Code No:

R20

III B. Tech I Semester Regular/Supplementary Examinations, NOV - 2022
DIGITAL IMAGE PROCESSING
(Common to CSM)

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

Note: Answer **ONE** question from each unit **(5 × 12 = 60 Marks)**

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		UNIT-I	
1.	a)	Explain the fundamental steps involved in a typical digital image processing system along with distinguishing between image processing and image analysis	[6M]
	b)	Define gray level resolution and explain what happens if it is not adequate in the quality of the image.	[6M]
		(OR)	
2.	a)	Explain the concepts and types of adjacency, path and connectivity in basic pixel relationships.	[6M]
	b)	What are various imaging sensors? Explain how images are acquired using those sensors.	[6M]
		UNIT-II	
3.	a)	What is gamma correction? Why is it necessary for display devices and how it is done?	[6M]
	b)	Given the histogram $P_r(r) = \begin{cases} \dfrac{2r}{(L-1)^2} & 0 \le r \le L-1 \\ 0 & otherwise \end{cases}$ Derive the transformation function needed for its equalization.	[6M]
		(OR)	
4.	a)	Why flattening of histogram components across the entire gray scale is necessary for an image to have good contrast?	[6M]
	b)	A 3-bit image of size 64x64 has the following histogram. Derive the transformation function needed for its histogram equalization. Also plot the transformation function obtained along with both histograms. $H(r_k)$={790, 1023, 850, 656, 329, 245, 122, 81}	[6M]
		UNIT-III	
5.	a)	What is the purpose of image restoration? Explain the model of image degradation and restoration process using suitable block diagram.	[6M]
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	b)	Discuss the ordered statistic filters suitable for the removal of different types of noises.	[6M]
		(OR)	
6.	a)	How degradation can be estimated?	[6M]
	b)	Using Weiner filter how a degraded image can be restored?	[6M]
		UNIT-IV	
7.	a)	Distinguish between point, line and edge features of an image.	[6M]
	b)	Derive the sequence of application of Opening and Closing operations involved in the detection of a particular binary pattern in fixed orientation. Hint: Pixels which you Hit are the shape pixels and which you Miss are doesn't.	[6M]
		(OR)	
8.	a)	What is the purpose of image segmentation?	[6M]
	b)	Define the morphological operation and Explain the following: (i) Erosion, (ii) Dilation	[6M]
		UNIT-V	
9.	a)	Discuss the fidelity criteria used in the quality assessment of compression techniques.	[6M]
	b)	Describe arithmetic coding with an example for compression of image.	[6M]
		(OR)	
10.	a)	What are different types of redundancies present in digital images? Explain.	[6M]
	b)	With the help of a block diagrams explain image compression and decompression systems.	[6M]

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