Exam Seat No:_____ Enrollment No:_____

# C.U.SHAH UNIVERSITY

**WADHWAN CITY**

**University (Winter) Examination -2013**

***Course Name :M.Tech(EC) Sem-I*** **Subject Name: -Advance Image Processing** **Mark:70**

**Duration :- 2:30 Hours** **Date : 10/01/2014**

**Instructions:-**

**(1)** Attempt all Questions of both sections in same answer book / Supplementary.
**(2)** Use of Programmable calculator & any other electronic instrument is prohibited.
**(3)** Instructions written on main answer Book are strictly to be obeyed.
**(4)**Draw neat diagrams & figures (If necessary) at right places.
**(5)** Assume suitable & Perfect data if needed.

## SECTION – I

**Q-1** **Define the following terms:** 07

a) Digital image 1
b) Pixel 1
c) Spatial resolution 1
d) Gary level resolution 1
e) Color image 1
f) Image sampling 2

Q-2 A How a color image processing is different from gray image processing? 04

B Draw block diagram of image processing in frequency domain and explain each block. 05

C Explain image transformation techniques related to the coordinates of image. 05

**OR**

Q-2 A What is inverse filtering? Explain with help of an example and Discuss its technical consequences. 04

B Explain the frequency domain filtering. 05

C Explain the method of histogram equalization considering the histogram to be continuous. What is the difference in the result if the histogram is discrete? 05

Q-3 A Define a model of Image restoration. Also explain the different noise Probability Density functions. 07

B Explain MMSE(Wiener)Filtering 07

**OR**

Q-3 A What is meant by local enhancement? Discuss its importance. Explain the image enhancement in spatial domain. 07

B Illustrate the histogram equalization and intensity distribution for a 3 bit image of size 64x64 pixel having 8 intensity levels. 07

| $r_k$ | $r_0$ | $r_1$ | $r_2$ | $r_3$ | $r_4$ | $r_5$ | $r_6$ | $r_7$ |
|---|---|---|---|---|---|---|---|---|
| $n_k$ | 790 | 1023 | 850 | 656 | 329 | 245 | 122 | 81 |

Where $r_k$ is an intensity level and $n_k$ is the number of pixel having intensity value $r_k$ .The image has intensity levels in the range of [0, 7].

## SECTION – II

| | | | |
|---|---|---|---|
| **Q-4** | | **Attempt the following:** | 7 |
| | | a) Stereo-pair image | 2 |
| | | b) Triangulation | 2 |
| | | c) Optical interferometry (OF) | 2 |
| | | d) Properties of 2D DFT. | 1 |
| Q-5 | A | Explain the architecture of the warping system with neat sketch. | 07 |
| | B | Explain the Optical transfer function. Why is it known as modulation transfer function of the optical System? | 07 |

**OR**

| | | | |
|---|---|---|---|
| Q-5 | A | Explain Second order polynomial warping system and write the required equation. | 07 |
| | B | Write a short note on Quadrature filtering. | 07 |
| Q-6 | A | Discuss the effect of the size of filter coefficients in the frequency domain filtering on the resulting image. | 07 |
| | B | Explain the concept of thresholding in image segmentation and discuss any two methods of thresholding in brief. | 07 |

**OR**

| | | | |
|---|---|---|---|
| Q-6 | A | Explain with example the hit or miss transformations in binary image. | 07 |
| | B | What do you mean by Image restoration? Can an original Image be restored Completely? Justify your answer technically. | 07 |

************10-14*************