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NATIONAL INSTITUTE OF TECHNOLOGY, HAMIRPUR

B.Tech End Term Examination

Roll No.

Branch : Computer Science & Engineering
Semester 6th
Subject: Digital Image Processing

Subject Code: CSD-323
Max Marks: 60
Time Allowed: 3 Hours

Note: All questions are compulsory.

Q1 a) Explain various functional blocks of digital image processing system. (5)

b) What do you mean by false contouring? Explain with examples that the perceived brightness is not a simple function of intensity. (5)

Q2 a) The 8-directional chain code of the image is given by
(2,2), 0,2,1,0,7,2,2,3,3,4,5,6,6,6,6
where, (2,2) provides the row and column axis of the initial point, respectively. Decode the chain code and draw the decoded object in a 12x12 grid. (5)

b) What is high boost filtering? Implement high boost filtering in frequency domain. (5)

Q3 a) List the properties of the second order derivative around an edge? (5)

b) Consider the following image. Calculate entropy of the image: (5)

5	10	15	15
10	15	20	20
20	20	25	30
25	25	30	30

Q4 a) Consider an image with an object (R1) and a background (R2), where R1 and R2 have prior probabilities of 0.3 and 0.7, respectively. Let mean and standard deviations in two regions are 2, 10 (mean) and 1, 2 (standard deviation), respectively. Compute the optimal threshold? (5)

b) What is histogram equalization and its significance? Explain why histogram equalization results in an image with flat histogram? (5)

Q5 a) What are the disadvantages of local processing technique for edge linking? In the Hough transform, what is the problem with using the line equation y=ax+b for mapping to ab-plane (parameter space). (5)

b) Implement Bayes theorem to calculate the probability of the class membership of a given sample. (5)

Q6 A source emits four symbols {a,b,c,d} with the probabilities 0.4, 0.3, 0.2, and 0.1, respectively. Construct arithmetic coder to encode and decoder to decode the word '**dad**' (stop decoding process after retrieving word '**dad**'). (10)