University of Mumbai

Examinations Summer 2022

Program: Electronic & Telecommunication Engineering

SEM-VI (C Scheme) (R2019)

Subject: IPMV   Course Code: ECC603

Time: 2hour 30 minutes Max. Marks: 80

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Q1.	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks
1.	Which is not a color model
Option A:	HIS
Option B:	RGB
Option C:	RCB
Option D:	CMYK
2.	Haar Transformation is defined by
Option A:	T=HFT
Option B:	T=HFH
Option C:	T=HFHT
Option D:	T=HT
3.	Image can be sharpened using
Option A:	contouring
Option B:	High Pass Filter
Option C:	Erosion
Option D:	Low pass filter
4.	Noise reduction can be obtained by blurring the image using smoothing filter
Option A:	False
Option B:	True
Option C:	Maybe
Option D:	Can't say
5.	Hit and miss transformation is used for shape
Option A:	compression
Option B:	decompression
Option C:	detection
Option D:	removal
6.	Opening and closing are each other
Option A:	Duals
Option B:	Centers
Option C:	Corners
Option D:	Neighbors
7.	Dilation Process makes images
Option A:	thinner
Option B:	Thickened
Option C:	sharpened
Option D:	shrinked
8.	_____is process of partition the digital image in to multiple regions
Option A:	transform

Option B:	splitting
Option C:	filling
Option D:	merging
9.	_____is the position of sign change of the first derivative among neighboring points
Option A:	point
Option B:	line
Option C:	edge
Option D:	zero-crossing
10.	Canny edge detection algorithm is based on
Option A:	Step edge
Option B:	Real model
Option C:	smoothing model
Option D:	ideal model
11.	_____ is the starting pixel of region growing process.
Option A:	image
Option B:	base pixel
Option C:	original pixel
Option D:	seed pixel
12.	Which of the following of a boundary is defined as the line perpendicular to the major axis?
Option A:	Minor axis
Option B:	Equidistant axis
Option C:	Equilateral axis
Option D:	Median axis
13.	The effectiveness of an SVM depends upon:
Option A:	Selection of Kernel
Option B:	Kernel Parameters
Option C:	Soft Margin Parameter C
Option D:	Selection of Kernel, Kernel Parameters and Soft Margin Parameter C
14.	Which of the following is the useful descriptor of a boundary, whose value is given by the ratio of length of the major axis to the minor axis?
Option A:	Eccentricity
Option B:	Perimeter
Option C:	Area
Option D:	Radius
15.	The order of shape number for a closed boundary is:
Option A:	Even
Option B:	Odd
Option C:	1
Option D:	Any positive value
16.	The term, Curvature is defined as:
Option A:	Rate of change of area
Option B:	Rate of change of diameter
Option C:	Slope
Option D:	Rate of change of slope
17.	In 4-neighbours of a pixel p, how far are each of the neighbours located from p?
Option A:	one pixel apart

Option B:	Two pixels apart
Option C:	Four pixels apart
Option D:	Alternate pixels apart
18.	Discrete cosine transform (DCT) applied to predict error on
Option A:	2x2 pixels
Option B:	4x4 pixels
Option C:	8x8 pixels
Option D:	3x3 pixels
19.	DTFT is the representation of
Option A:	Periodic continuous signals
Option B:	Aperiodic continuous signals
Option C:	Aperiodic Discrete time signals
Option D:	Periodic Discrete time signals
Q20.	Which of the following is a second-order derivative operator
Option A:	Spatial
Option B:	Gaussian
Option C:	Histogram
Option D:	Laplacian
Q21.	Spatial domain refers to
Option A:	Manipulations on whole image
Option B:	Direct manipulation of image pixel
Option C:	Modifications on Fourier transform of an image
Option D:	Contrast shrinking
Q22.	Gray level enhancement improves
Option A:	Contrast stretching
Option B:	Bandwidth
Option C:	Gamma Factor
Option D:	Resolution
Q23.	What is the name of the filter that multiplies two functions F(u, v) and H(u, v), where F has complex components too since is Fourier transformed function of f(x, y), in an order that each component of H multiplies both real and complex part of corresponding component in F?
Option A:	Unsharp mask filter
Option B:	High-boost filter
Option C:	Zero-phase-shift-filter
Option D:	High pass filter
Q24.	Histogram Equalisation also called as?
Option A:	Histogram Matching
Option B:	Image Enhancement
Option C:	Histogram linearization
Option D:	None of the Mentioned
Q25.	Purpose of restoration is to gain
Option A:	Degraded image
Option B:	Original image
Option C:	Pixels
Option D:	Coordinated
26.	Degraded image is given in a
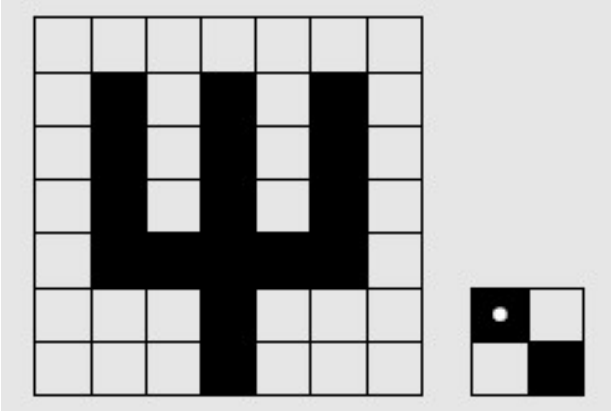
Option A:	Frequency domain
Option B:	Time domain
Option C:	Spatial domain
Option D:	Plane
27.	Degraded image is produced using degradation process and
Option A:	Additive noise
Option B:	Destruction
Option C:	Pixels
Option D:	Coordinates
28.	Segmentation is usually not perfect due to number of factors such as
Option A:	Noise, Bad illumination
Option B:	Object Contain several regions
Option C:	Due to boundary-filling
Option D:	Due to closed contour
29.	Laplacian is a
Option A:	First order derivative filter
Option B:	Sobel operator
Option C:	Canny operator
Option D:	Second order derivative filter
30.	Dilation followed by erosion is called as
Option A:	Opening
Option B:	Closing
Option C:	Burring
Option D:	Translation
31.	For point detection we use
Option A:	Second derivative
Option B:	First Derivative
Option C:	Third Derivative
Option D:	Fourth Derivative
32.	Thresholding gives the
Option A:	Binary Image
Option B:	Large Image
Option C:	Grayscale Image
Option D:	Color Image
33.	If the standard deviation of pixels is positive, then the sub image is labelled as
Option A:	Red
Option B:	White
Option C:	Green
Option D:	Black
34.	Which of the following is process of partition the digital image in to multiple regions
Option A:	Merging
Option B:	Filling
Option C:	Transform
Option D:	Splitting
35.	Which of the following of a boundary is defined as the line perpendicular to the major axis?
Option A:	Equidistant axis

Option B:	Equilateral axis
Option C:	Median axis
Option D:	Minor axis
36.	Erosion also known as
Option A:	Shrinking
Option B:	Growing
Option C:	Convolution
Option D:	integration
37.	If the boundary is traversed in the clockwise direction, a vertex point 'p' is said to be a part of the convex segment if the rate of change of slope at 'p' is:
Option A:	Positive
Option B:	Negative
Option C:	Zero
Option D:	Non-negative
38.	Erosion also known as
Option A:	Shrinking
Option B:	Growing
Option C:	Convolution
Option D:	integration
39.	What is the order of the shape number of a rectangular boundary with the dimensions of 3×3?
Option A:	2
Option B:	6
Option C:	12
Option D:	9
40.	In object recognition, the sensed object properties are called as _____
Option A:	Patterns
Option B:	Classes
Option C:	Labels
Option D:	Objects

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Sr. No.	Q.1 or Q2 or Q3 5 marks each
1	Explain Unsharp Masking andHigh-boost Filtering,
2	Explain different color models.
3	Explain Histogram equalization andHistogram Specification
4	Explain Sobel,Prewitt and Roberts operators for sharpening image.
5	Explain 2-D DFT.
6	Explain 2-D DFT application in frequency domain filtering
7	Explain Boundary extraction , Hole filling, Thinning and thickening
8	Explain Model of the Image Degradation/Restoration Process
9	Explain removal of periodic noise and inverse filtering
10	Compare Ideal, Butterworth and gaussian filtering
11	Find chain code and shape number 8-connectivity. Use anticlockwise direction.

| | Staring point |

| 12 | List different knowledge representation methods.. |

| 13 | Show the segmentation of the image shown in Fig using split-and-merge technique. |

14	Explain Ideal, Butterworth and Gaussian filter.
15	Explain Wavelet transform.
16	Explain Model of the Image Restoration Process and Removalof periodic noise
17	Explain Thinning and thickening and inverse filtering.
18	Explain edge linking.
19	Explain thresholding.
20	Explain principle of machine vision.

Sr. No.	Q.1 or Q2 or Q3 10 marks each
1	Explain different point processing techniques.
2	Explain average and median/ Order-StatisticFilters with example.
3	Explain wavelet and Haar transform.
4	Explain erosion, dilation and Hit and Miss transform,
5	Determine median value of marked pixels using 3 x 3 mask For pixels 128 24 172 and 26 (in second row) [18 22 33 25 32 34; 34 128 24 172 26 23; 22 19 32 31 28 26
6	Calculate histogram equalization for

Calculate histogram equalization for

Gray level r	0	1	2	3	4	5	6	7
No. of pixels with	200	170	130	50	70	80	140	160

		gray level n_r									
7	Explain Canny edge detection.										
8	Explain Laplacian of Gaussian method for edge detection.										
9	Explain region growing and region splitting and merging.										
10	Explain Image Segmentation using the Second Derivative-The Laplacian.										
11	Explain boundary detection using polygonal method.										
12	Explain various boundary descriptors.										
13	Explain Fourier transform of boundaries.										
14	Explain Boundary description using segment sequences										
15	Explain K-means algorithm.										
16	Explain Bayesian Classifiers and its types.										
17	Explain SVM.										
18	Explain Confusion matrix and co-occurrence matrix with example.										
19	Explain classifier settings and learning										
20	Determine opening and closing for										