(3 Hours) **[Total Marks: 80]**

N.B. 1) Question No. 1 is compulsory.

2) Attempt any three out of remaining five questions.

3) Figures to the right indicate full marks.

4) Make suitable assumptions wherever necessary and justify them

Q.1.	a)	Write a note on dynamic range compression.	4
	b)	Find DTFT of x(n) = {1,2,3,4}	4
	c)	Explain energy and power signal with examples.	4
	d)	Write a note on distance measures.	4
	e)	Explain Image segmentation.	4
Q.2.	a)	Explain any 5 properties of Discrete Fourier Transform	10
	b)	(i) Find the 4 point DFT of x(n) = {1,-1,2,-2}	10
		(ii) Find the IDFT of X(k) = {1,0,1,0}	
Q.3.	a)	For x(n) = {1,3,-1,2,0,4}, plot the following discrete time signals	10
		(i) x (n+2)	
		(ii) x(-n-1)	
		(iii) 2x(n)	
		(iv) x(n-1). δ (n-3)	
		(v) x(n).u(n-2)	
	b)	(i) Find the cross correlation of the causal sequences	10
		x(n) = {1,4,7,8} and y(n) ={2,0,1,3}	
		(ii) Determine whether the following system is linear or non linear	
		y(n) = 4x(n)+ 2	
Q 4.	a)	Determine radix 2 DIT-FFT Flow graph for	10
		x(n) = {2,2,3,1}	
	b)	Justify or Contradict	10
		(i) Point processing techniques are called as Zero memory operations	
		(ii) To remove salt and pepper noise median filter is better than low pass filter	

Q 5. (a) Apply Horizontal and vertical line detection mask on the following 8 bits per pixel image F. Use appropriate threshold value. Assume virtual rows and Column by repeating border pixel values. 10

F =

10	15	10
200	200	200
5	20	10

b) Explain Contrast stretching. Perform Contrast stretching on the following 4 bpp images 10

r1=4, r2= 9, s1= 2, s2 = 13

4 BPP IMAGE			
7	**8**	**5**	**1**
7	**8**	**8**	**2**
5	**9**	**7**	**7**
8	**7**	**12**	**15**

Q 6. a) Write Short note on edge detection in detail 10

b) What is a Histogram and what is histogram equalization. Perform Histogram Equalization on the following 3 bpp image. Calculate the new histogram. Plot the original and new histogram and show the new image. 10

5	**0**	**7**	**7**	**1**	**4**	**5**	**2**	**0**	**1**
7	**5**	**6**	**2**	**5**	**3**	**4**	**3**	**2**	**5**
4	**3**	**6**	**2**	**7**	**3**	**2**	**4**	**3**	**5**
7	**4**	**4**	**1**	**6**	**4**	**3**	**7**	**7**	**4**
3	**2**	**5**	**1**	**1**	**1**	**1**	**5**	**4**	**0**
