Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058, India

(Autonomous College Affiliated to University of Mumbai)

End Semester Examination

December 2 0 2 1

Max. Marks: 60	Duration: 2 Hrs.
Class: B. E	Semester: VII
Course Code: ELE72B	Branch: ETRX.
Name of the Course: Image Processing and Applications	

Instruction:
  (1) All questions are compulsory
  (2) Draw neat diagrams
  (3) Assume suitable data if necessary

Q. No.		Max. Marks	CO-BL-PI
Q1 a)	Why do we need power law transformation with gamma correction and gray level slicing operation in image processing?	3.5+3.5 =7	1-3-3.3.1
Q1 b)	Perform histogram equalization on the following image data table below and plot original and equalized histogram.	8	1-3-3.3.1
Q2 a)	State and prove convolution and periodicity properties of two-dimensional discrete Fourier transform. Justify that the Walsh transform matrix is a sequency ordered Hadamard matrix.	6+4=10	3-3-3.3.1
Q.2 b)	Find the edge direction using Prewit mask for Given F = table below	5	2-3-3.3.1

Q1 b) table:

Gray level	0	1	2	3	4	5	6	7
No. of pixel	210	130	60	60	80	150	140	160

Q.2 b) table:

125	130	190
23	140	200
14	34	140

Q.3 a)	Perform edge detection using graph theoretic technique for the sub image given below. Assume that the edge starts at the 1st column and ends by 3rd column. Find all possible paths and edges with minimum cost.
	
	    2 1 0
	    1 1 7
	    6 8 2
		5	2-3-3.3.1

Q.3 b)	Justify that lossless image compression techniques are invertible. Construct the Huffman code for word "COMMITTEE" and calculate efficiency.	4+6=10	4-5-2.4.1
Q.4 a)	Construct the arithmetic coding to encode the word "INDIA" and find tag value for the same.	5	4-5-2.4.1

Q.4 b)	Describe an operation with suitable block diagram and constraints of the proposed system. **(Any two)**
	    1. Vehicle Number Plate Detection and Recognition
	    2. Object Detection using Correlation Principle
	    3. Handwritten Character Recognition
		5+5=10	5-2-2.4.1