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Total Number of Pages : 02

B.Tech  
PIT6J002

6<sup>th</sup> Semester Regular / Back Examination 2018-19  
DIGITAL IMAGE PROCESSING

BRANCH : IT

Max Marks : 100

Time : 3 Hours

Q.CODE : F622

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- What is image translation and scaling?
- Define the term Bit depth.
- How much memory required to store 256x256 binary image?
- Define Mach band effect.
- Give the relation for degradation model for continuous function.
- What do you mean by Lossy compression?
- Explain under what condition degraded image can be restored correctly.
- What is Entropy? How it related with the information of a message.
- What is mother wavelet of wavelet transform? Explain.
- Define contrast stretching.

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Explain the process of image acquisition using circular sensor strip.
- Explain about image compression models.
- Briefly explain about color transformations.
- Describe the components of general purpose image processing system.
- What is Unsharp masking? Explain High boost filter by analyzing the equations and its weighted mask.
- What is blurring? Explain at least two noise model with its probability density function.
- Explain Homomorphic filtering.
- Explain about different types of redundancy in the text of image processing.
- If an image of 256\*256 pixel having 8 distinct intensity levels need to be transmitted over a communication channel, how image compression helps? Explain using this example.
- Calculate and construct the Huffman code for the given image data. Compute its Entropy.

Symbols	$a_1$	$a_2$	$a_3$	$a_4$	$a_5$	$a_6$
Probability	0.1	0.4	0.06	0.1	0.04	0.3

k) Perform histogram equalization for the 8x8 image shown in the table

Grey levels ( $r_k$ )	0	1	2	3	4	5	6	7
No. of pixels ( $p_k$ )	8	10	10	2	12	16	4	2

l) Write a short note on Sub band coding.

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

**Q3** With neat block diagram discuss about JPEG compression standard. **(16)**

**Q4** Filter the image shown below by using a 3x3 median filter and hence prove that median filtering minimizes the salt and pepper noise. **(16)**

24	23	33	25	32	24
34	255	24	0	26	23
23	21	32	31	28	26

**Q5** What is the issue with inverse filtering for restoring image? Explain with appropriate equations how Wiener filter takes care of this issue. **(16)**

**Q6** Explain the importance of image enhancement in image processing. Explain in brief any two point processing techniques implemented in image processing. **(16)**