JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS-2022

B.Tech-VI Semester (ECE)

COURSE CODE (CREDITS): 19B1WEC633 (3)   MAX. MARKS: 35

COURSE NAME: Computer Vision

COURSE INSTRUCTORS: Lt. Pragya Gupta   MAX. TIME: 2 Hours

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

1) What are the desirable properties of descriptors? With an example show that chain code is rotation variant and how can we make chain code rotation variant.   [5]

2) What do you understand by Polygon approximation? Explain two polygon approximation methods with example.   [5]

3) Write a note on the following boundary and region descriptors-

   a. Boundary straightness

   b. Skewness

   c. Boundary length

   d. Euler number   [4]

4) Look at the following histograms for images A, B,C,D, E and F. All images of the same scene. Zero represents black and 255 represents white.

   (a) Which of the images D and E has a higher contrast? Why?

   (b) How does image B look like compared to image A? Explain.

   (c) What is the relation between images C and D? Explain your answer.   [5]
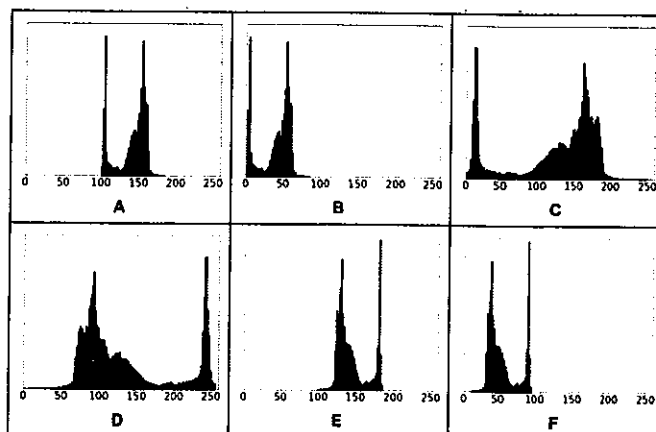
5) Find out the first order and second order derivative of the given pixel values. What information do we get from first and second order derivatives of the given data? **[4]**

Pixel (x)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pixel Values (a)	50	50	40	30	20	10	10	10	60	10	10	10	50	50	60

6) With an example show that how can we remove the noise present in the background region using morphological operations? **[4]**

7) Consider the following binary image and structuring element. Find X⊖B

$$X = \begin{array}{|c|c|c|c|c|c|c|}
\hline
0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\hline
0 & 0 & 0 & 0 & 0 & 0 & 0 \\
\hline
0 & 0 & 1 & 1 & 0 & 0 & 0 \\
\hline
0 & 1 & 1 & 1 & 1 & 0 & 0 \\
\hline
0 & 0 & 1 & 1 & 0 & 0 & 0 \\
\hline
\blacksquare & 0 & 0 & 0 & 0 & 0 & 0 \\
\hline
\end{array}$$

$$B = \begin{array}{|c|c|c|}
\hline
0 & 1 & 0 \\
\hline
0 & \blacksquare & 0 \\
\hline
0 & 1 & 0 \\
\hline
\end{array}$$

[3]

8) Consider the following 5x5 binary image. Find out the moments m00, m10, and m01 and then find out the area and centroid of the object. 1's belongs to the object region and 0's belongs to the background region.

$$A = \begin{array}{|c|c|c|c|c|}
\hline
0 & 1 & 1 & 0 & 0 \\
\hline
1 & 1 & 0 & 0 & 0 \\
\hline
1 & 1 & 0 & 0 & 0 \\
\hline
0 & 1 & 1 & 0 & 0 \\
\hline
0 & 0 & 1 & 0 & 0 \\
\hline
\end{array}$$

[5]