Hall Ticket Number:

Code No. : 16245 (A) N/O

VASAVI COLLEGE OF ENGINEERING *(AUTONOMOUS)*, HYDERABAD

Accredited by NAAC with A++ Grade

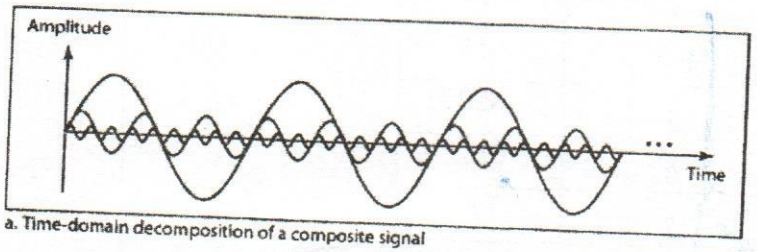
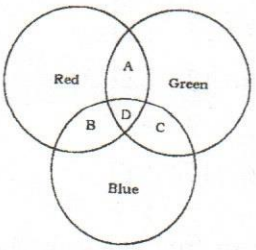
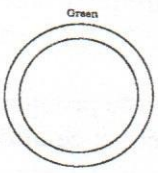
B.E. (C.S.E.) VI-Semester Main Examinations, May/June-2023

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 image attributes.	2	1	1	1
2.	What is the number of colors we get if we use 4-bits for each of Red, Green and Blue channels	2	2	1	1,2
3.	What are the different point detection operators	2	1	2	1
4.	Give the Prewitt operators.	2	2	2	1,2
5.	What is the appropriate representation of the given signal in frequency domain  a. Time-domain decomposition of a composite signal	2	2	3	1,2
6.	Which transformation of an image is used in JPEG compression	2	1	3	1
7.	What are the different binary image compression standards	2	1	4	1
8.	What are the other two JPEG format and what is the difference among all the three JPEG formats	2	1	4	1
9.	Write the colors for A.B, C and D 	2	2	5	1,2
10.	Complete the circle labeling, which are for complements on color circle. 	2	1	5	1

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Part-B (5 × 8 = 40 Marks)

11. a)	What are the components required for Image Processing and explain with neat block diagram?	4	2	1	1,2
b)	Explain how Electromagnetic spectrum bands are used in Image Processing	4	2	1	1,2
12. a)	An image with the occurrence of gray values (0-7) are shown in column-2. Apply the histogram equalization and give the resultant image gray values. After applying one time, once again apply the histogram equalization for the second pass and then third pass. Give the resultant histogram for all the three passes.	4	3	2	1,2

Gray Value	Frequency
0	81
1	122
2	245
3	329
4	656
5	850
6	1023
7	790

b)	Obtain the appropriate threshold by using by using Basic global thresholding algorithm.	4	3	2	1,2

$$\begin{bmatrix} 11 & 12 & 13 & 14 & 13 & 12 & 11 & 15 \\ 10 & 15 & 16 & 17 & 14 & 13 & 12 & 11 \\ 16 & 14 & 14 & 13 & 12 & 11 & 14 & 13 \\ 13 & 14 & 15 & 12 & 11 & 10 & 15 & 14 \\ 15 & 16 & 13 & 12 & 11 & 15 & 17 & 13 \\ 14 & 16 & 13 & 12 & 15 & 16 & 13 & 12 \\ 15 & 14 & 17 & 13 & 12 & 15 & 13 & 12 \\ 15 & 13 & 12 & 14 & 12 & 16 & 17 & 11 \end{bmatrix}$$

13. a)	Explain in detail about image sharpening in frequency domain using ideal high pass filter.	4	2	3	1,2
b)	Explain in detail about image smoothening in frequency domain using ideal low pass filter.	4	2	3	1,2
14. a)	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 ***aacabc.***	4	3	4	1,2,

Contd... 3

b)	Use LZW compression technique and give the result for the following image. $\begin{bmatrix} 39 & 39 & 126 & 126 \\ 39 & 39 & 126 & 126 \\ 39 & 39 & 126 & 126 \\ 39 & 39 & 126 & 126 \end{bmatrix}$	4	3	4	1,2
15. a)	Give the procedure to convert RGB color model to HSI color model? Convert RGB values 24, 98, 118 respectively into HIS values in range [0-1].	4	3	5	1,2
b)	Explain about Inverse filtering	4	2	5	1,2
16. a)	Explain about Image sensing and acquisition with suitable diagram.	4	2	1	1
b)	Explain about different sharpening filters with suitable example.	4	3	2	1,2
17.	Answer any ***two*** of the following:				
a)	Explain about DFT of two variables and compute DFT sequence of f(x)={0, 1, 2, 1}	4	3	3	1
b)	Explain about different redundancies in images. Compute compression ratio and relative redundancy of an image.	4	3	4	1,2
c)	Explain about pseudocolor image processing with neat diagram?	4	1	4	1

intensity	**probability**	**Code1**	**Code2**
87	0.25	01010101	01
128	0.47	10000000	1
186	0.25	10111010	000
255	0.03	11111111	001

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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