SLIATE

SRI LANKA INSTITUTE OF ADVANCED TECHNOLOGICAL EDUCATION

(Established in the Ministry of Higher Education, vide in Act No. 29 of 1995)

Higher National Diploma in Information Technology
Second Year, Second Semester Examination – 2015
HNDIT2415- Digital Image Processing

Instructions for Candidates:	No. of questions : 06
Answer 5 Questions.	No. of pages : 03
	Time : 3 hours

1) i) Explain how an image represent in the computer

[2 Marks]

   ii) State two different image acquisition system

[4 Marks]

   iii) Distinguish the sampling and quantization

[6 Marks]

   iv) What information of the image display by the histogram

[8 Marks]

2) i) What is meant by image enhancement?

[3 Marks]

   ii) Explain the point processing

[3 Marks]

   iii) Write the mathlab code for the log transformation $P_{out} = c\log_{10}(1 + P_{in})$ where 'c' is a constant

[8 Marks]

   iv) Draw the output of the following image after inverse transformation

[6 Marks]

3) i) Explain the mean and median filtering using an example

[4 Marks]

   ii) State the general purpose for applying mean filtering to the image

[3 Marks]

   iii) What would be the negative effect of mean filtering

[3 Marks]

   iv) Write the mathlab code for mean filtering the given image using a suitable filter

[5 Marks]

v) Following matrix define the 5x5 image f(x,y) and after applying 3x3 mean filter in special domain, what would be the new values of inner pixels
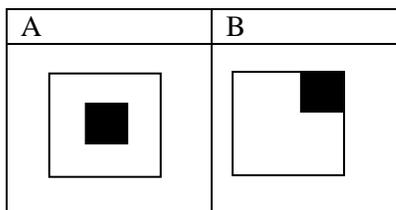
5	4	2	5	3
6	5	2	1	4
3	4	2	1	1
2	3	6	7	3
1	4	5	6	4

[5 Marks]

4) i) Describe the edge direction and edge strength of an image

[4 Marks]

ii) What would be the resultant image of after the logical operations (A AND B) & NOT(B)

[4 Marks]

iii) Explain the detecting the edge of an image using following sobel operators

-1	-2	-1
0	0	0
1	2	1

-1	0	1
-2	0	2
-1	0	1

[6 Marks]

iv) Write the matlab code to find the above describe procedure

[6 Marks]

5) i) State the usefulness of the thresholding

[2 Marks]

ii) suppose the following image matrix 'r'

32	36	29	39	25	23	9
22	36	26	14	19	18	20
21	20	32	23	34	35	14
20	23	34	34	35	23	25
34	30	28	29	30	31	25
12	23	20	8	10	19	12
11	22	19	9	8	7	9

a) Write the output when given the matlab command 'tr=(r>10 & r<20)'

[4 Marks]

b) Write the output when given the matlab command 'tr1=r>30'

[4 Marks]

2

iii) Describe the following matlab function
   a) rgb2gray
   b) imshow
   c) imhist
   d) filter2
   e) medfilt2

[10 Marks]

6) i) Distinguish lossless compression and lossy compression

[4 Marks]

ii) What is tell us from the entropy defined by $H = -\sum_{i=0}^{L-1} p_i log_2(p_i)$

[4 Marks]

iii) Construct a Huffman code for the probability table given below

Gray value	0	1	2	3	4	5	6	7
Probability	.09	.13	.15	.1	.14	.12	.11	.16

[8 Marks]

iv) Find the entropy for the above gray values

[4 Marks]