



## **BRAINWARE UNIVERSITY**

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Barasat, Kolkata - 7034 22

Term End Examination 2022

Programme – B.Tech.(CSE)-2018/B.Tech.(CSE)-2019/B.Tech.(CSE)-2020

Course Name – Signals and Systems

Course Code - ESC(CSE)501

( Semester V )

	<b>Marks : 60</b> he figure in the margin indicates full marks. Cand own words as far	Time: 2:30 didates are required to give their answers in teas practicable.]	<b>Hours</b> their	
	Grou (Multiple Choice	-	5=15	
1.	Choose the correct alternative from the following:			
(i)	What are the conditions called which are required for a signal to fulfil to be represented as Fourier series?			
	<ul><li>a) Dirichlet's conditions</li><li>c) Fourier conditions</li><li>What are the properties of continuous time Fo</li></ul>	b) Gibbs phenomenon d) Fourier phenomenon urier series?		
(iii)	<ul> <li>a) Linearity, time shifting</li> <li>c) Linearity, time shifting, frequency shifting, time reversal, time scaling, periodic convolution</li> <li>Find the Laplace transform of x(t) = u(t 2) u(t-2)</li> </ul>	<ul> <li>b) Linearity, time shifting, frequency shifting</li> <li>d) Linearity, time shifting, frequency shifting</li> <li>time reversal, time scaling, periodic</li> <li>convolution, multiplication, differentiation</li> </ul>	ng,	
(iv)	<ul><li>a) cos2s/s</li><li>c) sinh2s/s</li><li>When do Discrete Time Fourier Transform (DT</li></ul>	b) cosh2s/s d) sin2s/s FT) and Z-Transform (ZT) are equal?		
(v)	a) When $\sigma = 0$ c) When $\sigma = 1$ What is the nature of the following function: y	b) When r = 1 d) When r = 0 [n] = y[n-1] + x[n]?		
(vi)	<ul> <li>a) Integrator</li> <li>c) Subtractor</li> <li>The sampling frequency of a signal is Fs = 200 interval.</li> </ul>	b) Differentiator d) Accumulator 0 samples per second. Find its Nyquist	-	
· (vii)	<ul><li>a) 0.5 sec</li><li>c) 5 sec</li><li>State space analysis is applicable even if the in</li></ul>	b) 5 msec d) 0.5 msec nitial conditions are		
	a) Zero c) Equal	b) Non-zero d) Not equal		

b) Phase overlapping

d) Spectral overlapping

(viii) Which of the following is the process of 'aliasing'?

a) Peaks overlapping

c) Amplitude overlapping

(ix)	Sum of two periodic signals is a periodic signal when the ratio of their time periods is			
(×)	a) A rational number c) A complex number What is the process gain of a signal with bandy of 100MHz?	b) An irrational number d) An integer vidth 20MHz and a sampling frequency		
·	a) 4dB c) 4.6dB Which of the following systems is linear?	b) 5dB d) 125dB		
(xii)	a) y(t) = sin(x(t)) c) y(t) = cos(x(t)) For an definite energy signal power is	b) $y(t) = log(x(t))$ d) $y(t) = dx(t)/dt$		
(xiii	a) P = 20 c) none of these ) A signal is said to be a periodic signal if	b) P = infinity d) P = 0		
(xiv	<ul><li>a) the signal changes with time</li><li>c) the signal repeats in a fixed interval of time</li><li>) If a signal f(t) has energy E, the energy of the si</li></ul>	<ul><li>b) the signal changes with frequency</li><li>d) the signal repeats over a fixed frequency</li><li>gnal f(100t) is equal to</li></ul>	ency	
	a) E c) E/100 The convolution of a discrete time system with	b) 100E d) 400E		
	a) the square of the system c) the derivative of the system	b) the system itself d) the integral of the system		
	<b>Gro</b> u (Short Answer Ty	•	3 x 5=1	
<ol> <li>Explain the convolution property of the Fourier transform.</li> <li>Classify the different methods of evaluating inverse z-transform.</li> <li>Construct an anti-aliasing filter.</li> <li>Identify eigenvalue and eigenfunction of LTI-CT system.</li> <li>Develop the modulation property and convolution (time) property of the Fourier transform.</li> </ol>			(3) (3) (3) (3)	
	O alculate the Fourier transform of function x(t)=d		(3)	
	<b>Grou</b> (Long Answer Ty	-	5 x 6=3	
<ol> <li>State and describe Parseval's relation for discrete-time aperiodic signals.</li> <li>Determine the Fourier Transform of the impulse response.</li> <li>Analyze the z-transform and ROC of the (a) causal sequence, X(n) = {1,0,3,-1,2} (b) anti causal sequence, X(n) = {-3,-2,-1,0,1}</li> <li>State and explain the following properties of z-transform. i) Time shifting ii) Time reversal iii) Differentiation iv) Scaling in z-domain</li> <li>Describe in detail the following signals. (i) Periodic and aperiodic (ii) Even and odd (iii)</li> </ol>			(5) (5) (5) al (5)	
	complex exponential CT signal. (a) State Sampling theorem. (b) Decide how the	aliasing process is eliminated.	(5)	
	(a) Write the properties of the state transition mexamples, the advantages of Sate Space represe	natrix. (b) Conclude with appropriate	(5)	
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