter masks for image enhancement. i) Gaussian Low-pass filter ii) Gaussian high pass filter | CO2 | **5M** | |
| **Unit – III** | | | | | |
| 6. | a) | Explain about minimum mean squares restoration process for image restoration | CO3 | **5M** | |
|  | b) | Explain the process of converting colors from RGB to HIS and vice versa | CO3 | **5M** | |
|  |  | **(OR)** |  |  | |
| 7. | a) | Define image restoration. Explain the operation of inverse filtering | CO3 | **5M** | |
|  | b) | Discuss with an example how a color image can be represented? | CO3 | **5M** | |
| **P.T.O**  **18EC603**  **Unit - IV** | | | | | |
| 8. | a) | Perform the Hit or Miss Transform with the structuring element SE1 and Small window (SE2) on input image as following. | CO4 | **5M** | |
|  | b) | With an example explain about the LZW coding in the image compression. | CO4 | **5M** | |
|  |  | **(OR)** |  |  | |
| 9. | a) | Write in detail about the opening and closing operations in morphological image processing. | CO4 | **5M** | |
|  | b) | 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 | 0.1 | 0.4 | 0.06 | 0.1 | 0.04 | 0.3 | | CO4 | **5M** | |

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