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**Question Paper Code : 41272**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Sixth Semester

Electronics and Communication Engineering

080290042 — DIGITAL IMAGE PROCESSING

(Common to Medical Electronics Engineering)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the fundamental steps used in Digital Image Processing?
2. How is the image of an object formed in human visual system?
3. Write the two dimensional DFT pair.
4. What are the features of slant transform?
5. Define the image averaging technique.
6. What is unsharp masking?
7. Sketch the image degradation model as well as the image restoration process.
8. What is segmentation?
9. Differentiate between lossy and lossless compression.
10. How is the entropy of a coding measured?

PART B — (5 × 16 = 80 marks)

11. (a) (i) With a neat block diagram, explain the functioning of the elements of a general purpose image processing system.  
(ii) Describe the brightness adaptation and discrimination of the human visual system.

Or

- (b) (i) Explain the process of image sampling and quantization.  
(ii) Discuss about the effects of variation in spatial and grey level resolution of an image.
12. (a) (i) Explain the properties of DFT. (10)  
(ii) Obtain the 1D Walsh transformation Kernel for a size of  $N = 8$ . (6)

Or

- (b) Discuss about Hadamard transform and wavelet transform.
13. (a) (i) Explain the process of histogram equalization in detail.  
(ii) For the specified histogram of an image, how is the enhancement technique applied? Explain.

Or

- (b) (i) Describe in detail the use of gradient and Laplacian operators in image enhancement.  
(ii) Explain the concept of homomorphic filtering.
14. (a) (i) Explain the constrained method of image restoration. How is it different from unconstrained restoration?  
(ii) Describe the Inverse filtering of degraded image for image restoration.

Or

- (b) Explain the Wiener filtering of image restoration in detail.
15. (a) (i) A source of six alphabets with the probability of generation is given below :

Alphabets :	A	B	C	D	R	S
Probability :	0.3	0.2	0.1	0.2	0.08	0.12

Obtain the Huffman code and calculate the entropy and average length of the code. (10)

- (ii) Highlight the features of bit plane coding. (6)

Or

- (b) Write notes on the following :
- (i) JPEG standards  
(ii) Runlength Encoding.