

## JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

## TEST -1 EXAMINATION- 2015

B.Tech 7<sup>th</sup> Semester

COURSE CODE: 10BIWEC734

MAX. MARKS: 15

COURSE NAME: Fundamentals of Digital Image Processing

COURSE CREDITS: 3

MAX. TIME: 1 HR

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q1. (a) Write the expression to find the number of bits to store a digital image. Find the number of bits required to store 256 x 256 image with 32 gray levels.

(b) Define subjective brightness and brightness adaptation.

(c) What are the reasons of low contrast image?

(d) Write down two advantages and two disadvantages of median filter.

(e) What is meant by matchband effect?

(f) A captured image appears very dark because of wrong lens aperture setting. What are the enhancement techniques that can be used to enhance such an image? [1x6]

Q2. Consider the image segment shown below. Let  $V = \{1, 2, 3\}$  and compute the  $D_4$ ,  $D_8$  and  $D_m$  distances between p & q.

(q)	1	2	3	4	0
	5	3	2	1	1
	4	2	1	3	0
	3	1	0	2	5
	1	2	0	3	1(p)

[1+1+1]

Q3. An input image has the following gray level PDF:

$$P_r(r) = 2r \quad 0 \leq r \leq 1$$

It is desired to transform the gray levels of this image so that they will have the following PDF:

$$P_z(z) = \frac{\pi}{2} \cos \frac{\pi z}{2} \quad 0 \leq z \leq 1$$

Assume that both  $r$  and  $z$  are continuous variables. Find the transformation function of  $r$  and  $z$  that will accomplish this histogram specification. [3]

Q3. Given an image 'I' of size 5x5. Apply Median filter on the given image and show the result. To avoid problems at the edge of the image you only need to calculate the filtered values for the central 3x3 region. [3]

I =

208	207	210	210	215
200	200	190	190	190
9	10	10	15	18
210	210	200	190	190
215	215	215	210	210