Name :	
Roll No. :	A Aurora W Consider 2nd Conford
Invigilator's Signature :	

CS/M.Tech(CSE)/SEM-2/CST-1202 B2/2013

2013

IMAGE PROCESSING & COMPUTER VISION

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks. Candidates are required to give their answers in their own words as far as practicable.

GROUP – A (Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

 $10 \times 1 = 10$

- i) In Image Processing technique the input & output are
 - a) low & improved quality image
 - b) description & image
 - c) image & description
 - d) low quality image & description.
- ii) An image function f(x, y) is characterized by f(x, y) = i(x, y)r(x, y), where
 - a) 0 < i(x, y) < 0 and $0 < r(x, y) < \infty$
 - b) 0 < i(x, y) < 1 and 0 < r(x, y) < 1
 - c) $0 < i(x, y) < \infty$ and 0 < r(x, y) < 1
 - d) none of these.

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iii)	Sampling of an image is required for					
	a)	quantization	b)	sharpening		
	c)	smoothing	d)	thinning.		
iv)	Intensity range of 8-bit pixel image is					
	a)	0 to 7	b)	0 to 15		
	c)	0 to 31	d)	0 to 255.		
v)	An image size of $M \times N$ with 64 grey level required to store digitized image is					
	a)	$M \times N \times 64$	b)	$M \times N \times 63$		
	c)	$M \times N \times 6$	d)	$M \times N \times 8.$		
vi)	An image of 1024×1024 having intensity of each pixel 8-bit requires a storage space					
	a)	1 kB	b)	1 MB		
	c)	2 kB	d)	2 MB.		
vii)	Stat	State True or False :				
	a)	Computer Vision system can be managed by AI systems.				
	b)	8-bit colour depth combinations.	requi	ires 256 no. of grey		
viii)	In 8 distance measurement system distance between centre pixel & corner pixel is					
	a)	2 unit	b)	$\sqrt{2}$ unit		
	c)	1 unit	d)	1·5 unit.		

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ix)	If the pixels of an image are suffled then the parameter that may change is					
	a)	histogram	b)	mean		
	c)	entropy	d)	covariance.		
x)	The prime colour model is					
	a)	RGB	b)	СМҮК		
	c)	HSR	d)	none of these.		
xi)	Soft computing is an emerging area of					
	a)	AI	b)	ANN		
	c)	Image Processing	d)	all of these.		

GROUP – **B**

(Short Answer Type Questions)

Answer *all* the following questions. $5 \times 3 = 15$

- 2. Describe different areas of image processing problems & applications.
- 3. Describe image reconstruction from projection.
- 4. Define block matrices & knocker products. Describe with proper example.
- 5. What is entropy of an image source ? Describe the following :

$$H = -\sum_{k=1}^{L} P_k \log_2 P_k \text{ bits/message.}$$

6. Describe the different criteria of image fidelity.

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GROUP – C

(Long Answer Type Questions

Answer any *three* of the following. $3 \times 15 = 45$

- 7. a) Describe colour representation model (perceptual representation) with sensitivity curve.
 - b) Describe the laws of colour matching. 7 + 8
- 8. a) Describe image enhancement in brief.
 - b) Describe contrast stretching, clipping & thresholding with proper equations. 7 + 8
- 9. a) Describe image restoration technique in brief.
 - b) Draw image observation model diagram & explain. 7 + 8

10. a) Show that
$$\frac{1}{2\pi} \int_{-\pi}^{\pi} e^{\pm jn\theta} d\theta = \delta(n)$$
.

b) Given a sequence $u(m,n) = (m+n)^3$. Evaluate $u(m,n)\delta(m-1), (n-2)$ and $u(m,n)\otimes\delta(m-1,n-2)$.

8 + 7

- 11. Write short notes on any *three* of the following : 3×5
 - a) Histogram of image
 - b) Image Vision system
 - c) Image Quantization
 - d) Filtering of noise in digital image
 - e) Fuzzy applications in Image Processing.

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