USN | | | | | | | | | | |

NEW SCHEME

First Semester M.Tech. Degree Examination, Dec. 06 / Jan. 07
Digital Image and Computer Vision

Time: 3 hrs.] [Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 Discuss all the methodologies that can be applied to images for different purposes and possibly with different objectives. **(20 Marks)**

2 a. Explain how the continues sensed data is converted into digital form and represented it is in a digital image form. **(10 Marks)**

b. Consider the image segment shown below:

	3	1	2	1	(Q)
	1	2	1	1	
	1	2	1	1	
(P)	1	0	1	2	

Let V = {1, 2}, Compute the lengths of the shortest 4-, 8-, and m- path between P and Q. If a particular path does not exists between these two points, explain why? **(10 Marks)**

3 Explain the role of histogram equalization in image enhancement. Explain why the discrete histogram equalization technique does not, in general yield a flat histogram. **(20 Marks)**

4 Discuss the characteristics of ideal Butterworth and Gaussian high pass filters for both the frequency and spatial domains. **(20 Marks)**

5 Show that the Fourier transform of the 2-D continuous sine function

$f(x,y) = A\sin(u_0 x + v_0 y)$

is the pair of conjugate impulses

$$F(u,v) = -j\frac{A}{2}\left[\delta\left(u - \frac{u_0}{2\pi}, v - \frac{v_0}{2\pi}\right) - \delta\left(u + \frac{u_0}{2\pi}, v + \frac{v_0}{2\pi}\right)\right].$$ **(20 Marks)**

6 Derive the mapping functions that convert colors from HSI to RGB and RGB to HIS model. **(20 Marks)**

7 Consider an 8-pixel line of gray-scale data {12, 12, 13, 13, 10, 13, 57, 54}, which has been uniformly quantized with 6-bit accuracy. Construct its 3-bit IGS code. Compute the rms error and rms signal-to-noise ratios for the decoded IGS data. **(20 Marks)**

8 a. Discuss a method for estimating dynamic thresholds that produce a minimum average segmentation error. **(10 Marks)**

b. Explain any one segmentation technique used for region finding. **(10 Marks)**

*****