MUTHAYAMMAL ENGINEERING COLLEGE
(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

MUST KNOW CONCEPTS

MKC

BME & MDE

2021-2022

Subject	19BMC04 – SIGNALS AND SYSTEMS & 19MDC03 – BIOSIGNALS AND SYSTEMS			
UNIT-1 SIGNALS AND SYSTEMS				
S.No	**Term**	**Notation (Symbol)**	**Concept/Definition/Meaning/Units/Equation/Expression**	**Units**
1	Continuous time signal	-	Continuous time signal is an infinite and uncontrollable sequence of numbers, as are the possible values each number can have.	-
2	Discrete time signal	-	A discrete-time signal is a finite sequence of numbers, with finite possible values for each number.	-
3	Deterministic signal	-	A signal is said to be deterministic if there is no uncertainty with respect to its value at any instant of time.	-
4	Random signal	-	A signal is said to be non-deterministic if there is uncertainty with respect to its value at some instant of time.	-
5	Even signal	-	A signal is referred to as an even if it is identical to its time-reversed counterparts; x(t) = x(-t).	-
6	Odd signal	-	A signal is odd if x(t) = -x(-t). An odd signal must be 0 at t=0, in other words, odd signal the origin	-
7	Energy signal	-	A signal x(t) is said to be energy signal if and only if the total normalized energy is finite and non-zero. Ie. 0<E< 4	-
8	Power signal	-	The signal x(t) is said to be power signal, if and only if the normalized average power p is finite and non-zero. Ie. 0<p<4	-
9	Classification of signals	-	• Continuous Time and Discrete Time Signals	-

			• Deterministic and random signal • Even and Odd Signals • Periodic and Aperiodic Signals • Energy and Power Signals	
10	Unit impulse signal	-	An impulse signal has zero value except at t = 0. It has infinitely high value t = 0. Continuous-Time Signal δt = 1 t = 0 0 $t \neq 0$ Discrete-Time Signal δn = 1 n = 0 0 $n \neq 0$	-
11	Unit step signal	-	A unit step signal has unity value for $t \geq 0$ else zero value. Continuous-Time Signal ut = 1 $t \geq 0$ 0 $t< 0$ Discrete-Time Signal u(n)= 1 $n \geq 0$ 0 $n< 0$	-
12	Unit ramp signal	-	A ramp step signal has unity slop value for $t \geq 0$, otherwise it has zero value .Continuous-Time Signal $r(t) = t$, t≥ 0 0, $t< 0$ Discrete-Time Signal $r(n) = n$, $n \geq 0$ 0, $n< 0$	-
13	Classification of systems	-	• linear and Non-linear Systems • Time Variant and Time Invariant Systems • linear Time variant and linear Time invariant systems • Static and Dynamic Systems • Causal and Non-causal Systems • Stable and Unstable Systems	-
14	Linear and non linear systems	-	A system is said to be linear when it satisfies superposition and homogenate principles. Consider two systems with inputs as x_1(t), x_2(t), and outputs as y_1(t), y_2(t) respectively.	-
15	Time Variant and Time Invariant	-	A system is said to be time variant if its input and output characteristics vary with time. Otherwise, the system is considered	-

	Systems		as time invariant.	
16	Causal and Non-Causal Systems	-	A system is said to be causal if its output depends upon present and past inputs, and does not depend upon future input. For non causal system, the output depends upon future inputs also.	-
17	Stable systems	-	The system is said to be stable only when the output is bounded for bounded input.	-
18	Unstable systems	-	For a bounded input, if the output is unbounded in the system then it is said to be unstable.	-
19	Static systems	-	A static system is a system in which output at any instant of time depends on the input sample at the same time.	-
20	Dynamics systems	-	A dynamic system is a system in which output at any instant of time depends on the input sample at the same time as well as at other times	-
21	Basic Operations on signals	-	Addition, subtraction, multiplication, differentiation, and integration fall under the category of basic signal operations acting on the dependent variables.	-
22	Amplitude scaling	-	Amplitude scaling is a very basic operation performed on signals to vary its strength.	-
23	Addition	-	This particular operation involves the addition of amplitude of two or more	-
24	Multiplication	-	multiplication of amplitude of two or more signals at each instance of time or any other independent variables is done which are common between the signals	-
25	Pulse signal	-	A pulse in signal processing is a rapid, transient change in the amplitude of a signal from a baseline value to a higher or lower value, followed by a rapid return to the baseline value	-
UNIT -2 ANALYSIS OF CONTINUOUS TIME SIGNALS				
26	Fourier series	-	any periodic function or periodic signal into the sum of a set of simple oscillating functions, namely sines and cosines	-
27	Fourier transform	-	The Fourier transform is commonly used to convert **a** signal **in** thetimespectrum **to a** frequencyspectrum.	-
28	Dirichlet condition for Fourier transform	-	✧the function X(t) should be signal values in any finite time To. ✧The function X(t) should have a finite number of discontinuities in the interval To.	-

29	Bilateral Laplace Transform	-	The bilateral Laplace transform can represent both causal and non-causal time functions.	-
30	Unilateral Laplace Transform	-	The unilateral Laplace transform is restricted to causal time functions	-
31	Region convergence	-	The Region of Convergence is the area in the pole/zero plot of the transfer function in which the function exists	-
32	Properties of ROC	-	1) ROC does not contain any poles 2) The system is stable if is ROC	-
33	Types of Fourier series	-	☞ Trigonometric Fourier Series ☞ Exponential Fourier Series ☞ Cosine Fourier Series	-
34	Fourier Series Analysis	-	If f(t) is a periodic function of period T, then under certain conditions, its Fourier Series.	-
35	Laplace Transform	-	Laplace transform is the integral transform of the given derivative function with real variable **t** to convert into complex function with variables.	-
36	Inverse Laplace Transform	-	In the inverse Laplace transform, we are provided with the transform F(s) and asked to find what function we have initially. The inverse transform of the function F(s) is given by: $f(t) = L^{-1}\{F(s)\}$	-
37	Time-CT Signal	-	A continuous time signal is a function that is continuous, meaning there are no breaks in the signal.	-
38	Initial Value Theorem	-	The initial value theorem is a theorem used to relate frequency domain expressions to the time domain behavior as time approaches zero.	-
39	Final Value Theorem	-	The final value theorem is used to determine the final value in time domain by applying just the zero frequency component to the frequency domain representation of a system	-
40	Fourier Cosine Transform	-	If (t) is even function ie. $f(-t) = f(t)$ Then Fourier cosine transform is given by FC $(\omega) = \sqrt{2\pi} \int f(t) \cos \omega t dt \infty 0$ And inverse Fourier cosine transform is given by $f(t) = \sqrt{2\pi} \int FC(\omega) \cos \omega t d\omega$	-

41	Fourier Sine Transform	-	If (t) is odd function ie. $f(-t) = -f(t)$ Then Fourier sine transform is given by FS $(\omega) = \sqrt{2\pi}\int$ □(□) sin □□□□ ∞0 And inverse Fourier sine transform is given by □(□) = √2□∫ □□(□) sin □□□□	-
42	Application of Laplace Transform	-	Analysis of electrical and electronic circuits. Breaking down complex differential equations into simpler polynomial forms. Laplace transform gives information about steady as well as transient states.	-
43	Time Scalling	-	In continuous time we can scale by an arbitrary real number. Indiscrete-time we scale only by integers. For an integer k, define xk [n] = x[n/k] if n is a multiple of k, 0 if n is not a multiple of k. xk [n] ⇔X(kf).	-
44	Properties of Time Scalling	-	Time scaling of signals of signals involves the modification of a periodicity of the signal, keeping its amplitude constant. Y (t) = βX(t)	-
45	Properties of Fourier Series	-	Understanding properties of Fourier series makes the work simple in calculating the Fourier series coefficients in the case when signals modified by some basic operations. Graphical representation of a periodic signal in frequency domain represents Complex Fourier Spectrum	-
46	Synthetic Equation	-	A synthesis Equation occurs when two or more reactants combine to form a single product.	-
47	Compressing in Time	-	Compressing in time requires decimation.	-
48	Periodic Signal	-	A periodic continuous-time signal can be represented in frequency domain using Fourier series	-
49	Discrete time signal	-	The Fourier transform is used to analyze problems involving continuous-time signals or mixtures of continuous- and discrete-time signals	-
50	Arbitrary Signals	-	All Fourier methods use sinusoids of different frequencies as building blocks to represent arbitrary signals.	-
UNIT -3 LINEAR TIMEINVARIANT SYSTEMS				
51	The impulse response properties	-	Dynamicity condition h(t)=(t) Causality Stability Step response	-

52	Realization structure	-	Block diagram representation of the differential equation is called realization structure	-
53	Different types of structure realization	-	➢ Direct form I realization ➢ Direct form II realization ➢ Cascade form realization ➢ Parallel form realization	-
54	System function (or) Transform function	-	System function (or) Transform function H(s) is defined as the ratio of Laplace transform of the output to Laplace transform of the input Initial conditions are zero H(s)=V(s)/X(s)	-
55	Impulse response of any system	-	Impulse response h(t) is the output y(t) produced by CT system when unit impulse is applied at the input	-
56	Three Elementary operations of continuous time system	-	1) Scalar Multiplication 2) Adder 3) Integrators	-
57	Impulse response of two LTI Systems connected in parallel	-	If the system are connected in parallel, having responses h1(t) and h2(t), then their overall response is given as, h(t)= h1(t) + h2(t)	-
58	Convolution integral	-	The output y(t) is equal to the convolution of input signal x(t) and impulse response h(t) y(t)= x(t)* h(t)	-
59	Continuous	-	Continuous signal or a continuous-timesignal is a varying quantity (a signal) whose domain, which is often time, is a continuum (e.g., a connected interval of the reals)	-
60	Differential Equations	-	An equation that shows the relationship between consecutive values of a sequence and differences among them.	-
61	Fourier series	-	To represent any periodic signal x(t), Fourier developed an expression called Fourier series.	-
62	Linear-Time Invarient System(LTI)	-	**Lineartime-invariantsystems (LTIsystems)** are a class of systems used in signals and systems that are both linear and time-invariant.	-
63	Block Diagram	-	A block diagram illustrates the sub-systems and signal pathswithin a larger system for processing signals.	-
64	Time-Invarient Linear system	-	Thus a time-invariant linear system G whose input x(t) is a sum of sinusoids will yield an output y(t) which is also a sum ofsinusoids at the same frequencies but	-

			scaled and phase shifted	
65	Types of system	-	Continuous time system Discrete time system	-
66	Properties of LTI	-	Commutative property of LTI systems Distributive property of LTI systems Associative property of LTI systems Static and dynamic LTI systems Invertibility of LTI systems Causality of LTI systems Stability of LTI systems Unit-step response of LTI systems	-
67	Associative property of LTI System	-	According to associative property, both convolution integral for continuous time LTI systems andconvolution sum for discrete time LTI systems are associative.	-
68	Causality for LTI System	-	This property says that the output of a causal system depends only on the present and past values of the input to the system	-
69	Stability for LTI System	-	A stable system is a system which produces bounded output for every bounded input.	-
70	Classification of CT LTI System	-	Causal system and non causal system Time invariant and time variant system Stable and unstable system Linear and Non-linear system Static and Dynamic systems Invertible and noninvertible system	-
71	Properties of convolution integral	-	Commutative property Distributive property Associative property	-
72	Commutative property	-	The commutative property is a basic property of convolution in both continuous and discrete time .	-
73	Distributive property	-	The distributive property states that both convolution integral for continuous time LTI system and convolution sum for discrete time LTI system are distributive.	-
74	Impulse Response	-	In signal processing, the impulse response, of a dynamic system is its output when presented with a briefinput signal, called an impulse.	-
75	Conditions required for transfer function	-	(i) System should be in unloaded condition (initial conditions are zero) (ii) The system should be linear time invariant.	-
UNIT-4 ANALYSIS OF DISCRETE TIME SIGNALS				
76	DTFT	-	The discrete-time Fourier transform (DTFT) is a form of Fourier analysis that is applicable to a sequence of values.	-

77	Properties of DTFT	-	Periodicity, linearity, stability, timeshifting, frequencyshifting, time and frequency scaling.	-
78	Applications of DTFT	-	The discrete-time Fourier transform (DTFT) is a form of Fourier analysis that is applicable to a sequence of values. The DTFT is often used to analyze samples of a continuous function.	-
79	Discrete time Fourier series	-	discrete-time Fourier series representation provides notions of frequency content of discrete-time signals.	-
80	Uses of DTFS	-	This discrete-time Fourier series representation provides notions of frequency content of discrete-time signals, and it is very convenient for calculations involving linear, time-invariant systems because complex exponentials are Eigen functions of LTI systems.	-
81	Sampling theorem	-	The sampling theorem essentially says that a signal has to be sampled at least with twice the frequency of the original signal.	-
82	Properties of sampling theorem	-	The sampling theorem specifies the minimum-sampling rate at which a continuous-time signal needs to be uniformly sampled so that the original signal can be completely recovered or reconstructed by these samples alone.	-
83	Sampling theorem types	-	There are three types of sampling techniques: Impulse sampling. Natural sampling. Flat Top sampling.	-
84	The Region of convergence of z transform	-	The Region of Convergence has a number of properties that are dependent on the characteristics of the signal, x[n]. The ROC cannot contain any poles.	-
85	The inverse z transform	-	To analyze a system, which is already represented in frequency domain, as discrete time signal then we go for Inverse Z-transformation. Mathematically, it can be represented as; $x(n)=Z^{-1}X(Z)$	-
86	Properties of z transform	-	Properties of the Z-Transform Linearity. Symmetry. Time Scaling. Time Shifting. Convolution. Time Differentiation. Parse Val's Relation. Modulation	-
87	The unilateral z transform	-	The Unilateral z-transform is also called as one-sided z- transform. It is defined for. i.e.	-

			Causal sequences.	
88	Uses of unilateral z transform	-	The unilateral z- transform is used to solve difference equations with initial conditions	-
89	Uses of z transform	-	The z-transform is an important signal-processing tool for analyzing the interaction between signals and systems.	-
90	Fourier transform	-	A function derived from a given function and representing it by a series of sinusoidal functions.	-
91	Fourier transform application	-	The Fourier Transform is an important image processing tool which is used to decompose an image into its sine and cosine components.	-
92	Relationship between z transform and DTFT	-	Restrict the z-transform to the unit circle in the complex plane, the Fourier transform (DTFT, So the z-transform is like a DTFT after multiplying the signal by the signal	-
93	Uses of Fourier transform	-	The Fourier transform can be used to interpolate functions and to smooth signals. For example, in the processing of pixelated images.	-
94	Applications of z transform	-	The z-transform is a powerful tool in solving problems where sequences of impulsive actions are involved, and has been extensively used in the analysis and synthesis of discrete- time feedback control systems	-
95	use Z transform in control system	-	The basic idea now known as the Z-transform was known to Laplace, others as a way to treat sampled-data control systems used with radar. It gives a tractable way to solve linear, constant-coefficient difference equations.	-
96	Advantages of z transform	-	Z transform is used for the digital signal. Both Discrete-time signals and linear time-invariant (LTI) systems can be completely characterized using Z transform.	-
97	Properties of Fourier transform	-	Linearity Property. Time Shifting Property. Frequency Shifting Property. Time Reversal Property. Differentiation and Integration Properties. Multiplication and Convolution Properties.	-
98	Applications of transform	-	Transform is used in a wide range of applications such as image analysis ,image filtering , image reconstruction and image compression.	-
99	Converting of Laplace to z transform	-	Laplace Transform can be converted to Z-transform by the help of bilinear Transformation.	-

100	Importance of inverse z transform	-	The Inverse Z-transform is very useful to know for the purposes of designing a filter.	-
UNIT-5 LINEAR TIMEINVARIANT DISCRETE TIME SYSTEMS				
101	Casual LTI system	-	A discrete-time LTI system is causal if the current value of the output depends on only the current value and past values of the input. A necessary and sufficient condition for causality is. Where. Is the impulse response.	-
102	LTI	-	Linear Time-invariant	-
103	Z transform	-	In mathematics and signal processing, the Z-transform converts a discrete-time signal, which is a sequence of real or complex numbers, into a complex frequency-domain representation. It can be considered as a discrete-time equivalent of the Laplace transform	-
104	Types of Z transform	-	Bilateral Z-transform. Unilateral Z-transform.	-
105	Block diagram	-	A block diagram illustrates the sub-systems and signal paths within a larger system for processing signals.	-
106	Importance of LTI	-	Time-invariant systems are systems where the output does not depend on when an input was applied. These properties make LTI systems easy to represent and understand graphically	-
107	Convolution Sum	-	The total response of the system is referred to as the CONVOLUTION SUM or superposition sum **of the sequences x[n] and h[n]**.	-
108	Properties of Linear Convolution	-	Commutative Law Associate Law Distribute Law	-
109	Commutative Law	-	(Commutative Property of Convolution) x(n) * h(n) = h(n) * x(n)	-
110	Associate Law	-	(Associative Property of Convolution	-
111	Distribute Law	-	(Distributive property of convolution) x(n) * [h1(n) + h2(n)] = x(n) * h1(n) + x(n) * h2(n)	-
112	Types of convolution sum	-	Continuous convolution. Discrete convolution.	-
113	Fourier Transform	-	The Fourier Transform is a mathematical technique that transforms a function of time, x(t), to a function of frequency, X(ω). It is closely related to the Fourier Series.	-

114	Recursive system	-	A recursive system is a system in which current output depends on previous output(s) and inputs	-
115	Non –Recursive system	-	In non-recursive system current output does not depend on previous output(s	-
116	Application of Z transform	-	The z-transform is an important signal-processing tool for analyzing the interaction between signals and systems.	-
117	Impulse response	-	Generally, an impulse response is the reaction of any dynamic system in response to some external change.	-
118	Lineartime invariant systems	-	“Continuous–time, linear, time invariant systems” refer to circuits or processors that take one input signal and produce one output signal with the following properties.	-
119	Types of convolution sum	-	Continuous convolution. • Discrete convolution.	-
120	Recursive filter	-	In signal processing, a recursive filter is a type of filter which re-uses one or more of its outputs as an input.	-
121	Continuous convolution	-	Continuous convolution is an operation on two continuous time signals defined by the integral.	-
122	Discrete convolution	-	Any discrete time signal x[n] can be represented as a linear combination of shifted Unit Impulses scaled by X(n)	-
123	Impulse response convolution example	-	The recorded spectrum by a recording spectrophotometer it may be considered as the convolution of the impulse response	-
124	Advantage of LTI systems	-	Time-invariant systems are systems where the output does not depend on when an input was applied. These properties make LTI systems easy to represent and understand graphically.	-
125	Disadvantage of LTI systems	-	Disadvantages are LTI does not handle so well discontinuity and non-linearity (eg amplitude quantization, saturation).	-
PLACEMENT QUESTION AND ANSWERS				
126	Y (t) = x (t/5) is ________ a) Compressed signal b) Expanded signal c) Time shifted signal d) Amplitude	-	Answer: b - Expanded signal Explanation: y (t) = x (at), comparing this with the given expression we get a = 1/5. If 0<a<1 then it is expanded (stretched) version of x (t).	-

	scaled signal by factor 1/5			
127	Time scaling is an operation performed on ________ a) Dependent variable b) Independent variable c) Both dependent and independent variable d) Neither dependent nor independent variable	-	Answer: b - Independent variable Explanation: Time scaling is an example for operations performed on independent variable time. It is given by y (t) = x (at).	-
128	Which of the component performs integration operation? a) Resistor b) Diode c) Capacitor d) Inductor	-	Answer: c - Capacitor Explanation: Capacitor performs integration. V (t) developed across capacitor is given by v (t) = (1/C)* $\int_{-\infty}^{t}$ i (∂).d∂, I (t) is the current flowing through a capacitor of capacitance C.	-
129	AM radio signal is an example for ___________ a) y (t) = a x (t) b) y (t) = x1 (t) + x2 (t) c) y (t) = x1 (t) * x2 (t) d) y (t) = -x(t)	-	Answer: c Explanation: AM radio signal is an example for y (t) = x1 (t) * x2 (t) where, x1 (t) consists of an audio signal plus a dc component and x2 (t) is a sinusoidal signal called carrier wave.	-
130	Which of the following is an example of amplitude scaling? a) Electronic amplifier b) Electronic attenuator c) Both amplifier and attenuator d) Adder	-	Answer: c -) Both amplifier and attenuator Explanation: Amplitude scaling refers to multiplication of a constant with the given signal. It is given by y (t) = a x (t). It can be both increase in amplitude or decrease in amplitude.	-
131	Exponentially damped sinusoidal signal	-	Answer: b - Non periodic Explanation: Exponentially damped sinusoidal signal of any kind is not periodic	-

	is _______ a) Periodic b) Non periodic c) Insufficient information d) Maybe periodic		as it does not satisfy the periodicity condition.	
132	The time period of continuous-time sinusoidal signal is given by ______ a) T = 2π / w b) T = 2π / 3w c) T = π / w d) T = π / 2w	-	Answer: a - T = 2π / w Explanation: X (t) = A cos (wt+φ) is the continuous-time sinusoidal signal and its period is given by T = 2π / w where w is the frequency in radians per second.	-
133	A causal DT system is BIBO stable only if its transfer function has __________.	-	A causal DT system is stable if poles of its transfer function lie within the unit circle.	-
134	Which are the fourier coefficients in the following? a) a_0, a_n and b_n b) a_n c) b_n d) a_n and b_n	-	Answer: a - a_0, a_n and b_n Explanation: These are the fourier coefficients in a trigonometric fourier series. $a_0 = 1/T\int x(t)dt$ $a_n = 2/T\int x(t)\cos(nwt)dt$ $b_n = 2/T\int x(t)\sin(nwt)dt$	-
135	Do exponential fourier series also have fourier coefficients to be evaluated. a) True b) False	-	Answer: a - True Explanation: The fourier coefficient is : $X_n = 1/T\int x(t)e^{-jwt}dt$.	-
136	The fourier series coefficients of the signal are carried from –T/2 to T/2. a) True b) False	-	Answer: a - True Explanation: Yes, the coefficients evaluation can be done from –T/2 to T/2. It is done for the simplification of the signal.	-
137	Fourier series is not true in case of discrete time signals. a) True b) False	-	Answer: b - False Explanation: Fourier series is also true in case of discrete time signals. They just need to follow the dirichlet’s conditions.	-

138	What is the disadvantage of exponential Fourier series? a) It is tough to calculate b) It is not easily visualized c) It cannot be easily visualized as sinusoids d) It is hard for manipulation	-	Answer: c -) It cannot be easily visualized as sinusoids Explanation: The major disadvantage of exponential Fourier series is that it cannot be easily visualized as sinusoids. Moreover, it is easier to calculate and easy for manipulation leave aside the disadvantage.	-
139	How does Fourier series make it easier to represent periodic signals? a) Harmonically related b) Periodically related c) Sinusoidally related d) Exponentially related	-	Answer: a - Harmonically related Explanation: Fourier series makes it easier to represent periodic signals as it is a mathematical tool that allows the representation of any periodic signals as the sum of harmonically related sinusoids.	-
140	The lengths of two discrete time sequence $x_1[n]$ and $x_2[n]$ are 5 and 7 respectively. The maximum length of a sequence $x_1[n] * x_2[n]$ is ______________ a) 5 b) 6 c) 7 d) 11	-	Answer : d – 11 Explanation : 5+7-1 = 11	-
141	A signal x (t) has its FT as X (f). The inverse FT of X(3f +2) is ______________ a) 12x(t2)ej3πt b) 13x(t3)e−j4πt/3 c) $3x(3t)e^{-j4\pi t}$ d) x(3t + 2)	-	Answer: b - 13x(t3)e−j4πt/3 Explanation: Applying the time shifting and scaling property, we get, X [3(f+2/3)] = 13x(t3)e−j4πt/3.	-

142	The impulse response of a continuous time system is given by $h(t) = \delta(t-1) + \delta(t-3)$. The value of the step response at t=2 is ________________ a) 0 b) 1 c) 2 d) 3	-	Answer: b - 1 Explanation: For step response, the impulse response can be integrated. So, $y(t) = u(t-1) + u(t-3)$ Hence, $y(2) = u(1) + u(-1)$ $= 1 + 0 = 1$.	-
143	Fourier series uses which domain representation of signals? a) Time domain representation b) Frequency domain representation c) Both combined d) Neither depends on the situation	-	Answer: b - Frequency domain Explanation: Fourier series uses frequency domain representation of signals. $X(t)=1/T\sum X_n e^{jnwt}$. Here, the X(t) is the signal and $X_n = 1/T\int x(t)e^{-jwtn}$.	-
144	What is the polar form of the fourier series? a) $x(t) = c_0 + \sum c_n\cos(nwt+\phi_n)$ b) $x(t) = c_0 + \sum c_n\cos(\phi_n)$ c) $x(t) = \sum c_n\cos(nwt+\phi_n)$ d) $x(t) = c_0 + \sum \cos(nwt+\phi_n)$	-	Answer: a Explanation: $x(t) = c_0 + \sum c_n\cos(nwt+\phi_n)$, is the polar form of the fourier series. $C_0=a_0$ and $c_n = \sqrt{a2_n + b2_n}$ for $n\geq1$ And $\phi_n = \tan^{-1} b_n/a_n$.	-
145	Advantage of FFT over DFT	-	FFT algorithm reduces number of computations	-
146	Steps involved in finding convolution sum	-	folding Shifting Multiplication Summation	-

147	Zero padding	-	The method of appending zero in the given sequence is called as Zero padding	-
148	In the equation $x(t) = be^{at}$ if $a < 0$, then it is called _______ a) Growing exponential b) Decaying exponential c) Complex exponential d) Both Growing and Decaying exponential	-	Answer: b - Decaying exponential Explanation: If $a > 0$ in $x(t) = be^{at}$ it is called growing exponential and if <0 it is called decaying exponential. Hence Decaying exponential is correct.	-
149	Examples of CT signals	-	AC waveform, ECG, Temperature recorded over an interval of time etc	-
150	Causal condition for LTI CT system	-	An LTI continuous time system is causal if and only if its impulse response is zero for negative values of t.	-
Faculty Prepared		M.Gayathri Devi, Assistant Professor, Department of BME.	Signature	

HOD