

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-VII (NEW) - EXAMINATION – SUMMER 2017****Subject Code: 2171712****Date: 09/05/2017****Subject Name: Image Processing(Departmental Elective - II)****Time: 02.30 PM to 05.00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Explain the representation of  $M \times N$  size, 8-bit gray scale images. Also explain the spatial resolution and the dynamic range resolution in this case. **07**  
(b) Explain the power-law transform and its applications. **07**
- Q.2** (a) Explain  $3 \times 3$  averaging operation on  $M \times N$  gray scale image. **07**  
(b) Explain the MMSE (Wiener) filter for image restoration. **07**
- OR**
- (b) Classify the following image intensity values in to two distinct classes {101, 201, 100, 200, 105, 205, 210, 107, 109, 208}. Give justification. **07**
- Q.3** (a) Explain Homomorphic filter giving a block diagram and its applications. **07**  
(b) Explain RGB and CMY color models, and their relationship. **07**
- OR**
- Q.3** (a) Explain the image sharpening operation in spectral domain. Give its applications. **07**  
(b) Explain ideal Low-Pass Filter operation spectral domain for  $M \times M$  images. Give its applications. **07**
- Q.4** (a) Explain Huffman coding method with a suitable example. **07**  
(b) Explain any two different noise models with their Probability Density Functions, and applications. **07**
- OR**
- Q.4** (a) Explain JPEG compression standard with its block diagram. **07**  
(b) Explain opening and closing operations with suitable examples. Give their applications. **07**
- Q.5** (a) Explain edge detection methods and their applications in image segmentation. **07**  
(b) Explain any two applications of image processing in process industries. **07**
- OR**
- Q.5** (a) Explain Hough transform and its applications. **07**  
(b) Represent a case study of object recognition. **07**

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