Department of Electronics & Communication Engineering

MID QUESTION BANK(2017-18)

Course Title	**SIGNALS AND STOCHASTIC PROCESS**			
Course Code	**EC304ES**			
Regulation	**R16**			
Course Structure	Lectures	Tutorials	Practicals	Credits
	4	1	-	4
Course Coordinator	**A.SAIKUMAR,**	**M.VISHWANATH,**	**J.NARENDAR**	
Team of Instructors				

Course Objectives:

This course aims at:

A. Represent any arbitrary analog or Digital time domain signal in frequency domain.

B. Understand the importance of sampling, sampling theorem and its effects.

C. Understand the characteristics of linear time invariant systems.

D. Determine the conditions for distortion less transmission through a system.

Signal Analysis, Signal Transmission through Linear Systems

unit 1 short answer questions

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	Show that the following signals are orthogonal over an interval [0,1] and the given signals are f(t)=1 and x(t)= (1-2t) √3	Knowledge	A	a
2	Test the DT signal is periodic or not cos0.001nπ?	Knowledge	A	c
3	Test the Discrete signal is periodic or not X(n)=sin3n	Understand	A	f
4	X(t)=(cost + sin√2t) test x(t) is periodic or not.	Analysis	A	d
5	Sketch even and odd components of $x(n)=e^{-(n/4)}U(n)$	Knowledge	A	d
6	Sketch even and odd components of $x(t)=\cos^2(\pi t/2)$	Knowledge	A	f
7	Sketch even and odd components of $x(n)=Im[e^{jn\pi/4}]$?	Applying	A	e
8	Prove that power of the energy signal is zero over an infinite time?	Understand	A	c
9	Prove that energy of the power signal is infinite over an infinite time?	Understand	A	d
10	If x(n)=U(n).Find the power of	Analyze	A	b

	the signal?			
11	What are the elementary standard test signals?	Knowledge	A	b
12	If U(n) is the unit step function then sketch U(n)-U(n-1) and U(n-2)?	Knowledge	A	c
13	Write the Dirchlet's condition for the existence of fourier series	Understand	A	c
14	Sketch u(-t) and u(-t-1) where u(t) is unit step function.	Analysis	A	c
15	What is meant by Gibbs phenomenon	Knowledge	A	c
16	Write the formulae for Energy and power of continous time and discrete time signals.	Knowledge	A	i
17	sketch the even and odd component of the signal x(t)=t for 0≤t≤1 and x(t)=2-t 1≤t≤2	Analysis	A	d
18	.Draw the signum function and express signum function in terms of unit step function.	Knowledge	A	d
19	Define signal and system.	Knowledge	A	b
20	Expalin folding, delaying, Advance operations on the signal with an example	Knowledge	A	a

unit 1 Long answer questions

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	Explain the concept of orthogonality in	Analyze	A	a

	signals?			
2	If the signal is $x_1(t)$ approximated in terms of $x_2(t)$.Derive an expression for evaluation of component of $x_1(t)$ contained in $x_2(t)$?	Understand	A	c
3	A square wave is defined $f(t)=1$ for $0<t<\pi$ and $f(t)=-1$ for $\pi<t<2\pi$.Approximate this function by a waveform sint over an interval $[0,2\pi]$?	Analyze	A	f
4	Explain signal approximation using orthogonal function?	Knowledge	A	d
5	Derive an expression for evaluation of mean square error in the signal approximation?	Understand	A	d
6	Explain orthogonality in complex functions?	Analyze	A	f
7	Show that the signal set $\{1,\cos w_ot,\cos 2w_o,\ldots\ldots\cos nw_ot,\ldots\ldots,\sin w_ot, \sin 2w_ot,\ldots\ldots,\sin nw_ot,\ldots.\}$ are orthogonal over an interval $T=2\pi/w_o$?	Understand	A	e
8	Prove that set of exponential $1,e^{\pm jwt},e^{\pm 2jwt},\ldots\ldots,e^{\pm njwt}$ are orthogonal over an interval T_o	Analyze	A	c
9	A)If $x(n)=(0.5)^nU(n)$.Find the energy of the signal? If $x(n)=\cos^2 w_ot$.Find the power of the signal?	Analyze	A	d
10	sketch the even and odd component of the signal $x(t)=t$ for $0\le t\le 1$ and $x(t)=2-t$ $1\le t\le 2$	Analyze	A	b
11	Test the orthogonality of cosine waves $\cos nw_ot,\cos mw_ot$?	Creating	A	b
12	What is meant by impulse response. define the term Transfer function	Creating	C	c
13	What is meant by LTI system. State paley wiener criterion.	Creating	C	c

14	Expain the terms signal bandwidth and system band width. Expalin the relation between bandwidth and rise time.	Applying	D	c
15	What is the relation between impulse response and Transfer fuction Draw the ideal LPF characteristics	Applying	C	c
16	When the LTICT system is said to be causal,stable,dynamic. Define time invariant and time varying systems.	Applying	C	i
17	The impulse response of the LTI-CT system is given as h(t) = e-2t u(t). Determine transfer function, impulse response of a linear time invariant system.	Creating	C	d
18	Find the unit step response of the system given by h (t)= 1/RC e-at/RC u(t)	Applying	A	d
19	Write the formulae for Energy and power of continous time and discrete time signals.and Write with Examples?	Applying	A	b
20	Write the relation between Unit step and signum function?	Applying	A	a

UNIT 1 problems

S.No:	QUESTION	Blooms Taxonomy Level	Course outco me	Progra mOutc omes
1	Test the continous time system y(t)=tx(t) is time variant or invariant.	Knowledge	D	a
2	Test the continous time system y(t)= tx(t)is linear or non linear	Knowledge	D	c
3	Test the continous time system y(t)= $x^2(t)$is linear or non linear.	Understand	C	f
4	Test the discrete time system y(n)= $x^2(n)$ is linear or non linear.	Analysis	C	d
5	Test the discrete time system y(n)= $x(n^2)$ is linear or non linear.	Knowledge	C	d

6	Test the continous time system y(t)= $x(t)+x^2(t)$is linear or non linear.	Knowledge	C	f
7	Test the discrete time system y(n)= x(n)+x(n-1) is linear or not.	Applying	C	e
8	Test the continous time system y(t)=tx(t) is time variant or invariant.	Understand	C	c
9	What is the relationship between input and output of an LTI system?	Understand	C	d
10	Define LTI CT systems	Analyze	C	b

UNIT 2 FOURIER SERIES,FOURIER TRANSFORM,SAMPLING

UNIT 2 LONG ANSWER QUESTIONS

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	State and prove time shifting and frequency shifting properties of fourier transform.	Knowledge	A	a
2	write the time scaling,frequency differentiation property of fourier transform.	Knowledge	A	c
3	write the convolution property of fourier transform.	Understand	A	f
4	find the fourier transform of $x(t)=te^{-at}$ u(t)	Analysis	A	d
5	find the fourier transform of $x(t)= e^{-t}$ sint u(t)	Knowledge	A	d
6	find the fourier transform of $x(t)=e^{-a\|t\|}$ sgn(t)	Knowledge	A	f
7	what is the fourier transform of a rectangular function is defined as x(t)=1 for -1<t<1	Applying	A	e
8	state and prove sampling theorem.	Understand	B	c

9	Expalin natural sampling techinique.	Understand	B	d
10	Explain the process of reconstruction of signals from its samples	Analyze	B	b
11	Explain flat top sampling	Knowledge	B	b
12	compare ideal,natural,flattop sampling techniques	Knowledge	B	c
13	using fourier transform find the convolution of the signals $x(t)=t\ e^{-2t}\ u(t)$ and $y(t)=t\ e^{-t}\ u(t)$	Understand	B	c
14	Derive the formulae for fourier transform of periodic function	Analysis	B	c
15	find the fourier transform of $x(t)=e^{-\|t\|}$ for $-2<t<2$ $x(t)=0$ otherwise	Knowledge	B	c
16	find the fourier transform of $x(t)=\sin(8t+0.1\pi t)$.	Knowledge	B	i
17	State Parseval's relation for continuous time fourier transforms	Analysis	B	d
18	The Fourier transform (FT) of a function x (t) is X (w). What is the FT of dx(t)/ dt	Knowledge	B	d
19	Explain how aperiodic signals can be represented by fourier transform.	Knowledge	B	b
20	find the fourier transform of $x(t)=5\sin^2(3t)$	Knowledge	B	a

UNIT 2 SHORT ANSWER QUESTIONS

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	find the fourier transform of $x(t)=e^{-at}\ u(t)$	Knowledge	A	a
2	write the integration	Knowledge	A	c

	property of fourier transform			
3	write the duality property of fourier transform	Understand	C	f
4	find the fourier transform of x(t)=sgn(t)	Analysis	C	d
5	find the fourier transform of x(t)=u(t)	Knowledge	C	d
6	find the fourier transform of $x(t)=\cos w_o t$	Knowledge	C	f
7	find the fourier transform of $x(t)=\sin w_o t$	Applying	C	e
8	What is the inverse fourier transform 1/(a+jw)	Understand	C	c
9	What are the difference between Fourier series and Fourier transform	Understand	C	d
10	What is the inverse fourier transform $1/(a+jw)^2$	Analyze	C	b
11	Define nyquist rate and nyqusit interval.	Knowledge	B	b
12	what is aperture effect	Knowledge	B	c
13	Find the nyquist interval of x(t)=(sin200πt).	Understand	B	c
14	find the fourier transform of x(t)=f(t-2)+f(t+2).	Analysis	B	c
15	What is meant by Hilbert transform	Knowledge	B	c
16	write the properties of Hilbert transform	Knowledge	B	i
17	What is an antialiasing filter?	Analysis	B	d
18	What is meant by sampling,aliasing.	Knowledge	B	d
19	find the fourier transform of x(t)=sin6t	Knowledge	B	b
20	Write down the condition for avoiding the aliasing effect?	Knowledge	B	a

UNIT 2 PROBLEMS

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	if $x(t)=e^{-t}$ and it is periodic signal with period 1 sec.Represent x(t) in Trigonometric fourier series.	Knowledge	D	a
2	Derive relationship between Trignometric fourier series and Exponential fourier series?	Knowledge	D	c
3	Determine the fourier series represenatation of the signal $x(t)=3\cos(0.5\pi t+0.25\pi t)$	Understand	C	f
4	Derive the expressions for trigonometric fourier series coefficients.	Analysis	C	d
5	Determine the fourier series represenatation of the full wave rectified signal	Knowledge	C	d
6	Explain halfwave symmetry.	Knowledge	C	f
7	Explain quarter wave symmetry.	Applying	C	e
8	Write the dirichlets conditions.	Understand	C	c
9	Write the time shiting and frequency shifting property of fourier series	Understand	C	d
10	Write the parsevals theorem for fourier series	Analyze	C	b

Laplace Transforms and Z–Transforms:

unit 3 short answer questions

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	What is ROC	Knowledge	D	a
2	What is the relation between Laplace transform and Fourier transform	Knowledge	D	c
3	State Initial Value theorem	Understand	C	f
4	State Final value theorem	Analysis	C	d
5	What is a right sided signal? What is its ROC	Knowledge	C	d
6	What is a left sided signal? What is its ROC	Knowledge	C	f
7	What is a two sided signal? What is its ROC	Applying	C	e
8	What is a finite duration signal? What is its ROC	Understand	C	c
9	What is unilateral laplace transform	Understand	C	d
10	What is Bilateral transform	Analyze	C	b
11	What are the limitations of z transform?	Knowledge	C	b
12	What is inverse Z transform	Knowledge	B	c
13	When do you get DTFT from the Z transform	Understand	B	c
14	What is the ROC of Z transform	Analysis	B	c
15	What is the ROC of finite duration of Positive time sequence	Knowledge	B	c

16	What is the ROC of finite duration of negative time sequence	Knowledge	B	i
17	State the linearity property of Z transforms	Analysis	B	d
18	State Initial Value theorem of Z transform	Knowledge	B	d
19	State final Value theorem of Z transform	Knowledge	B	b
20	Define transfer function of a system	Knowledge	B	a

UNIT 3 LONG ANSWER QUESTIONS

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	Compare laplace and fourier transforms	Knowledge	D	a
2	State the properties of laplace transform	Knowledge	D	c
3	Obtain the relation between laplace and fourier transform	Understand	C	f
4	State the properties of laplace transform	Analysis	C	d
5	State and prove initial and final value theorems	Knowledge	C	d
6	State and prove time shifting property in s domain	Knowledge	C	f
7	What is ROC? Discuss about ROCs of various classes of signals	Applying	C	e
8	Discuss the partial fraction method of finding an inverse laplace transform	Understand	C	c
9	State the properties of ROC	Understand	C	d
10	State and prove time reversal property	Analyze	C	b
11	Derive the relation between Z transform and DTFT	Knowledge	C	b
12	Compare Laplace z and Fourier transforms	Knowledge	B	c
13	Derive the relation between Laplace and Z transforms	Understand	B	c

14	State and prove Parsevals relation?	Analysis	B	c
15	State and prove initial and final value theorems of Z transforms	Knowledge	B	c
16	Prove that for a causal sequences, the ROC is the exterior of a circle of radius r.	Knowledge	B	i
17	What are ROCs of finite duration sequences.	Analysis	B	d
18	Define inverse Z transform. Explain in detail different methods of finding inverse z transform	Knowledge	B	d
19	State and prove convolution property of Z transforms	Knowledge	B	b
20	Write the properties of ROC of x(z)	Knowledge	B	a

UNIT3problems

1	Find the inverse z-transform of X(z)= $(z-1)$^ 2/ z^ 2−0.1z−0.56	Knowledge	B	c
2	Find inverse z-transform of X(z) using long division method X(z)= 2+3z −1 1+z−1/ (1+0.25z−1− (z−2) 8)	Knowledge	B	i
3	Find the inverse Z-transform of X(z)= zzz−1 (z−2) ^2 ; |z|>2 using partial fraction	Analysis	B	d
4	Find the z-transform and ROC of the following sequences i) x[n]=[4(5n)-3(4n)] u(n) ii) (1/3)n u[-n] iii) (1/3)n [u[-n]-u[n-8]]	Knowledge	B	d
5	Find the z-transform of the following i) x[n]= cos nw. u[n] ii) x[n]= an sin nw. u[n] iii) x[n]= an u [n]	Knowledge	B	b
6	A finite series sequence x[n] is defined as x[n]={5,3,-2,0,4,-3}.find X[z] and its ROC.	Knowledge	B	c
7	Obtain the inverse Laplace transform of the function $ln(s+a/ s+b)$	Knowledge	B	i
8	Find the Laplace transform of the following function , x(t)= (1/t) $\sin^2$ w	Analysis	B	d
9	Find x(t) if X(s)= 1 /$(s^2+a^2)^2$ using convolution	Knowledge	B	d
10	Find the Laplace Transforms of the following functions a) exponential function b) unit step function c) hyperbolic sine & cosine d) damped sine function e) damped hyperbolic cosine & sine f) power ‘n’.	Knowledge	B	b
11	Find the inverse z-transform of X(z)= $(z-1)$^ 2/ z^ 2−0.1z−0.56	Knowledge	B	c
12	Find inverse z-transform of X(z) using long division method X(z)= 2+3z −1 1+z−1/ (1+0.25z−1− (z−2) 8)	Knowledge	B	i
13	Find the inverse Z-transform of X(z)= zzz−1	Analysis	B	d

	$(z-2)$ ^2 ; |z|>2 using partial fraction			
14	Find the z-transform and ROC of the following sequences i) x[n]=[4(5n)-3(4n)] u(n) ii) (1/3)n u[-n] iii) (1/3)n [u[-n]-u[n-8]]	Knowledge	B	d
15	Find the z-transform of the following i) x[n]= cos nw. u[n] ii) x[n]= an sin nw. u[n] iii) x[n]= an u [n]	Knowledge	B	b
16	A finite series sequence x[n] is defined as x[n]={5,3,-2,0,4,-3}.find X[z] and its ROC.	Analysis	B	d
17	Obtain the inverse Laplace transform of the function $ln(s+a/ s+b)$	Analysis	B	d

RANDOM PROCESSES – TEMPORAL CHARACTERISTICS:

UNIT 4 SHORT ANSWER QUESTIONS

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	Define Random Process?	Knowledge	D	a
2	Define Strict sense stationary Random Process?	Knowledge	D	c
3	Define Joint Distribution Function of Random process?	Understand	C	f
4	Define Joint Density Function of Random process?	Analysis	C	d
5	Define Wide sense stationary process?	Knowledge	C	d
6	Write the formula for cross correlation coefficient	Knowledge	C	f
7	Explain any two properties of Auto correlation function?	Applying	C	e
8	When a random process is said to be mean ergodic?	Understand	C	c
9	When a random process is said to be correlation ergodic?	Understand	C	d
10	Write the formula of autocorrelation of	Analyze	C	b

	random process X(t)			
11	Define auto covariance of Random process	Knowledge	C	b
12	Define ensemble autocorrelation	Knowledge	B	c
13	Define Time average autocorrelation	Understand	B	c
14	Define Poisson Random Process	Analysis	B	c
15	Define Gaussian Random Process	Knowledge	B	c
16	State and prove any two properties of autocorrelation function	Knowledge	B	i
17	State and prove any two properties of cross correlation function	Analysis	B	d
18	What are the types of Random processes	Knowledge	B	d
19	Define cross correlation	Knowledge	B	b
20	Write the formula of time average cross correlation	Knowledge	B	a

unit 4Long answer questions

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	The auto correlation function of a stationary random process X(t) is given by $R_{XX}(\tau) = 36 + (16/(1+8\tau^2))$ Find mean, mean square and variance of the process.	Knowledge	D	a
2	Explain Ergodic Theorem and Ergodic process	Knowledge	D	c
3	A random process Y(t) is given as Y(t) = X(t)Cos(ωt+θ) is a wide sense stationary random process, 'ω' is a constant, and θ is a random phase independent of X(t), uniformly distributed on (π, - π). Find out RYY(τ).	Understand	C	f

4	A random process is given as X(t) = At, where A is an uniformly distributed random variable on (0, 2). Find whether X(t) is wide-sense stationary random process or not.	Analysis	C	d
5	A random process is given as X(t) = At, where A is an uniformly distributed random variable on (0, 2). Find whether X(t) is wide-sense stationary random process or not.	Knowledge	C	d
6	Prove that the autocorrelation function is maximum at the origin.	Knowledge	C	f
7	Explain i) Mean ergodic process ii) Correlation ergodic process.	Applying	C	e
8	A random process X(t) is given as X(t) = A Cos(ωt+θ) is a wide sense stationary random process, 'ω' is a constant, and θ is a random phase independent of X(t), uniformly distributed on (0,2π). Find out $R_{xx}(\tau)$.	Understand	C	c
9	Explain Wide sense Stationary Random Process and Strict sense stationary Random process	Understand	C	d
10	Consider a random process x(t)=A cos (ωt+θ) where w and θ are constants and A is a random variable with zero mean and variance σA 2 . Determine whether x(t) is a wide sense stationary process or not	Analyze	C	b
11	Consider two random processes x(t)=3 cos (wt+θ) and y(t)=2 cos(wt+θ -π 2/) where θ a random variable distributed in (0,2π) prove	Knowledge	C	b

	that $\lvert R_{xy}(\tau)\rvert \le \sqrt{R_{xx}(0)\, R_{yy}(0)}$			
12	a) Explain the following w.r.to Random processes i) Strict sense stationary ii) Mean Ergodic processes. b) Explain about Poisson Random processes	Knowledge	B	c
13	For a random process x(t), assume that $Rxx(\tau) = \rho\, e^{-\tau^2/2a^2}$ where ρ>0 and a>0 are constants. Find the power density spectrum of x(t)	Understan d	B	c
14	Explain the cross covariance and correlation coefficient	Analysis	B	c
15	Two random processes U(t) and V(t) are defined as U(t) = X(t) + Y(t) and V(t) = 2 – X(t)+3 Y(t), where X(t) and Y(t) are two orthogonal stationary processes. Find $R_{uu}(\tau)$, $R_{vv}(\tau)$, $R_{uv}(\tau)$ in terms of $R_{XX}(\tau)$ and $R_{YY}(\tau)$.	Knowledge	B	c
16	A random process is defined as X(t)=A cos(wt+ θ) where A is constant and θ is a random variable, uniformly distributed over(-π,π) check X(t) is stationary or not	Knowledge	B	i
17	Consider a random process x(t)=cos (ωt+θ) where w is a real constant and θ is a random variable, uniformly distributed over(0,π/2) show that x(t) is not WSS	Analysis	B	d
18	Distinguish between stationary and not stationary random process	Knowledge	B	d
19	Explain the classification of	Knowledge	B	b

	the random processes with neat sketch			
20	Consider a random process x(t)=cos (ωt+θ) where w is a real constant and θ is a random variable, uniformly distributed over(0,π/2) Find average power	Knowledge	B	a
21	The auto correlation function of a stationary random process X(t) is given by $R_{XX}(\tau) = 36 + (16/(1+8\tau^2))$ Find mean, mean square and variance of the process.	Knowledge	B	c
22	Explain Ergodic Theorem and Ergodic process	Knowledge	B	i
23	A random process Y(t) is given as Y(t) = X(t)Cos(ωt+θ) is a wide sense stationary random process, 'ω' is a constant, and θ is a random phase independent of X(t), uniformly distributed on (π, - π). Find out RYY(τ).	Analysis	B	d
24	A random process is given as X(t) = At, where A is an uniformly distributed random variable on (0, 2). Find whether X(t) is wide-sense stationary random process or not.	Knowledge	B	d
25	A random process is given as X(t) = At, where A is an uniformly distributed random variable on (0, 2). Find whether X(t) is wide-sense stationary random process or not.	Knowledge	B	b

UNIT- V:
Random Processes – Spectral Characteristics:

<u>unit 5 short answer questions</u>

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	What is weiner – Khintchine relation	Knowledge	D	a
2	Define Power spectral density	Knowledge	D	c
3	Write the formula of cross power spectral density	Understand	C	f
4	State and prove any two properties of cross psd?	Analysis	C	d
5	State and prove any two properties of psd?	Knowledge	C	d
6	Define Cross power spectral density?	Knowledge	C	f
7	Show that psd is an event function	Applying	C	e
8	Show that psd at zero frequency is equal to the area under the curve of auto correlation	Understand	C	c
9	Prove that PSD of WSS is always non negative	Understand	C	d
10	Show that time average of autocorrelation and PSD form F.T pair	Analyze	C	b
11	Find out the power spectral density of a wide sense stationary process X(t) whose auto correlation function is $R_{XX}(\tau) = e^{-3\|\tau\|}$	Knowledge	C	b
12	Find out the power spectral density of a wide sense stationary process X(t) whose auto correlation function is $R_{XX}(\tau) = ke^{-k\|\tau\|}$	Knowledge	B	c
13	State the relation between Auto correlation function and PSD	Understand	B	c
14	Show that cross PSD of X(t), Y(t) is zero when X(t),	Analysis	B	c

	Y(t) are orthogonal			
15	State the relation between cross PSD and Cross correlation function	Knowledge	B	c
16	Show that real part of cross PSD is even function of w	Knowledge	B	i
17	Show that imaginary part of cross PSD is odd function of w	Analysis	B	d
18	Show that Sxy(w)=Syx(-w)	Knowledge	B	d
19	State the relation between average power and PSD	Knowledge	B	b
20	State the relation between average cross power and cross PSD	Knowledge	B	a

Unit 5 Long Answer question

S.No:	QUESTION	Blooms Taxonomy Level	Course outcome	ProgramOutcomes
1	Prove that $S_{XY}(\omega)=0$ and $S_{YX}(\omega)=0$, If X(t) and Y(t) are orthogonal.	Knowledge	D	a
2	State and prove any three properties of power spectral density.	Knowledge	D	c
3	Determine which of the following function is valid power density spectrums and why? $\cos(8\omega)/(2+\omega^4)$	Understand	C	f
4	Derive the relationship between power spectral density and auto correlation function.	Analysis	C	d
5	Derive the relationship between cross power spectral density and cross correlation.	Knowledge	C	d
6	Find out the power spectral density of a wide sense stationary process X(t) whose auto correlation function is $R_{XX}(\tau) = ae^{-b\|\tau\|}$	Knowledge	C	f

7	A WSS Random process X(t) has PSD, **$S_{XX}(w)=w^2/(w^4+10w^2+9)$ find auto correlation and mean square value**	Applying	C	e
8	A stationary random process has an auto correlation function of $$R(\tau)=\begin{cases}1-\frac{\lvert\tau\rvert}{T} & \lvert\tau\rvert\le T\\ 0 & \text{else where}\end{cases}$$ find PSD	Understa nd	C	c
9	What is cross PSD state its properties	Understa nd	C	d
10	A WSS Random process X(t) has PSD, **$S_{XX}(w)=w^2/(w^4+13w^2+36)$ find auto correlation and mean square value**	Analyze	C	b
11	Find out the power spectral density of a wide sense stationary process X(t) whose auto correlation function is **$R_{XX}(\tau) = ae^{-\lvert\tau\rvert}$**	Knowledg e	C	b
12	A stationary random process has an auto correlation function of $$R_x(\tau)=16-e^{-5\lvert\tau\rvert}\ \cos 20\pi\tau+8\cos$$ find Varinace,PSD	Knowledg e	B	c
13	The auto correlation function of an a periodic random process is . Find the PSD and average power of the signal. $$R_{XX}(\tau)=exp\left[-\frac{x^2}{2\sigma^2}\right].$$	Understa nd	B	c
14	A WSS Random process X(t) has PSD, **$S_{XX}(w)=1+w^2$ for $\lvert w\rvert<1$ find auto correlation and mean square value**	Analysis	B	c
15	State and prove weiner – Khintchine relation	Knowledg e	B	c
16	The auto correlation of a periodic random process is	Knowledg e	B	i

	$R_{XX}(\tau) = exp\left[-\frac{x^2}{2\sigma^2}\right].$ find PSD and average power of the signal			
17	State and prove any three properties of corss power spectral density	Analysis	B	d
18	Determine which of the following function is valid power density spectrums and why? $e^{-(w-1)}$	Knowledge	B	d
19	The PSD of a Random process is given by $S_{xx}(w) = \begin{cases} \pi & \lvert w \rvert < 1 \\ 0 & else\ where \end{cases}$ find Auto correlation function	Knowledge	B	b
20	Find the PSD of a random process whose auto correlation function is $R_{XX}(\tau)$=A COS($\omega_0\tau$)	Knowledge	B	a
21	Prove that $S_{XY}(\omega)$ =0 and $S_{YX}(\omega)$ =0 , If X(t) and Y(t) are orthogonal.	Knowledge	B	b
22	State and prove any three properties of power spectral density.	Knowledge	B	a