CBCS SCHEME

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22SCS241

Second Semester M.Tech. Degree Examination, June/July 2023
Digital Image Processing

Time: 3 hrs. Max. Marks: 100

Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.

		Module – 1	M	L	C
Q.1	a.	With a neat block diagram, explain the fundamental steps in Digital Image Processing.	10	L1	CO1
	b.	Outline the process of Image Sampling and quantization with a suitable example.	10	L1	CO1
		OR			
Q.2	a.	Explain RGB and HSI color model. How RGB to HSI conversion is done.	10	L1	CO1
	b.	Illustrate the process of Brightness adaption and Discrimination.	10	L1	CO1
		Module – 2			
Q.3	a.	Explain basic Gray level transformation functions.	10	L1	CO1
	b.	Explain different smoothing filters used in spatial domain.	10	L1	CO1
		OR			
Q.4	a.	Explain Homomorphic filtering approach for Image Enhancement.	10	L3	CO2
	b.	Explain the working of Ideal low pass, Butterworth low pass and Gaussian low pass filters with relevant expressions and sketches.	10	L3	CO2
		Module – 3			
Q.5	a.	Develop any Five Noise probability density functions with their plot.	10	L2	CO3
	b.	Explain image restoration and degradation model with a neat sketch.	6	L2	CO3
	c.	Discuss briefly about any 4 mean filters used for restoration.	4	L3	CO2
		OR			
Q.6	a.	What are order statistic filters? Explain different types of order statistic filters.	10	L3	CO2
	b.	Outline the role of Inverse filters and Minimum Mean Square Error Filtering (Weiner) in image restoration.	10	L3	CO2
		Module – 4			
Q.7	a.	Apply Hough transform of technique for the process of Edge Linking in Images.	10	L3	CO2
	b.	Explain region growing and region splitting and merging procedure of region based segmentation.	10	L3	CO2
		OR			
Q.8	a.	Explain Dilation and Erosion process in Image morphology.	10	L2	CO3
	b.	Explain about image segmentation using Thresholding.	7	L2	CO3
	c.	Explain the different types of Edge models.	3	L2	CO3
		Module – 5			
Q.9	a.	Develop Huffman code for the following data given in Fig. Q9 (a). Also compute the average length of the code.	10	L2	CO3
	b.	Explain Run length coding by taking suitable example.	10	L2	CO3

Symbol	a_1	a_2	a_3	a_4	a_5	a_6
Probability	0.1	0.4	0.06	0.1	0.04	0.3

Fig. Q9 (a)

OR

Q.10	**a.**	Develop Arithmetic code for the message a_1 a_2 a_3 a_3 a_4. Probability and Subinterval of each source symbol is given in Fig. Q10 (a).	**10**	**L3**	**CO3**

Source Symbol	Probability	Initial Sub Interval
a_1	0.2	[0.0,0.2]
a_2	0.2	[0.2,0.4]
a_3	0.4	[0.4,0.8]
a_4	0.2	[0.8,0.1]

Fig. Q10 (a)

	b.	Explain the use of chain codes to represent a boundary.	**10**	**L3**	**CO3**

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