B.E. Electronics Engineering / Electronics Telecommunication / Communication Engineering Eighth Semester

EN802 - Elective-II - Digital Image Processing

P. Pages : 2

Time : Three Hours

GUG/W/18/2018

Max. Marks: 80

Notes : 1. All questions carry equal marks.

- 2. Due credit will be given to neatness and adequate dimensions.
- 3. Assume suitable data wherever necessary.
- 4. Illustrate your answers wherever necessary with the help of neat sketches.
- A common measure of transmission for digital data is to baud rate, defined as number bits transmitted per second. Generally, transmission is accomplished an packets consisting of a start bit, a byte (8 bits) of information, and a stop bit. Using these facts, answer the following:
 - a) How many minutes would if take to transmit a 1024x1024 Image with 256 intensity levels using a 56k baud modem?
 - b) What would the time be at 3000k baud.

OR

- 2. Consider the image segment shown in fig. Q. 2.

 - a) Let $V = \{0, 1\}$ and compute the lengths of shortest 4-, 8-, and m-path between p and q. If a particular path does not exist between these two points, explain why?
 - b) Repeat for $V = \{1, 2\}$.

Find two dimensional convolution of f(x, y) and w(x, y).

3.

f(x,y)									
0	0	0	0	0			w(x,y)		
0	0	0	0	0			1	2	3
0	0	1	0	0			4	5	6
0	0	0	0	0			7	8	9
0	0	0	0	0					

OR

4.Explain what do you understand by
a)8a)Smoothing spatial filters.8b)Sharpening spatial filters.8

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16

16

- Consider a 3x3 spatial mask that averages the four closest neighbors of a point (x, y) but **16** excludes the point it self from the average.
 - a) Find equivalent filter, H (U, V) in the frequency domain.
 - b) Show that your resent is low pass filter.

5.

OR

6.	a)	State and prove two dimensional Discrete convolution property of Fourier transform.							
	b)	If f (x, y) is real then show that $F^*(U, V) = F(-U, -V)$. Where F (U, V) is two dimensional Fourier transform of f (x, y).	8						
7.		Consider the simple 4x8, 8 bit image shown in fig. Q. 7.							
		21 21 21 95 169 243 243 243							
		21 21 21 95 169 243 243 243							
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		21 21 21 95 169 243 243 243							
		Fig. Q. 7.							
		a) Compute the entropy on the Image.							
		b) Compress the image using Huffman coding.							
		OR							
8.	a)	Write a general procedure for finding Golomb code of positive integers.	8						
	b)	Compute Golomb code $G_4(n)$ for $0 \le n \le 7$.	8						
9.	a)	Explain what do you understand by median filter, max and min filter's.							
	b)	Explain what do you understand by Alpha trimmed mean filter.							
		OR							
10.		Obtain mid-point filtered image for the image shown shown in fig Q. 10.							
		52 55 61 66							
		63 59 66 90							
		62 59 68 113							
		63 58 71 122							
		Fig. Q. 10.							
