Bharatiya Vidya Bhavan's

# Sardar Patel Institute of Technology

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## End Semester Examination

November 2019

Max. Marks: 60 Duration: 3Hrs
Class: B.E. SEMESTER : 7
Course Code: IT71 Branch: IT
Name of the Course: Digital Image Processing

**Instructions: (1) Draw neat diagrams wherever necessary**
**(2) Assume suitable data if necessary**

| Question No. | | Marks | CO | BL |
|---|---|---|---|---|
| 1. a | What do you understand by dynamic range? | 3 | CO 1 | 2 |
| 1. b | We can not differentiate the change in intensity when the intensity is too high or too low. Justify. | 3 | CO 1 | 2 |
| 1. c | Define gradient filter. Write its equation. | 3 | CO 1 | 2 |
| 1. d . | If all the pixels of an image are shffled, will there be any change in histogram? Justify your answer. | 3 | CO 1 | 4 |
| 2. a | Explain with diagram fundamental steps in image processing.<br>OR<br>Explain briefly neighbours, paths and connectivity with example. | 6 | CO 1 | 2 |
| 2. b | Explain various image enhancement techniques in spatial domain. | 6 | CO 1 | 2 |
| 3. a | Find 2D DFT of given image using DIF FFT algorithm.<br>$f(x,y) = \begin{bmatrix} 0 & 0 & 1 & 1 \\ 1 & 2 & 0 & 0 \\ 1 & 0 & 1 & 1 \\ 2 & 0 & 1 & 0 \end{bmatrix}$ | 6 | CO 2 | 3 |

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|---|---|---|---|---|
| 3. b | Compute the Hadamard transform of the given image. Also generate and compute Walsh transform. $f(x,y) = \begin{bmatrix} 2 & 1 & 2 & 1 \\ 1 & 2 & 3 & 2 \\ 2 & 3 & 4 & 3 \\ 1 & 2 & 3 & 2 \end{bmatrix}$ | 6 | CO 2 | 3 |
| 4. a | Compute the entropy of the image f(m,n) = $\begin{bmatrix} 0 & 1 & 0 & 0 \\ 0 & 1 & 2 & 2 \\ 0 & 1 & 2 & 3 \\ 1 & 2 & 2 & 3 \end{bmatrix}$ | 3 | CO 3 | 3 |
| 4. b | For the given data of grey level and count in an image, determine the efficiency if the image is coded using huffman coding.<br>Grey Level — Count<br>128 — 1750<br>64 — 1500<br>32 — 1000<br>16 — 500<br>8 — 250 | 3 | CO 3 | 3 |
| 4. c | Compare DPCM-based image compression technique against the transform based image compression technique. | 3 | CO3 | 4 |
| 4. d | What is fundamental principle of fractal image compression<br>OR<br>What are different types of redundancies exploited in image compression. | 3 | CO 3 | 2 |
| 5. a | Compare the characteristics of first and second order derivative filters. | 3 | CO 4 | 2 |
| 5. b | Explain morphological image processing. | 3 | CO 4 | 2 |
| 5. c | Write short note of Digital Waternarking.<br>OR<br>Write short note Content Based Image Retrieval. | 6 | CO 4 | 2 |