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Question Paper Code : **31272**

B.E./B.Tech. DEGREE EXAMINATION, MAY/JUNE 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.   State the importance of Hue and Saturation in the formation of a color image.

2.   Mention any two applications of 2D convolution in image processing.

3.   Justify that Fourier transform is separable.

4.   Give the 4 × 4 Hadamard transform matrix.

5.   What are the limitations of Averaging filter?

6.   What are the different causes of image degradation?

7.   How the edges are detected using Derivative operators?

8.   How the signature is used to represent an image?

9.   Specify any two application areas in which error free compression is used.

10. Name any two video compression standards.

PART B — (5 × 16 = 80 marks)

11. (a)   Explain the process of image sampling. Discuss the consequences of violation of the sampling criterion.   (16)

Or

(b)   (i)   Describe the Mach Band effect.   (6)

(ii) Explain how color images are represented using HSI color space model.   (10)

12. (a) Define the 2D Walsh transform. Obtain the Walsh basis for $N = 4$. List its major properties and device the relationship between Walsh and Hadamard transforms. (16)

Or

(b) Explain the basis function, properties and applications of DCT and Wavelet transforms. (16)

13. (a) (i) Describe the process of linear spatial filtering methods. (8)

(ii) Explain the principle of Harmonic and contra Harmonic filters. (8)

Or

(b) (i) Explain the constrained least square error filtering used for image restoration. (8)

(ii) Discuss about the spatial domain approaches of image restoration. (8)

14. (a) Explain in detail how an image is segmented using Region Splitting and merging algorithm and how the segmented object is represented by chain codes. (16)

Or

(b) (i) Explain the operators used for point, line and edges in an image. (8)

(ii) Explain how skeletons are used for representing the structural shape of image regions. (8)

15. (a) (i) With an example, explain how coding redundancy is reduced using variable length coding. (8)

(ii) Explain the principle of LZW coding. (8)

Or

(b) Discuss in detail the compression standards used for Binary, Gray scale, color and video images. (16)

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