University of Mumbai

Examination 2020 under cluster VESIT, Chembur **(Lead College:** A. P. Shah Institute of Technology (APSIT), Thane**)**

Program: **Electronics and Telecommunication**

Curriculum Scheme: R2016

Examination: TE Semester VI

Course Code: ECC 604 and Course Name: Image Processing and Machine Vision

Time: 2 hour Max. Marks: 80

Q1.	**Choose the correct option for following questions. All the Questions are compulsory and carry equal marks**
1.	Which of the following color models is used for printers?
Option A:	CMYK
Option B:	RGB
Option C:	RCB
Option D:	CMR
2.	What are the basic necessary quantities that are used to describe the quality of a chromatic light source?
Option A:	Chrominance and wavelength
Option B:	Wavelength and frequency
Option C:	Radiance, brightness and luminance
Option D:	Contrast and dullness
3.	128X128 image with 64 gray levels requires _____bits of storage.
Option A:	4096
Option B:	8192
Option C:	12288
Option D:	98304
4.	To make the central Fourier spectrum, which operation is carried out on the input image.
Option A:	Rotation
Option B:	Scaling image by factor 2
Option C:	Multiplying image by (-1)^(x+y) where x, y are coordinates of pixel.
Option D:	Adding 128 to each pixel
5.	Following statement is true for the discrete cosine transform except_____
Option A:	Has real valued basis matrix
Option B:	Provides best energy compaction
Option C:	Does not provide image compression
Option D:	Is widely used in JPEG images
6.	Which of the following is a 4-point DFT matrix?
Option A:	$F = [+1 \ +1 \ +1 \ +1;\ +1 \ -i \ -1 \ +i\ ; +1 \ +1 \ -1 \ +i;\ 1 \ -1 \ -1 \ -i \ ]$

Option B:	$F = [+1 \ +1 \ +1 \ +1;\ +1 \ -i \ -1 \ +i;\ +1 \ +1 \ +1 \ +i\ ; -1 \ -1 \ -1 \ -i \ ]$
Option C:	$F = [+1 \ +1 \ +1 \ +1;\ +1 \ +i \ -1 \ -i;\ +1 \ +1 \ -1 \ -i;\ 1 \ -1 \ -1 \ +i \ ]$
Option D:	$F = [+1 \ +1 \ +1 \ +1;\ +1 \ -i \ -1 \ +i;\ -1 \ +1 \ -1 \ +i;\ +1 \ -1 \ +1 \ -i \ ]$
7.	What is the sum of all the components of a normalized histogram?
Option A:	-1
Option B:	0
Option C:	Size of image
Option D:	1
8.	The response of the smoothing linear spatial filter is_____
Option A:	Sum of image pixel in the neighborhood filter mask
Option B:	Difference of image in the neighborhood filter mask
Option C:	Product of pixels in the neighborhood filter mask
Option D:	Average of pixels in the neighborhood of filter mask
9.	Correction of power law response is called _____.
Option A:	Alpha correction
Option B:	Gamma correction
Option C:	Beta correction
Option D:	Pixel correction
10.	Histogram equalization on already Histogram equalized image will produce:
Option A:	Improvement in quality of an image
Option B:	Degrade quality of an image
Option C:	No change in quality of an image
Option D:	Blurring of an image
11.	Which of the following is the valid response when we apply a first derivative?
Option A:	Non-zero at flat segments
Option B:	Zero at the onset of gray level step
Option C:	Zero in flat segments
Option D:	Zero along ramps
12.	To set the average value of an image zero, which of the following coefficients should be 0 in the frequency domain representation of an image?
Option A:	F(0, 0)
Option B:	F(0, 1)
Option C:	F(1, 0)
Option D:	F(1, 1)
13.	In morphological operations, the Structuring element SE is viewed as
Option A:	Correlation mask
Option B:	Convolution mask
Option C:	Low pass filter
Option D:	High pass filter

14.	Which operator is used to detect isolated points in segmentation?
Option A:	Laplacian operator
Option B:	Prewitt operator
Option C:	Sobel operator
Option D:	Robert cross gradient
15.	Following are various type of mean filters except
Option A:	Arithmetic mean filter
Option B:	Geometric mean filter
Option C:	Sequence mean filter
Option D:	Harmonic mean filter
16.	What is an output image after applying a contra harmonic mean filter on the input image?
Option A:	Degraded image
Option B:	Original image
Option C:	Restored image
Option D:	Plane image
17.	Fourier approach for _____concept: convert 2D spectrum into 1D graphs.
Option A:	Texture Descriptor
Option B:	Regional Descriptor
Option C:	Parametric Descriptor
Option D:	Topological Descriptor
18.	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:	Radius
Option B:	Perimeter
Option C:	Area
Option D:	Eccentricity
19.	In object recognition, the sensed object properties are called as_____
Option A:	Classes
Option B:	Patterns
Option C:	Labels
Option D:	Objects
20.	The original support vector classifier was developed for….
Option A:	Non-linearly separable classes
Option B:	Linear separation of two classes
Option C:	Non-separable classes
Option D:	Multi-class classification

Q.2 A	**Solve any Two** **5 marks each**
i.	Justify DCT is real and orthogonal.
ii.	Draw and explain fundamental steps in digital image processing.

iii.	Generate Haar transform matrix for N=2.
Q.2. B	**Solve any One** **10 marks each**
i.	Perform histogram equalization for the image shown below and give the equalized image.

4	4	4	4	4
4	2	5	4	3
3	5	5	5	3
3	4	5	4	3
4	4	4	4	4

ii. Segment following image using split and merge algorithm. Predicate: T1= 100 and T2=200.

10	20	200	222	20	10	200	222
10	20	200	222	20	10	200	222
30	40	130	120	200	222	130	120
30	40	130	120	200	222	130	120
130	120	10	20	20	10	10	20
130	120	10	20	20	10	10	20
30	40	130	120	10	20	200	222
30	40	130	120	10	20	200	222

Q.3	**Attempt (any two)** **10 marks each**
i.	Write a short note on Support Vector Machine.
ii.	Explain Statistical Texture description method.
iii	Find chain code and shape number using 8 code connectivity for the following image. Arrow shows the starting point for chain code.