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**B. E. (Sixth Semester) Examination,
Nov.-Dec. 2015**

(New Scheme)

(IT Branch)

IMAGE PROCESSING

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

Note : Attempt all questions. Part (a) of each question is compulsory. Attempt any two parts from (b), (c) & (d) of each unit.

1. (a) What is image averaging? 2

   (b) What do you mean by sampling and quantization? Explain with suitable diagram. How local histogram processing is performed? 7

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(c) Find convolution and correlation of following stream of data :

(a) $F = \begin{bmatrix} 7 & 3 & 3 \\ 2 & 2 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ and $\begin{bmatrix} 1 & 1 \\ -1 & 1 \end{bmatrix}$

(b) $F = \begin{bmatrix} 7 & 2 & 3 \\ 2 & 2 & 2 \\ 2 & 1 & 1 \end{bmatrix}$ and $\begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix}$ 7

(d) Write short notes on : 7

   (i) Spacial and gray level resolution

   (ii) Contrast retching and thresholding

2. (a) Explain properties of 2D fourier transform and its inverse. 2

   (b) How can we detect an isolated point in input image? Write down its steps in detail. 7

   (c) Explain various types of high pass filters and low pass filters. 7

   (d) What is image segmentation? Explain region based segmentation in detail with suitable example. 7

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3. (a) What do you mean by morphology? 2

(b) Explain algorithm of boundary extraction and region filling with example. CSVTUonline.com 7

(c) Write differences between dialation and erosion operation. Show that dialation operation is commutative. 7

(d) Explain procedure of extracting connected component in any image with suitable example. 7

4. (a) How many types of redundancies are there in image compression? CSVTUonline.com 2

(b) Explain proceduer of Huffman coding. Calculate the average codeword length obtained from Huffman coding of given table :

Symbol	Occurance
A	303
B	96
C	204
D	148
E	249

(c) In between LZW or Huffman compression technique. Which one is better and why? Justify your statement. 7

(d) Write short note on : 7

(i) DCT

(ii) MPEG

5. (a) Explain chain code of shape number. 2

(b) What is the order of shape number for the figure 1 and figure 2 shown below. Obtain chain code, shape number and first order chain code for the given figures. 7
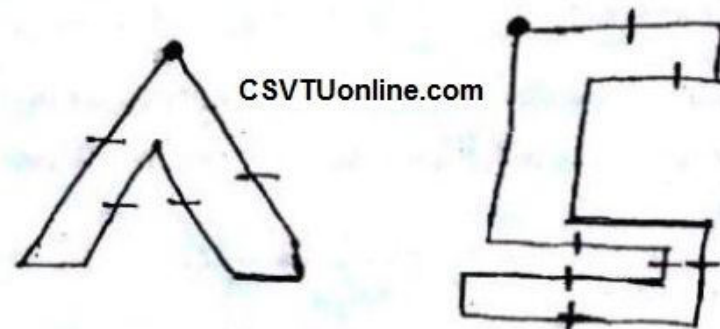

Fig. 1   Fig. 2

(c) Explain polygon approximation techniques of image description. 7

(d) Write short notes on : 7

(i) Shape from motion

(ii) Optical flow