Hall Ticket Number:

1	6	0	2	1	9	7	3	3	1	4	7

Code No. : 16237 AS

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

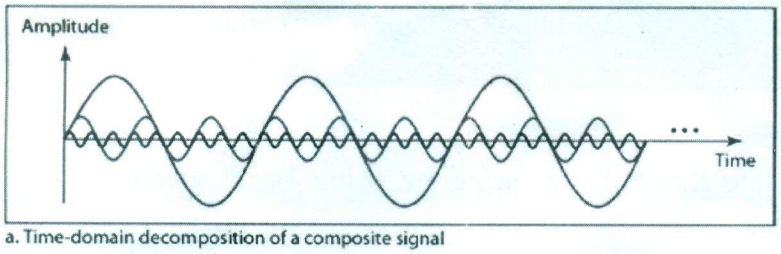
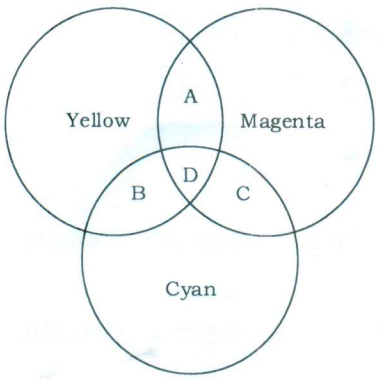
B.E. (C.S.E.) VI-Semester Advanced Supplementary Examinations, August-2022

Image Processing (PE-I)

Time: **3 hours** Max. Marks: **60**

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

Part-A (10 × 2 = 20 Marks)

Q. No.	Stem of the question	M	L	CO	PO
1.	What are the different processing for which input is an image and output is also an image.	2	2	1	1
2.	What is the number of colors we get if we use 6-bits for each of Red, Green and Blue channels?	2	3	1	2
3.	What are the different line detection operators?	2	1	2	1
4.	Give the Laplacian Masks.	2	1	2	1
5.	What is the appropriate representation of the given signal in frequency domain.  a. Time-domain decomposition of a composite signal	2	3	3	2
6.	What is the use of converting spatial domain to frequency domain.	2	2	3	1
7.	Give names of EIGHT image formats.	2	1	4	1
8.	Explain Run-Length Coding with an example.	2	3	4	2
9.	Write the colors for A.B, C and D  	2	3	5	1
10.	Write about Gaussian Noise model.	2	1	5	1

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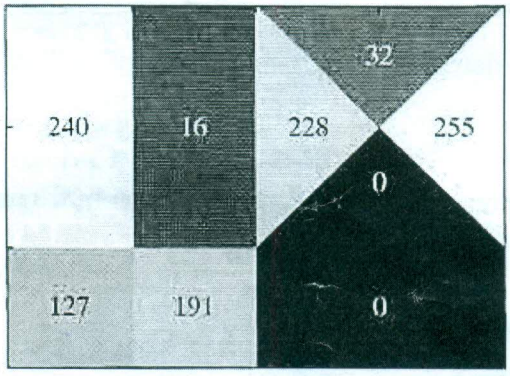
	Part-B (5 × 8 = 40 Marks)				
11. a)	What are the fundamental steps in Image Processing? Explain.	4	1	1	1
b)	What are the applications of Image Processing? Explain.	4	1	1	1
12. a)	Obtain the un-normalized and the normalized histograms of the following 8-bit, M×N image. Give your histogram either in a table or a graph, labeling clearly the value and location of each histogram component in terms of M and N. Double check your answer by making sure that the histogram components add to the correct value. 	5	3	2	3
b)	Obtain the appropriate threshold by using by using Basic global thresholding algorithm. $\begin{bmatrix} 1 & 2 & 3 & 4 & 3 & 2 & 1 & 5 \\ 0 & 5 & 6 & 7 & 4 & 3 & 2 & 1 \\ 6 & 4 & 4 & 3 & 2 & 1 & 4 & 3 \\ 3 & 4 & 5 & 2 & 1 & 0 & 5 & 4 \\ 5 & 6 & 3 & 2 & 1 & 5 & 7 & 3 \\ 4 & 6 & 3 & 2 & 5 & 6 & 3 & 2 \\ 5 & 4 & 7 & 3 & 2 & 5 & 3 & 2 \\ 5 & 3 & 2 & 4 & 2 & 6 & 7 & 1 \end{bmatrix}$	3	3	2	2
13. a)	Explain in detail about image smoothing in frequency domain.	4	2	3	1
b)	Explain in detail about image sharpening in frequency domain.	4	2	3	1

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14. a)	Using the Huffman code shown below, decode the encoded string 0101000001010111110100.	3	3	4	2
	b)	Given a five symbol source {a,b,c,d,e} with source probabilities {0.15, 0,2, 0.15, 0.2,0.3}, arithmetically encode the sequence ***bbcbbc.***	5	3	4	2
15.	a)	What are the different color models? Explain.	4	2	5	1
	b)	Explain Least squares filtering with an example.	4	3	5	2
16.	a)	Explain about Sampling and Quantization.	4	2	1	1
	b)	Explain any one smoothing filter with an example.	4	3	2	1
17.		Answer any ***two*** of the following:				
	a)	Explain about DFT of one variable.	4	2	3	1
	b)	Explain about different fidelity criteria used in image compression.	4	2	4	1
	c)	Explain about full color image processing.	4	2	5	1

Original source			Source reduction			
Symbol	Probability	Code	1	2	3	4
a_2	0.4	1	0.4 1	0.4 1	0.4 1	0.6 0
a_6	0.3	00	0.3 00	0.3 00	0.3 00	0.4 1
a_1	0.1	011	0.1 011	0.2 010	0.3 01	
a_4	0.1	0100	0.1 0100	0.1 011		
a_3	0.06	01010	0.1 0101			
a_5	0.04	01011				

M : Marks; L: Bloom's Taxonomy Level; CO; Course Outcome; PO: Programme Outcome

i)	Blooms Taxonomy Level – 1	20%
ii)	Blooms Taxonomy Level – 2	40%
iii)	Blooms Taxonomy Level – 3 & 4	40%

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