Code No: 136BD **R16**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech III Year II Semester Examinations, February - 2023

DIGITAL IMAGE PROCESSING

(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	List the steps involved in digital image processing.	[2]
b)	Write the properties of Hadamard transform.	[3]
c)	What is Image Negative?	[2]
d)	Illustrate with examples for linear and nonlinear filters?	[3]
e)	What is the principle of inverse filtering?	[2]
f)	What are the three methods of estimating the degradation function?	[3]
g)	State the conditions for Region splitting and Merging.	[2]
h)	What are the factors affecting the accuracy of Region growing?	[3]
i)	Define compression ratio.	[2]
j)	What is the need for compression?	[3]

PART – B

(50 Marks)

2. Assess image quantization and sampling and their importance and need in digital image processing. [10]

OR

3. Explain Walsh Transform with suitable equations. [10]

4. Estimate the constraints of histogram equalization and technique of histogram processing in detail. [10]

OR

5. Classify the performance of the following sharpening filters.
a) Ideal HPF b) Butterworth HPF c) Gaussian HPF [10]

6. Derive a wiener filter for image restoration and specify its advantages over the inverse filter. [10]

OR

7. Develop the least mean square filter in image restoration and derive the necessary equations. [10]

8. Apply the Laplacian operator for the detection of isolated points and lines in image segmentation. [10]

OR

9. Explain two important morphological operations opening and closing with examples. [10]

10. Design a coder which a source emits letters from an alphabet A={k_1,k_2,k_3,k_4,k_5} with probabilities P(k_1)=P(k_3)=0.2, P(k_2)=0.4, P(k_4)= P(k_5)=0.1, entropy = 2.122bits/symbol. Find a Huffman code for this source and the average length of the code and its redundancy and compare it with Binary code. [10]

OR

11. Write the concepts of the following methodologies:
a) Transform Based Compression
b) JPEG Standards. [5+5]

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