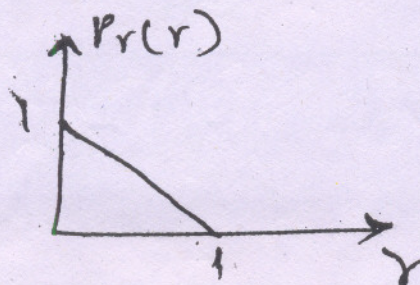
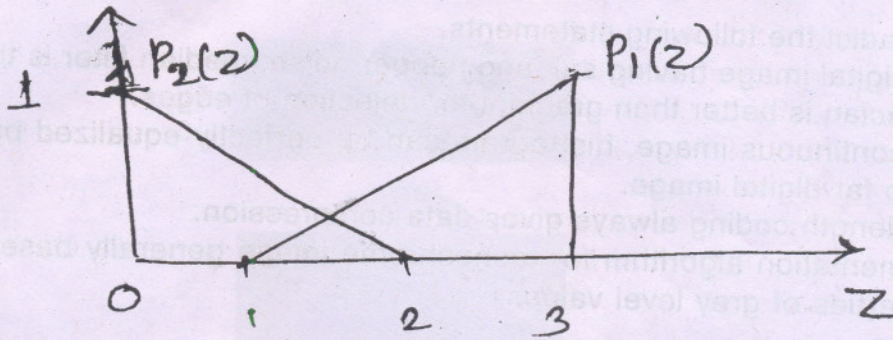


- N. B. :** (1) Question No. 1 is **compulsory**.
 (2) Answer any **four** out of remaining **six**.
 (3) Assume **suitable** data wherever **necessary** and state them **clearly**.

1. Justify / contradict the following statements. 20
- For digital image having salt and pepper noise, median filter is the best filter.
 - Laplacian is better than gradient for detection of edges.
 - For continuous image, histogram can be perfectly equalized but it may not be so far digital image.
 - Run length coding always gives data compression.
 - Segmentation algorithm for monochrome image generally based on 2 basic properties of grey level values.
2. (a) Explain a DDA algorithm. Using DDA algorithm draw a line. Calculate all points between point $x(10, 12)$ and $y(20, 20)$. 10
- (b) Define :
- Euclidean distance 2
 - City block distance 2
 - Chess board distance 2
 - 4, 8, m. connectivity 4
3. (a) What are the different types of redundancies in digital image? Explain in brief. 8
- (b) Explain any four method of data compression. Specify whether it is lossy or lossless and which type of redundancy it will minimize. 12
- Adaptive delta Modulation
 - Differential pulse code modulation
 - Transform Coding
 - Run length coding on bit planes
 - LZW algorithm.
4. (a) State and explain properties of 2-D Fourier Transform. 8
- (b) Write the expression for DFT of 2-D signal. 4
- (c) Explain Homomorphic filter in detail. 4
- (d) Find the DFT of the given image. 4
- | | | | |
|---|---|---|---|
| 0 | 1 | 2 | 1 |
| 1 | 2 | 3 | 2 |
| 2 | 3 | 4 | 3 |
| 1 | 2 | 3 | 2 |
5. (a) Explain filtering in spatial domain. 10
- (b) Explain histogram equalization. Derive the transformation function and draw new histogram. 5
- (c) Equalize the following histogram. 5



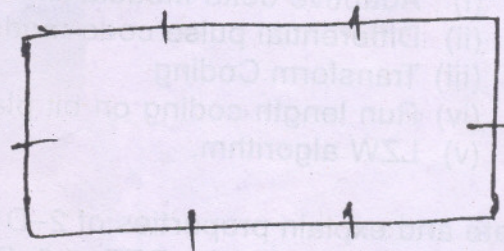
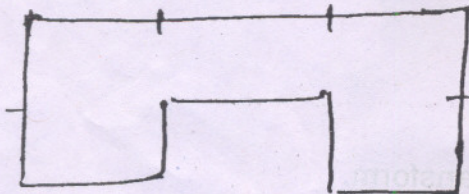
6. (a) Given image has the following intensity distributions where $P_1(z)$ corresponds to intensity of objects and $P_2(z)$ corresponds to the intensity of the background. Assume $P_1 = P_2$ and find the optimal threshold between object and background Pixels. 5



$$P_2(z) = \frac{-1}{2} Z + 1$$

$$P_1(z) = \frac{1}{2} Z - \frac{1}{2}$$

- (b) Define Erosion and Dilation operators. Explain their utility in image processing. 5
- (c) For the following boundaries shown below. Find the order, Chain code, first difference and shape no. 5



- (d) Show that the Laplacian mask is Isotropic filter (Use 3 x 3 mask). 5

7. Write short notes on (any **five**) :—

- (a) Discrete Cosine Transform
- (b) Sampling and Quantization
- (c) Hough Transform
- (d) Moments
- (e) Hit and Miss Transform
- (f) Vector Quantization.