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Question Paper Code : 50755

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017
Sixth/Seventh Semester
Information Technology
IT6005 – DIGITAL IMAGE PROCESSING
(Common to : Biomedical Engineering/Computer Science and Engineering/ Electronics and Communication Engineering/Electronics and Instrumentation Engineering/Instrumentation and Control Engineering/Machatronics Engineering/ Medical Electronics)
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Answer ALL questions

PART – A **(10×2=20 Marks)**

1. Distinguish between photopic and scotopic vision.
2. Define the term "Quantization".
3. Whether two different images can have same histogram ? Justify your answer.
4. For an eight bit image, write the expression for obtaining the negative of the input image.
5. Mention two drawbacks of inverse filter.
6. Which filter will be effective in minimizing the impact of "salt and pepper" noise in an image ?
7. Mention the conditions for function to be called as wavelets.
8. When a code is said to be "prefix code" ? Mention one advantage of prefix code.

9. Obtain the 4 directional chain code for the shape shown in figure 1. The dot in the figure represents the starting point.

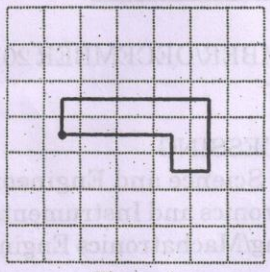

Figure 1

10. Define pattern and pattern class.

PART – B (5×16=80 Marks)

11. a) What are the elements (components) of digital image processing system ? Explain the function of each element in detail.

(OR)

b) Explain in detail about the phenomenon of image sampling. Illustrate how aliasing happens if sampling theorem is violated.

12. a) Why histogram equalization is considered as an "idempotent operation" ?

Perform histogram equalization of the image $\begin{bmatrix} 3 & 2 & 4 & 5 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 5 & 2 & 4 & 4 \end{bmatrix}$.

(OR)

b) Explain the following gray level transformation techniques in detail

i) Image negative

ii) Thresholding

iii) Gray level slicing and

iv) Logarithmic transformation.

13. a) What is the objective of image segmentation ? Explain any one of the region based image segmentation technique in detail. Mention two applications of image segmentation.

(OR)

b) Describe the image restoration technique of inverse filtering. Why inverse filtering approach fails in the presence of noise ?

14. a) Construct Huffman code for the word "BABY". Also compute the efficiency of Huffman code.

(OR)

b) With a neat block diagram, explain transform based image compression scheme. Also mention different modes in JPEG compression standard.

15. a) Write short on the following image representation techniques

i) Chain code and

ii) Polygonal approximation.

(OR)

b) Mention different techniques for the representation of shapes in a digital image. Explain the principle behind "Fourier Descriptor" based shape representation.
