

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -3 EXAMINATION- 2017
B.Tech (CSE & IT) VIth Semester/PhD

MAX. MARKS: 35

COURSE CODE: 10B1WC1737
COURSE NAME: Image Processing Techniques
COURSE CREDITS: 03

MAX. TIME: 120 Minutes

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Ques 1 [1x7 = 7 Marks] Explain the following with suitable examples.

- a. List any five important applications of digital image processing?
- b. Define the terms PSNR, MSE and degree of compression.
- c. Define the HSI color model. Also convert RGB space to HSI space.
- d. List three reasons why compression is important in multimedia documents
- e. Two images have the same histogram. Which of the following properties must they have in common? (i) Same total power (ii) Same entropy and (iii) Same inter-pixel covariance function.
- f. What is the difference between image restoration and image enhancement? What do they have in common?
- g. How does the study of the human colour vision affect the way we do image processing?

Ques 2 [6 Marks] Compute the median value of the marked pixel (as shown in Figure 1) using 3x3 mask. Further, justify the statement "Median filter is an effective tool to minimize salt-and-pepper noise" through simple illustration.

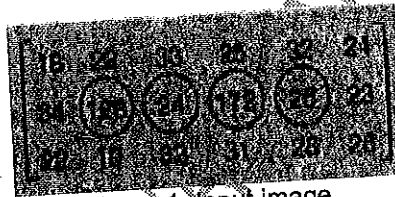


Figure-1: Input image

Ques 2 [6 Marks] What do you meant by pseudo-colouring? For what purpose is it useful? Write the algorithmic steps for gamma correction of colour image? Perform the gamma correction of the image

2	4	6	8
3	5	7	9
4	6	8	10
12	14	15	13

Where the value of gamma to be 0.5. Also, discuss the effect the different value of gamma of the visual quality of the image.

Ques 3 [6 Marks] List three reasons why compression is important on web. Consider an image strip of size 50x100. The image consists of five vertical strips. The grey levels of the strips from left to right are 128, 64, 32, 16 and 8. The corresponding widths of the strips are 35, 30, 20, 10 and 5 pixels respectively. If this stripe image is coded by binary and non-binary Huffman coding, determine its efficiency and degree of compression by both compression techniques. Assuming 2 bits to represent the pixel value.

Ques 5 [10 Marks] Write the short notes on following

- (a) Image restoration and de-noising
- (b) Edge detection techniques
- (c) Binary Image Processing
- (d) Image segmentation