

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – I • EXAMINATION – WINTER 2012

Date: 12-01-2013

Subject Name: Digital Image Processing and Pattern Recognition

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 in detail the image processing workstation. **07**
 (b) With reference to image processing, briefly explain following terms: **07**
 (i) Dynamic range (ii) Contrast
 (iii) Connectivity (iv) Transform coding

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| Q.2 | <p>(a) In image processing, briefly explain with example when we use uniform and non-uniform sampling and quantization.</p> <p>(b) Explain following geometrical operations used in image processing with suitable example and application.: (i) Translation (ii) Rotation</p> | <p>07</p> <p>07</p> |
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OR

- (b)** Explain in detail GIF file format with merits, demerits and limitations. **07**

- Q.3**
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|------------|--|-----------|
| (a) | Prove following 2D-DFT property: | 07 |
| | (i) Periodicity property (ii) Conjugate symmetry | |
| (b) | “Weighted average filter reduce blurring in the smoothing process.” Justify the statement with suitable reason and an example. | 07 |

OR

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| Q.3 | (a) What is the need for transform? Explain in brief about Walsh transform and its application in image processing. | 07 |
| | (b) Which domain is more suitable to remove periodic noise? Explain in brief about Band pass and Notch filters to remove periodic noise. | 07 |

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| Q.4 | (a) Explain in brief about adaptive median filter. For which criteria it works best w.r.t. median filter? | 07 |
| | (b) Explain in detail the RGB color model. What is the Hex number for brightest possible red? | 07 |

OR

- Q.4 (a)** Explain in brief about coding redundancy. Explain Huffman coding technique with suitable example to remove coding redundancy. **07**

- Q.4 (b)** Write short note on wavelet transform. **07**

- Q.5 (a)** Explain following morphological operations used in image processing with suitable example and application. **07**

- (i) Thinning (ii) Extraction of connected components
- (b)** List the types of Edge detectors used for image segmentation. Explain how laplacian is used to detect edge. **07**

OR

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| Q.5 | (a) List and explain the steps for basic region-growing algorithm based on 8-connectivity in image segmentation. | 07 |
| | (b) Explain with example the importance of representation and description in image processing. | 07 |
