

Examination: ESE

Year: TY

Branch: Information Technology

Subject: IP & CV

Subject Code: IT 3203

Max. Marks: 60

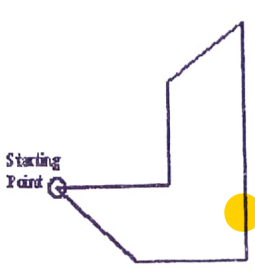
Total Pages of Question Paper: 02

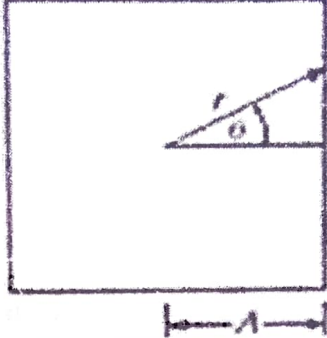
Day & Date: Monday, 19/12/22

Time: 11am to 1pm

Instructions to Candidate

1. All questions are compulsory.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right indicate full marks.

Q. N.	CO No	BT* No		Max marks
Q. 1. A	1	5	Obtain the Huffman code for the word 'COMMITTEE'	8
Q. 1. B	1	3	Apply the Mask=[-1,-1,-1; 2, 2, 2; -1, -1, -1] on the first row of the given image $f(x,y)=[1, 2, 3; 2, 2, 1; 1, 2, 0]$. Find out the output image. OR	4
Q. 1. B	1	3	For reference images $F(x,y) = \begin{pmatrix} 3 & 2 & 1 \\ 1 & 2 & 1 \\ 3 & 2 & 2 \end{pmatrix} \text{ and } \hat{f}(x,y) = \begin{pmatrix} 3 & 1 & 1 \\ 1 & 1 & 2 \\ 1 & 1 & 1 \end{pmatrix}$ Compute the MSE, and PSNR for an 8-bit image.	4
Q. 2. A	2	4	Consider a one dimensional image $f(x) = [10 \ 10 \ 10 \ 10 \ 40 \ 40 \ 40 \ 40 \ 20 \ 20]$. What are the first and second derivatives? Locate the position of edge.	8
Q. 2. B	2	4	Find out the weighted median of the centre pixel of given image: $A = [1 \ 3 \ 2; 4 \ 6 \ 7; 5 \ 2 \ 3]$, Kernel=[1 2 1; 2 2 1; 2 1 2]. OR	4
Q. 2. B	2	4	Apply Weighted Mean filter on the first row of the given image and generate the values. $F(x,y)=[5, 4, 2; 4, 6, 1; 1, 2, 3]$	4
Q. 3. A	3	5	Consider the following shape and write the corresponding 8-directional codes. Perform Circular Normalization. Use Differential chain code. 	8

Q. 3. B	3	5	Consider approximation coefficient =9 and detailed coefficient = - 4 in Haar transform. Calculate $[x,y]$ coefficients of 1D array.	4
OR				
Q. 3. B	3	5	In the given Image, r is the distance between the centroid and object boundary, 'theta' is the angle with respect to reference axis and $A=20$. Find the distance of boundary pixel from the centroid at angle $3\pi/4$ by using Signature concept.	4
				
Q. 4. A	4	6	Perform Histogram Equalization on the following 3×3 image and generate an output image. $F(x,y) = [1,2,1 ; 1,1,3 ; 2,1,1]$	8
Q. 5. A	5	6	Differentiate LoG and Canny Edge detector algorithms used for Segmentation. Apply LoG on the first row of given image- $[1,2,1 ; 1,1,1 ; 2,2,2]$	8
Q. 6. A	6	1	Demonstrate Image Formation in a Digital Camera using CCD sensor & CMOS sensor.	8

CO Statements:

CO1: Apply lossless and Lossy compression techniques for image compression.

CO2: Explore pre-processing algorithms to acquire images

CO3: Use transforms to analyze and modify image

CO4: Extract features from Images and do analysis of Images

CO5: Apply Segmentation techniques on Imagers

CO6: Make use of Computer Vision algorithms to solve real-world problems.

* Blooms Taxonomy (BT) Level No:

1. Remembering; 2. Understanding; 3. Applying;
 4. Analyzing; 5. Evaluating; 6. Creating.