JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY WAKNAGHAT

TEST-2 EXAMINATION (April 2016)

M.Tech 2nd Sem. & B.Tech 8th Sem. (ECE)

COURESE CODE: - 16M1WEC231   MAX. MARKS: 25

COURSE NAME: - Advanced Digital Image Processing

COURSE CREDITS: 3   MAX. TIME: 1Hr 30Min

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

Q1(a). How is simultaneous contrast related to the human visual system?   **(1)**

Q1(b). How does contrast stretching method work?   **(1)**

Q1(c). How is histogram matching different from histogram equalization?   **(1)**

Q1 (d). Write the expression to find the number of bits, b, required to store a digitized image. How many

bits are required to store a 6-bit image of size 500*250.   **(1+1 =2)**

Q2(a). Explain Homomorphic filtering.   **(3)**

Q2(b). Discuss unsharp masking and high boost filtering techniques for image enhancement. Show the

filter mask also.   **(1+1 =2)**

Q 3(a). Discuss the various steps for frequency domain filtering.   **(2)**

Q3(b). Discuss the separability property of 2-D discrete Fourier Transform (DFT).   **(1)**

Q3(c). Explain order statistics spatial filter. Why an isolated cluster of dark or light (w.r.t. background)

pixels whose area is less than half of the area of a median filter are eliminated by the filter. **(1+1 =2)**

Q 4(a). Suppose that you form a lowpass spatial filter that averages the four immediate neighbors of a

point (x, y) but excludes the point itself.

   i)   Find the equivalent filter H (u, v) in the frequency domain.
   ii)   Show that your result is a lowpass filter.   **(1.5+1.5 =3)**

Q 4(b). It is said that the Butterworth lowpass frequency domain filter act as a transition between

Ideal and Gaussian lowpass frequency domain filters. Prove this statement.   **(2)**

Q 5. Differentiate between smoothing and sharpening spatial filters. Discuss sharpening (first order and

second order) filters in detail. Compute the filter masks for these filters.   **(1+2+2=5)**