

Name:

Student ID:

IE 404 – Digital Image Processing
Dhirubhai Ambani Institute of Information and Communication Technology (DA-IICT)
First In-Sem Examination, September 2019

[Time – 2 Hours]

[Total Marks - 60]

Instructions:

- Question paper contains 3 sections (A, B, and C).
 - Section A contains 5 questions, 2 marks will each question.
 - Section B contains 4 questions, 5 marks for each question.
 - Section C contains 2 question, 15 marks for each question.
- Answer all question. All questions are self-explanatory and understanding of question is a part of evaluation.
- No query regarding questions will entertained during examination by course instructor or invigilator.

Section A

1. What do you mean by the term pixel depth? Define Subjective brightness and Brightness adaption.
2. What is the smallest discernible change in intensity level? Define is false contouring?
3. What are the membranes that enclose the eye? In which type of interpolation, we used intensity of four neighboring pixels to obtain intensity of a new location?
4. What is meant by illumination and reflectance? How many types of light receptors?
5. Find transfer time, if you are transmitting RGB Color image of size 1024 x 1024, with 24-bit image via modem at 112 kbaud (kilo-bits per second).

Section B

6. Discuss the applications of various components of EM Spectrum
7. Consider two pixels p and q whose coordinates are (0,0) and (6,3). Calculate the D_e , D_4 , and D_8 distances between the pixels p and q.

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8. The original gray scale image is of size 512 x 512 pixels, with 8-bits per pixel. After compression the image file is 26,215 bytes. Find the compression ratio, number of bits in the compressed image, bits per pixel.
9. Explain following terms
- A. Pixel neighborhood
 - B. Paths
 - C. Connected component
 - D. Adjacency
 - E. Object connectivity

Section C

10. Consider an image whose intensity values are integers from 0 to 9, occurring with frequencies **0.1, 0.1, 0.15, 0.15, 0.025, 0.025, 0.15, 0.2, 0.05, 0.05** respectively (note: there are 10 intensity values). Find entropy, construct a Huffman tree for encoding these intensity values and find the corresponding average bit length (show your steps clearly).
11. How an RGB model is represented using HSV format? Describe the transformation. Let the RGB values of a point be (0.3, 0.5, 0.9). Find the HSV equivalent of RGB. Also verify whether the original point can be obtained by the inverse transform from HSV to RGB.