

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3172417****Date:15/12/2021****Subject Name:Image Processing****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define different processing level of an image.	03
	(b) Define following term:	04
	(i) Simultaneous contrast	
	(ii) Spatial resolution	
	(iii) False contorting	
	(iv) Mach band effect	
	(c) A common measure of transmission for digital data is baud rate, defined as the number of bits transmitted per second. Generally, transmission is accomplished in packets consisting of start bit, a byte (8 bits) of information ,and a stop bit. Using these facts ,answer the following:	07
	(a) How many minutes would it take to transmit a 1024 x 1024 image with 256 gray levels using a 56K baud modem?	
	(b) What would the time be at 750K baud ,a representative speed of a phone DSL (digital subscriber line)connection ?	
Q.2	(a) An observer is looking at a tree of 20m Hight at a distance of 200 m far away, what will be the size of retinal size of tree image in (mm)	03
	(b) Briefly explain spatial and gray-level resolution.	04
	(c) Explain: Image Negatives	07
	Log transformations	
	Power-Law transformations	
	OR	
	(c) Explain: Contrast stretching	07
	Grey-level slicing	
	Bit plane slicing	
Q.3	(a) Explain components of human visual system.	03
	(b) Explain in brief: Region growing by pixel aggregation	04
	(c) Explain image histogram along with the need of histogram processing and differentiate between histogram equalization and histogram matching.	07
	OR	
Q.3	(a) What is gamma correction ?Explain its importance in visualization .	03
	(b) Explain conversion from HSI to RGB color model.	04
	(c) Explain following filters in frequency domain.	07
	(i) Ideal low pass filter	
	(ii) Butterworth low pass filter.	
	(iii) Gaussian low pass filter	

Q.4 (a) Find out the Haar transform of the given pseudo image **03**

2	1	2	1
1	2	3	2
2	3	4	3
1	2	3	2

(b) Laplacian mask is a isotropic filter ,explain this statement with considering appropriate 3 x3 mask. **04**

(c) Explain smoothing and sharpening image spatial filter. **07**

OR

Q.4 (a) What is the difference between arithmetic mean filter and geometric mean filter? **03**

(b) Explain the relationship between filtering in the spatial and frequency domain ? **04**

(c) Explain two-dimensional Discrete Wavelet transform with suitable decomposition level. **07**

Q.5 (a) Explain 2D discrete Fourier transform with the help of equations. **03**

(b) Given below 3 X 3 image. What would the value of the center pixel change to when this image is passed through? **04**

1	7	5
6	2	3
1	4	2

- (i) Arithmetic mean filter
- (ii) Geometric mean filter
- (iii) Max-filter
- (iv) Min-filter

(c) Explain Thinning and Thickening transformation. **07**

OR

Q.5 (a) Draw the skeleton of circle and triangle **03**

(b) What is pseudo color image processing? Explain Intensity slicing technique in details **04**

(c) Equalize the given histogram **07**

Grey level	0	1	2	3	4	5	6	7
Number of pixels	790	1023	850	656	329	245	122	81
