GURU NANAK INSTITUTE OF TECHNOLOGY
An Autonomous Institute under MAKAUT
2022-2023
IMAGE PROCESSING
PGCSE105C

TIME ALLOTTED: 3 HOURS **FULL MARKS: 70**

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable

GROUP – A
(Multiple Choice Type Questions)

Answer any ***ten*** from the following, choosing the correct alternative of each question: **10×1=10**

		Marks	CO No.
1. (i)	Smoothing spatial filters are used for: a. blurring b. noise reduction c. Both a and b d. None of these	1	CO4
(ii)	Image negatives a gray level transformation is defined as: a. s=L-1-r b. s=L-r c. s=r-1-L d. none	1	CO2
(iii)	Frequency domain refers: a. its processing techniques are based on modifying the Fourier transform of an image. b. its processing techniques are based on modifying the laplacian transform of an image. c. Both a and b d. None of these	1	CO3
(iv)	What is spatial resolution? a. it's the largest discernible detail in an image. b. it's the smallest discernible detail in an image. c. Both a and b d. None of these	1	CO1
(v)	What is brightness adaption? a. For a given set of conditions, the current sensitivity level of the visual system. b. For a given set of conditions, the current sensitivity level of the in-visual system. c. Both a and b d. None of these	1	CO2

(vi) The dominant application of imaging in the microwave band is: 1 CO1
   a. Radar
   b. satellite
   c. communication
   d. None

(vii) In which technique which is used to determine changes between two images? 1 CO4
   a. Image differencing
   b. segmentation
   c. skin texture analysis
   d. image differencing

(viii) Which type of enhancement operations are used to modify pixel values according to the value of the pixels neighbors? 1 CO3
   a. point operations
   b. local operations
   c. global operations
   d. mask operations

(ix) An image is considered to be a function of a(x,y) where a represents 1 CO1
   a. height of image
   b. width of image
   c. amplitude of image
   d. resolution of image

(x) The amount of noise decreases by ———— of number of frames averaged 1 CO4
   a. division
   b. square root
   c. linear
   d. Nine of these

(xi) Localization of iris, pupil, eyelids come under 1 CO5
   a. normalization
   b. masking
   c. extraction
   d. segmentation

(xii) What is image? 1 CO1
   a. Picture
   b. Matrix of pixel
   c. Collection of pixel
   d. All of these

GROUP – B
(Short Answer Type Questions)

(Answer any *three* of the following) **3 x 5 = 15**

		Marks	CO No.
2.	Find the DFT of f(x) = (1,2,3,4) and where N=4	5	CO3
3.	What is the use of DCT in image processing?	5	CO3

4. a)	Explain Pixel.	2	CO1
b)	Define gray level of an image.	3	CO1
5.	Define Gamma transform.	5	CO2
6.	Differentiate between band pass and bands reject filters.	5	CO4

GROUP – C
(Long Answer Type Questions)

(Answer any *three* of the following) **3 x 15 = 45**

		Marks	CO No.
7. a)	State the steps for filtering in frequency domain.	7	CO4
b)	Explain spatial filtering with example.	8	CO4
8. a)	Define histogram processing.	2	CO3
b)	F(x,y) =4 4 4 4 4 3 4 5 4 3 3 5 5 5 3 3 4 5 4 3 4 4 4 4 4 F(x,y) an image of size 5x5. Apply histogram equalization and give the processed image.	10	CO3
c)	Explain image enhancement.	3	CO2
9. a)	Define various types of noise.	10	CO4
b)	Define estimation of periodic noise .	5	CO4
10. a)	Give the steps of image restoration model.	5	CO4
b)	Explain high pass and low pass filters.	5	CO4
c)	Differentiate between mean and geometric mean filters.	5	CO4
11.	Write short notes on any three of the following:	3x5=15	
a)	Order statistics filter	5	CO4
b)	Sobel edge detector	5	CO5
c)	Sharpening using spatial filers.	5	CO4
d)	Image segmentation.	5	CO5
e)	Bit plane slicing	5	CO2