Enroll. No._____

MARWADI UNIVERSITY

Faculty of Technology

C.E / I.T

B.TECH. **SEM: 5** **WINTER:2018**

Subject: - Image Processing 01CE0507 **Date:-27/10/2018**

Total Marks:-100 **Time: - 03:00 hours**

Instructions:

1. **All Questions are Compulsory.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Question: 1.

(a) Identify the correct option [10]

i. A continuous image is digitized at _____ points.
a) random
b) vertex
c) contour
d) sampling

ii. On which of the following operation of an image, the topology of the region changes?
a) Stretching
b) Rotation
c) Folding
d) Change in distance measure

iii. What is the tool used in tasks such as zooming, shrinking, rotating, etc.?

a) Sampling
b) Interpolation
c) Filters
d) None of the Mentioned

iv. What does the total number of pixels in the region defines?

a) Perimeter
b) Area
c) Intensity
d) Brightness

v. Smallest unit of image is

a) Dot
b) Brightness
c) Pixel
d) None of the above

(b) Define the following terms [10]

i. Spatial Domain
ii. Frequency Domain
iii. Smoothing of image
iv. Sharpening of image

Question: 2.

(a) Explain Image Acquisition techniques in brief. [08]

(b) What is histogram? Explain histogram equalization algorithm. [08]

OR

(b) Explain Homomorphic filter giving a block diagram and its applications. [08]

Question: 3.

(a) Contrast over discussing the behavior of first and second order derivative applied to an image. [08]

(b) Write or design 3x3 mask for Sobel Edge detection. [04]

(c) Explain 3x3 averaging operation on M x N gray scale image. [04]

OR

(a) Explain the gradient and Laplacian applied to an image. [08]

(b) Write a short note on Power-Law (Gamma) transformation. [04]

(c) What is meant by gray level slicing. [04]

Question: 4.

(a) Explain filtering in frequency domain with support of appropriate examples. [08]

(b) Explain Weiner Filter. [04]

(c) Explain RGB color model. [04]

OR

(a) Explain about Band Reject, Band Pass and Noch filters. [08]

(b) Explain about morphological hit-or-miss transform. [04]

(c) Explain CMYK color model. [04]

Question: 5.

(a) Explain Dilation, Erosion, Opening, Closing operators demonstrate it with example also write the Matlab / Scilab commands to do such operation. [08]

(b) Design a MATLAB code for implementing averaging filter without using f-special function [04]

(c) Classify the following image intensity values in to two distinct classes {101, 201, 100, 200, 105, 205, 210, 107, 109, 208}. Give justification. [04]

OR

(a) Given image of 3 bit (l=8) of size 64*64 pixels has intensity distribution shown in table given below: [08]

rk 0 1 2 3 4 5 6 7
nk 790 1023 850 656 329 245 122 81
Obtain values of equalized histogram for each r.

(b) What is pseudo color image processing? Explain intensity slicing of color image. [04]

(c) Explain HSI color model with all essential figure and equation. [04]

Question: 6.

(a) Demonstrate or explain spatial correlation and convolution with suitable example. [08]

(b) What is image segmentation? Differentiate between first order and second order edge detection technique? [04]

(c) Explain about local and global thresholding. [04]

OR

(a) Define restoration. Explain model of restoration process and noise models with essential diagram and equation. [08]

(b) Explain Min-Max filter with example. [04]

(c) Explain any four probability density functions depicting noise. [04]

---Best of Luck---

Que. Paper weight-age as per Bloom's Taxonomy

No.	Que. Level	% of weight-age	
		% of weight -age	Que. No.
1	Remember/Knowledge	10	Q 1b
2	Understand	46	Q1 a, Q2 a & b, Q3 c, Q 4 b & c, Q5 c, Q6 c
3	Apply	16	Q5 a, Q6 a
4	Analyze	4	Q6 b
5	Evaluate	16	Q3 a, Q 4a
6	Higher order Thinking	8	Q3 b, Q5 b

GRAPH: