Hall Ticket Number:

Code No. : 42122

VASAVI COLLEGE OF ENGINEERING *(Autonomous)*, HYDERABAD

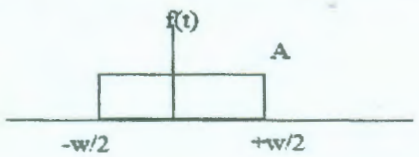
B.E. (CSE) IV Year II-Semester Main Examinations, May-2019

Image Processing

Time: 3 hours Max. Marks: 70

*Note: Answer **ALL** questions in **Part-A** and any **FIVE** from **Part-B***

Q.No.	Stem of the question	M	L	CO	PO
	Part-A (10 × 2 = 20 Marks)				
1.	Define image, sampling, quantization, gray levels in image?	2	2	1	1,2,3
2.	Computer the convolution and correlation of x(1,2,1,1)and h(1,1,2,1)?	2	3	1	1,2,3
3.	Define the expression of one-dimensional discrete Fourier transform pair?	2	2	2	1,2,3
4.	Calculate the gray image intensity for RGB values (25, 48, 50)?	2	3	2	1,2,3
5.	Compute first order and 2nd order derivative on row of the image (6,6,6,5,4,3,2,1,0,2,2,2)	2	3	3	1,2,3
6.	What is thresholding? Specify Sobel and Robert's operators?	2	2	3	1,2,3
7.	Define compression ratio? Calculate the entropy for the following distribution.	2	3	4	1,2,3
	Intensity: 0, 1, 2, 3 / probability: 0.3, 0.5, 0.15, 0.05				
8.	Compute the $\|g_x\|$ component of the following image using prewitt operator for the edge detection. $f(x,y)=\begin{matrix}0&2&2\\0&0&3\\0&0&0\end{matrix}$	2	3	4	1,2,3
9.	Define Gray-level interpolation? What are the three methods of estimating the degradation function?	2	2	5	1,2,3
10.	Find RGB values for the pixel having the CMY values as (0.5, 0.3, 0.2)?	2	3	5	1,2,3
	Part-B (5 ×10 = 50 Marks)				
11. a)	What are the various fundamental steps in digital image processing? Explain?	5	2	1	1,2,3
b)	Explain image formation in human eye?	5	2	1	1,2,3
12. a)	Prove any four 2-D discrete Fourier transform properties?	5	3	2	1,2,3
b)	Find the fourier transform of the f(t) and also compute $\|F(u)\|$.	5	3	2	1,2,3,4



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13. a)	Explain region growing and splitting method in image segmentation?	5	2	3	1,2,3
b)	Perform histogram equalization and draw the histograms.	5	4	3	1,2,3

r_k	n_k	$P_r(r_k)=n_k/MN$
$r_0=0$	790	0.19
$r_1=1$	1023	0.25
$r_2=2$	850	0.21
$r_3=3$	656	0.16
$r_4=4$	329	0.08
$r_5=5$	245	0.06
$r_6=6$	122	0.03
$r_7=7$	81	0.02

14. a)	Block diagram of lossy compression method? Provide short notes on quantization, transform coding and block transform coding in view of the lossy compression?	5	2	4	1,2,3
b)	Compute the $G_4(9)$ with Golomb coding ,explain each step of the algorithm.	5	3	4	1,2,3
15. a)	Explain about image restoration using inverse filtering. Write the draw backs of this method?	5	3	5	1,2,3
b)	List various color models? What are RGB and CMY models in color image processing?	5	3	5	1,2,3
16. a)	Explain elements of visual perception.	5	2	1	1,2,3
b)	Find Fourier transform of the X= [1 2 1 2].	5	3	2	1,2,3
17.	Answer any ***two*** of the following:				
a)	Redundancies in an image	5	2	3	1,2,3
b)	LZW coding	5	2	4	1,2,3
c)	i) Run-length encoding ii) Apply run-length encoding on the following data and find compressed data. Data: BBBBBBBBBAAAAAAAAAAAAAAAANMMMMMMMMMM	5	3	5	1,2,3,4

M: Marks; L: Bloom's Taxonomy Level.

S. No.	Criteria for questions	Percentage
1	Fundamental knowledge (Level-1 & 2)	60
2	Knowledge on application and analysis (Level-3 & 4)	40
3	*Critical thinking and ability to design (Level-5 & 6) (*wherever applicable)	