Register Number:……..

KUMARAGURU
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B.E/B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023

(Regulation 2018)

Fifth Semester

ELECTRONICS AND COMMUNICATION ENGINEERING

U18ECE0011**:** Digital Image Processing

COURSE OUTCOMES

CO1: Explain the fundamental concepts of a digital image processing.

CO2: Compare various Image Transform Techniques.

CO3: Apply enhancement and restoration algorithms for image analysis.

CO4: Choose appropriate segmentation algorithms for given application.

CO5: Compare various Image compression techniques.

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-
PART A (10 x 2 = 20 Marks)
(Answer not more than 40 words)

1.	Recall the component of the human eye responsible for: (i) bright light vision (ii) dim light vision?	CO1	[K_1]
2.	What is false contouring? How can it be eliminated?	CO1	[K_2]
3.	Define sequency in DWHT.	CO2	[K_2]
4.	State any four properties of wavelets.	CO2	[K_1]
5.	Illustrate the transfer characteristics of gray level slicing an image.	CO3	[K_2]
6.	Give the mathematical expression for inverse filtering.	CO3	[K_2]
7.	Outline the advantage and disadvantage of graph theoretic technique?	CO4	[K_2]
8.	Name the conditions to be applied in region-based segmentation?	CO4	[K_2]
9.	What are the metrics used to evaluate the quality of an image?	CO5	[K_2]
10.	Why is the block size chosen as 8x8 in JPEG?	CO5	[K_3]

Answer any FIVE Questions:-
PART B (5 x 16 = 80 Marks)
(Answer not more than 400 words)

11.	a)	Explain image sampling and quantization with an example.	8	CO1	[K_2]
	b)	For a pixel p, what are: (i) 4-neighbors (ii) 8-neighbors (iii) adjacency (iv)	8	CO1	[K_2]

connectivity?

12.	a)	Explain with an example, how a 2D transform can be obtained as two separable 1D transforms.	8	CO2	[K_2]
	b)	Enumerate the properties of 2D DFT with mathematical expression and give a brief explanation of each.	8	CO2	[K_2]
13.	a)	Derive the histogram equalization algorithm.	8	CO3	[K_2]
	b)	Obtain the estimate of the input image using Wiener filtering.	8	CO3	[K_2]
14.	a)	Distinguish between global and local thresholding with an example each.	8	CO4	[K_3]
	b)	Explain how Fourier descriptors are used in boundary description.	8	CO4	[K_2]
15.	a)	Obtain the minimum variance Huffman code for the following source: $X = \{x_1, x_2, x_3, x_4, x_5\}$ $P(X) = \{0.2, 0.4, 0.2, 0.1, 0.1\}$	8	CO5	[K_3]
	b)	Explain the vector quantization algorithm.	8	CO5	[K_2]
16.	a)	Draw the chromaticity diagram and explain.	8	CO1	[K_2]
	b)	Compare JPEG and JPEG2000.	8	CO5	[K_3]

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