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**Question Paper Code : 51147**

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

Eighth Semester

Electronics and Communication Engineering

CS 1002 — DIGITAL IMAGE PROCESSING

(Common to Sixth Semester Electronics and Communication Engineering and Seventh Semester Information Technology and Computer Science and Engineering)

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What are the two processes involved in converting a continuous data into digital form?
2. State convolution theorem.
3. Define histogram equalization and state the conditions satisfied by the transformation function.
4. State and explain any two properties of 2-D Fourier transform.
5. What is white noise?
6. Why is the bipolar impulse noise called salt and pepper noise?
7. Differentiate between lossless compression and lossy compression.
8. What are the different image compression standards available?
9. What is multispectral thresholding?
10. What are the three principal approaches used to describe the texture of a region in image processing?

PART B — (5 × 16 = 80 marks)

11. (a) Explain basic relationships between pixels in detail. (16)
- Or
- (b) Compare and contrast DCT and DFT. (16)
12. (a) (i) Explain the different types of piecewise-linear transformation functions. State the advantages and disadvantages of piecewise-linear transformation. (10)
- (ii) Describe the process of image subtraction. (6)
- Or
- (b) Explain smoothing in frequency domain filters. (16)
13. (a) (i) Describe the model of image degradation/restoration process. (8)
- (ii) Explain any four noise probability density functions. (8)
- Or
- (b) (i) Explain in detail about inverse filtering. (8)
- (ii) Explain minimum mean square error filtering. (8)
14. (a) (i) Explain arithmetic coding process by solving the below. (8)
- | Source symbol | Probability |
|---------------|-------------|
| a1            | 0.8         |
| a2            | 0.02        |
| a3            | 0.18        |
- Encode a1, a3, a2, a1.
- (ii) Explain Lempel-Ziv- Welch coding. (8)
- Or
- (b) (i) Explain JPEG and MPEG techniques. (8)
- (ii) Explain vector quantization. (8)
15. (a) What are the different types of descriptors used to represent boundary? Discuss in detail. (16)
- Or
- (b) Describe the following thresholding approaches.
- (i) Basic adaptive thresholding. (4)
- (ii) Optimal, global and Adaptive thresholding. (12)