



Answer All Questions

Q. No		Marks	CO	BL
1.	Consider two random process $W(t) = X \cos t + Y \sin t$ $Z(t) = Y \cos t + X \sin t$ where X & Y independent random variables with zero mean and mean square are equal to one. Verify whether $W(t)$ & $Z(t)$ are jointly WSS.	10	CO3	L3
2.	a) Compute the average power, mean, mean square value, and variance of the random process $X(t)$ whose autocorrelation function is given by $R_{XX}(\tau) = 16 + \frac{2}{1+2\tau^2}$ b) For a stationary Gaussian random process the autocorrelation function $R_{XX}(\tau) = e^{- \tau }$, determine the PDF of random variables $X(t+1)$, and $X(t+2)$.	10	CO3	L3
3.	Find the average power and auto correlation function of the WSS random process $X(t)$ that has power spectral density $S_{XX}(\omega) = \frac{\omega^2 - 17}{(\omega^2 + 49)(\omega^2 + 16)}$	10	CO4	L3
4.	A stationary random process $X(t)$ has a two-sided spectral density given by $S_{XX}(\omega) = \begin{cases} 10; & 3 < \omega < 5 \\ 0; & \text{otherwise} \end{cases}$ Find the average power in the random process and RMS bandwidth.	10	CO4	L3
5.	A random process $X(t)$ having autocorrelation function $R_{XX}(\tau) = P e^{-\alpha \tau }$ where P and α are real positive constants, is applied to the input of a system with impulse response $h(t) = \begin{cases} W e^{-mt} & 0 < t \\ 0 & t < 0 \end{cases}$ Where W and m are real positive constants. Find the autocorrelation function of the network's response $Y(t)$.	10	CO5	L3

