Total No. of Questions – [06] Total No. of Printed Pages: 03

G.R. No.	

DECEMBER 2021 - ENDSEM EXAM

B. TECH. (E & TC) (SEMESTER - I)

COURSE NAME: Image and Video Processing

COURSE CODE: ETUA40181A

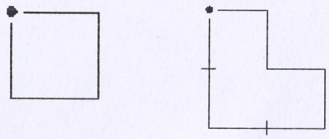
(PATTERN 2018)

Time: [1Hr] [Max. Marks: 30]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2, Q.3 OR Q.4, Q.5 OR Q.6.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1 a The following figure shows the object shape. Apply the chain code technique to obtain unique shape number and order. Justify the answer [4]



Q.1 b In Harris corner detection, if the equation for change in intensity is given by the equation of E(u,v) where M is covariance matrix, apply cornerness measure R to the given M matrix and decide whether the given point is a corner or edge? Justify the answer. Given K=0. 8 [6]

$$E(u,v) = \begin{pmatrix} u & v \end{pmatrix} M \begin{pmatrix} u \\ v \end{pmatrix} \qquad M = \begin{bmatrix} 2.32 & 0 \\ 0 & 0.045 \end{bmatrix}$$

OR

Q2 a Compute the covariance matrix for following data [4]

x	1	2
y	1	3

Q2 b Justify the following on the basis of compactness parameter. "Circle is the most compact shape". [6]

Q.3 a In the following 3 ×3 image, obtain bit planes after performing bit plane slicing/coding. Comment on the results on the basis of information content. [4]

2	4	1
4	3	7
1	6	0

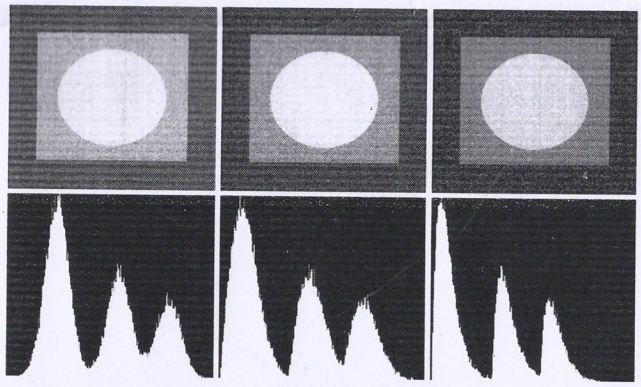
Q.3 b Refer below the original image and reconstructed image. Analyze the quality of reconstruction on the basis of MSE and PSNR. [6]

2	3
4	5

2	2
4	6

OR

Q.4 a Identify the noise in the following images from their histogram and Comment on type of the noise identified. [4]



Q.4 b Refer the following images. The left image is original image and right image is image after application of DCT transform. Analyze the energy of the image before and after transformation and comment on the properties, energy compaction and energy preservation. [6]

2	2
2	2

4	0
0	0

Q.5 a Justify that the interlaced scanning help reducing the flicker in video [4]

Q.5 b Refer following conversion formulae for RGB to YCbCr and YCbCr to RGB conversion. [6]

$$Y = 0.299R + 0.587G + 0.114B$$
$$Cb = 0.564(B - Y)$$
$$Cr = 0.713(R - Y)$$

$$R = Y + 1.402Cr$$
$$G = Y - 0.344Cb - 0.714Cr$$
$$B = Y + 1.772Cb$$

Compute the Y,Cb and Cr values for normalized Red color with RGB color triplet [1 0 0] and justify that reverse transformation also gives the same red color..

OR

Q.6 a Justify that the residual frame can help in determining temporal redundancy. [4]

Q.6 b Identify the following YCbCr sampling formats in video processing and compare. [6]