

db/13

VT-F.H.Exam. April(1)-13-138

Con. 7594-13.

B.E (CMPN) in VIT (R)  
Digital Signal Image  
Processing GS-5302  
(REVISED COURSE)

( 3 Hours )

[ Total Marks : 100

- N.B. : (1) Question No. 1 is compulsory.  
(2) Attempt any four questions out of remaining six questions.  
(3) Assume suitable data, wherever necessary.

1. (a) Explain signals and systems with the help of suitable examples. Give applications of signals and systems. 5  
(b) Find Z transform of the following finite duration signal and state its ROC :- 5  
 $X(n) = \{ 1, 2, 5, 7, 0, 1 \}$   
(c) Given  $X(n) = \{ 0, 1, 2, 3 \}$ . Find  $X(k)$  using DIT - FFT Algorithm. 5  
(d) Find CONVOLUTION of following signals :- 5  
 $X(n) = \{ 2, 1, 3, 5 \}$  and  $h(n) = \{ 0, 1, 2, 4 \}$ .

2. (a) Determine the system function and unit sample response of the system given 10  
by Difference equation :

$$Y(n) = \frac{1}{2} Y(n-1) + 2 X(n)$$

- (b) Perform Histogram Equalization for the following. Obtain a plot of original as 10  
well as Equalized Histogram.

Grey level	0	1	2	3	4	5	6	7
No. of Pixels	100	90	50	20	0	0	0	0

3. (a) Given  $X(n) = \{ 0, 1, 2, 3, 4, 5, 6, 7 \}$ . Find  $X(k)$  using DIT-FFT algorithm. 10  
(b) Compute 2D DFT of given Image using DIT-FFT algorithm. 10

$$f(x,y) = \begin{bmatrix} 1 & 2 & 3 & 2 \\ 4 & 3 & 2 & 1 \\ 4 & 3 & 2 & 4 \\ 3 & 2 & 1 & 4 \end{bmatrix}$$

4. (a) Explain in details Enhancement techniques in spatial domain used for images. 10  
(b) What is HADAMARD Transform ? Write a 4 x 4 Hadamard matrix and its 10  
applications.

5. (a) What is segmentation ? Explain the different methods of image segmentation. 10  
(b) Explain image Restoration and its applications. 10

6. (a) What do you understand by sampling and quantization with respect to Digital Image Processing ? How will you convert an Analog image into a Digital Image ? 10  
(b) Name and explain different types of Data Redundancies associated with Digital Image. 20

7. Write short notes on (any two) :-

- (a) Wavelet Transform (b) Properties of Fourier Transform  
(c) KL Transform (d) Discrete Cosine Transform.

\*\*\*\*\*