Total No. of Questions : 12] [Total No. of Pages : 3

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[3864]-257

B.E. (Electronics)

DIGITAL IMAGE PROCESSING

(2003 Course) (404212)

Time : 3 Hours] [*Max. Marks : 100*

Instructions to the candidates:

1) ***Answer Q1or Q2, Q3or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10, Q11or Q12.***
2) ***Answers to the two sections should be written in separate answer books.***
3) ***Figures to the right indicate full marks.***
4) ***Neat diagrams must be drawn wherever necessary.***
5) ***Assume suitable data, if necessary.***
6) ***Use of electronic pocket calculator is allowed.***

SECTION - I

Q1) a) Explain MTF of visual system. Sketch the typical response curve. **[8]**

b) Describe any one technique for acquiring image in detail. **[8]**

OR

Q2) a) Discuss with a neat block diagram the process of converting an analog image to a digital image. What is aliasing? **[10]**

b) Write a note on pixel connectivity. **[6]**

Q3) a) Write a note on Discrete Fourier Transform for image transformation. **[8]**

b) What is a color model? Explain any one model in detail. Also state its applications. **[8]**

OR

Q4) a) Explain Hadamard Transform. Derive Hadamard matrix for N = 4. **[8]**

b) Explain HSI model. Write an algorithm for conversion of HSI model to RGB. **[8]**

P.T.O.

Q5) a) Describe any 2 point processing techniques for image enhancement.[8]

b) What is histogram? Write the steps for histogram equalization. **[10]**

OR

Q6) a) State the techniques to remove salt–&–pepper noise from an image. Explain any one technique in detail. **[8]**

b) Explain difference between smoothing and sharpening filters. Consider an image and discuss the effects of implementing these filters. **[10]**

SECTION - II

Q7) a) What is redundancy? State and explain the redundancies in an image.**[8]**

b) Draw and explain image compression model. **[8]**

OR

Q8) a) Explain the terms-Lossy compression and Loseless compression. Suggest and explain a compression technique for each in brief. **[8]**

b) Explain JPEG compression standard. **[8]**

Q9) a) Write a note on dialation and erosion. State applications for both. **[8]**

b) Consider an image and derive the chain codes using 4-connectivity and 8-connectivity. **[8]**

OR

*Q10)*a) A binary image X and a structuring element B are given as below –

0	0	0	0	0	0
0	1	1	1	0	0
0	1	1	1	0	0
0	0	1	1	1	0
0	0	1	1	1	0
0	0	0	0	0	0

X

0	1	0
1	1	1
0	1	0

B

Perform image opening. **[8]**

b) Compare the performance of first order and second order derivatives w.r.t. an image. Which one would you prefer for detecting edges? Why? **[8]**

*Q11)*a) Explain noise models occuring in an image. **[8]**

b) Draw a block diagram for a character recognition system. Suggest various algorithms used at each block. **[10]**

OR

*Q12)*a) Explain Weiner filtering for image restoration. **[8]**

b) Draw a block schematic for a fingerprint recognition system. Suggest suitable image processing algorithms at each stage. **[10]**

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