

Reg. No.

**SEVENTH SEMESTER B.TECH (INSTRUMENTATION & CONTROL ENGINEERING)**

**END SEMESTER EXAMINATIONS, NOV/DEC 2015**

**SUBJECT: IMAGE PROCESSING [ICE 449]**

Time: 3 Hours

MAX. MARKS: 50

**Instructions to Candidates:**

- ❖ Answer **ANY FIVE FULL** questions.
- ❖ Missing data may be suitably assumed.

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|-----|--|---|
| 1A. | With a block diagram explain the fundamental steps in digital image processing   | 4 |
| 1B. | Explain the process of image acquisition using sensor strip and sensor array   | 3 |
| 1C. | Define following terms: 1. Adjacency 2. Connectivity 3. Spatial resolution   | 3 |
| 2A. | Explain the process of sampling and quantization in a digital image  | 4 |
| 2B. | How an image formation occur in human eye? Explain the importance of brightness adaptation in image processing.  | 4 |
| 2C. | What are the different processing levels in digital image processing? Give an example for each.  | 2 |
| 3A. | Define two dimensional DFT. Explain the following properties of 2D DFT.<br>1. Translation 2. Rotation 3. Distributivity and scaling  | 4 |
| 3B. | What is histogram equalization? Compute the histogram equalization for the following distribution having eight gray levels. $A = \{790, 1023, 850, 656, 329, 245, 122, 81\}$ | 4 |
| 3C. | Define histogram matching with a suitable example.   | 2 |
| 4A. | What are smoothing spatial filter? Explain different types with examples.  | 4 |
| 4B. | Explain how a Sobel operator can be used for edge detection.   | 2 |
| 4C. | With a block diagram, explain image degradation/restoration process.   | 4 |
| 5A. | What is redundancy in an image? Explain different types with examples.   | 4 |
| 5B. | What you mean by Lossy and Lossless compression techniques? Explain the active processing stages of image compression model.   | 4 |
| 5C. | Define fidelity with its objective and subjective contexts.  | 2 |
| 6A. | Compute the LZW dictionary coding for the following sequence.<br>$A = [39 \ 39 \ 126 \ 126 ; 39 \ 39 \ 126 \ 126 ; 39 \ 39 \ 126 \ 126 ]$                                    | 3 |
| 6B. | Design a multi-dimensional data processing pipeline for object recognition system in spatial domain.   | 3 |
| 6C. | Write a short note on: 1. Log transformation 2. Power law transformation   | 4 |