

- N.B. :** (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** questions out of remaining **six** questions.
 (3) **Figures** to the **right** indicate **full** marks.

- a) Discuss briefly the process of image formation in the eye. **8**
 b) Discuss the following image enhancement techniques and give their applications : **12**
 (i) Log transformations
 (ii) Power – law transformations
 (iii) Contrast stretching.

- a) Explain the following histogram modification techniques and state their advantages and disadvantages : **12**
 (i) Linear stretching
 (ii) Histogram equalization
 (iii) Histogram specification.
 b) What are the steps required to perform filtering in the frequency domain. Also, explain the Butterworth low pass filter. **8**

- a) Explain the following Edge Extraction operators with their advantages and disadvantages if any : **10**
 (i) Sobel (ii) Laplacian.
 b) For the given image, perform region based segmentation by split and merge technique. **10**

13	12	13	12	11	12	11	12
13	13	63	63	61	11	12	11
11	12	63	62	61	62	12	12
13	13	62	63	62	61	13	13
12	11	62	63	62	11	12	11
62	62	63	61	61	62	13	13
62	61	61	62	13	12	13	11
61	62	63	11	12	11	12	12

- a) State and explain the differences between 2-D DFT and DCT. **6**
 b) Generate Haar Matrix of size 4 and comment on the result. **6**
 c) Compare the DFT of the following image : **8**

1	3	4	5
3	2	6	4
4	6	2	3
5	4	3	1

- a) Explain different image redundancies along with a compression technique to reduce them. **10**
 b) Explain the Huffman coding procedure with a suitable example. **10**
 c) Discuss the different reconstruction techniques used in computed tomography. **12**
 d) Explain opening and closing operations with suitable examples. **8**

- Write short notes on (any **four**) :- **20**
 a) Median Filtering
 b) Connectivity of Pixels
 c) Mask Mode Radiography
 d) Homomorphic Filtering
 e) Sampling and Quantization.