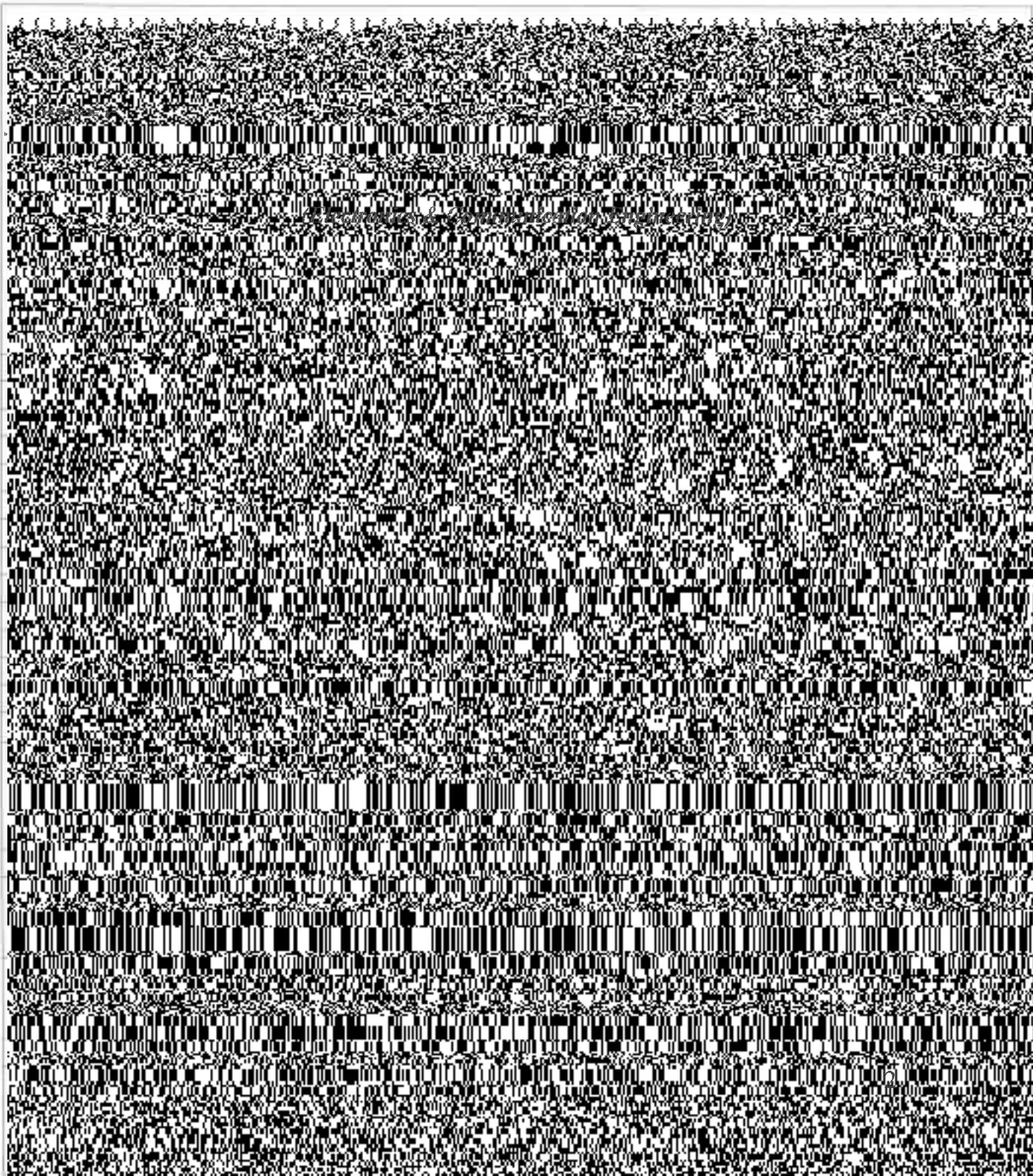




6	Consider a random variable X with $E[X]=4$ and variance of $X = 5$. Another random Variable is given as $Y=-3X+8$. Find i) $E[X^2]$, ii) $E[XY]$, iii) $E[Y^2]$, iv) $\text{Var}(Y)$?	10M	3	L2
OR				
7	If the Joint density function for x and y is $f_{x,y}(x,y) = \begin{cases} (xy)/9 & 0 < x < 2, 0 < y < 3 \\ 0 & \text{otherwise} \end{cases}$ a) Show that X and Y are statistically Independent. b) Show that X and Y are Uncorrelated.	10M	3	L2
8	If a Random Process $X(t) = A \cos wt + B \sin wt$ is given, where A, B are uncorrelated, Zero mean random variables having the variance σ^2 and w is a uniform random variable from $(0, 2\pi)$, Find a) autocorrelation b) Show that $X(t)$ is a wide sense Stationary (WSS)	10M	4	L3
OR				
9	a) State Ergodic Theorem, Ergodic process, Mean Ergodic Process. b) Prove the any 4 properties of Auto correlation functions.	5M 5M	4	L1 L2
10	A Random process has Autocorrelation function $R_{xx}(\tau) = \begin{cases} 1- \tau & \tau \leq 1 \\ 0 & \text{otherwise} \end{cases}$ Find the PSD and Draw the Plots ?	10M	5	L3
OR				
11	Prove that the power Spectrum and Auto correlation of random processes form Fourier transform pair	10M	5	L5