Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50580

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2024.

Fifth/Sixth Semester

Electronics and Communication Engineering

CEC 366 — IMAGE PROCESSING

(Common to : Electronics and Telecommunication Engineering)

(Regulations 2021)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Specify the basic components of image processing system.

2. Point out the steps for analog to digital conversion, state its need.

3. Define spatial domain method. Give example.

4. What is the relationship between spatial and frequency domain filtering?

5. Why is the restoration called as unconstrained restoration?

6. Mention the drawbacks of inverse filtering.

7. Formulate how the derivatives are obtained in edge detection.

8. Identify the role of multiresolution analysis in image processing.

9. Classify the types of image representations.

10. What are the operations performed by error free compression?

PART B — (5 × 13 = 65 marks)

11. (a) In detail explain the fundamental steps involved in digital image processing systems.

Or

(b) Assess about image quantization and sampling and their importance and need in digital image processing.

12. (a) Compose about the various grey level transformations with examples and plot the graph of the transformation functions.

Or

(b) Tabulate the various filters available under frequency domain for image enhancement.

13. (a) Summarize about the following noise model with their probability density function and their plots.

(i) Gaussian Noise (4)

(ii) Rayleigh Noise (3)

(iii) Gamma Noise (3)

(iv) Exponential noise (3)

Or

(b) Design constrained least square filtering for image restoration and derive its transfer function.

14. (a) Design the canny edge detector with necessary equation and also write its algorithm.

Or

(b) Apply the Laplacian operator for detection of isolated points and lines in image segmentation.

15. (a) What are all the object recognition method used in image processing for decision making methods? How those methods apply in pattern classification?

Or

(b) Evaluate the need for image compression. How run length encoding approach is used for compression? Is it lossy? Justify.

PART C — (1 × 15 = 15 marks)

16. (a) Describe histogram equalization. Obtain Histogram equalization for the following image segment of size 5 × 5. Write the inference on image segment before and after equalization.

Or

(b) Solve and find a Huffman code and average length of the code and its redundancy for the source emits letters from an alphabet A = {a1, a2, a3, a4, a5} with probabilities P(a1) = 0.2, P(a2) = 0.4, P(a3) = 0.2, P(a4) = 0.1 and P(a5) = 0.1.