

University of Mumbai
Examination 2020

Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester VI

Course Code: ELX604 and Course Name: Signals and Systems

Time: 1 hour

Max. Marks: 50

Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	What is the other name of a Continuous Time Unit Impulse Function?
Option A:	Dirac Delta Function
Option B:	Unit Function
Option C:	Area Function
Option D:	Direct Delta Function
Q2.	If $x(-t) = -x(t)$ then the signal is said to be _____
Option A:	Even signal
Option B:	Odd signal
Option C:	Periodic signal
Option D:	Non-periodic signal
Q3.	$Y(t) = x(t/5)$ is _____
Option A:	Compressed Signal
Option B:	Expanded Signal
Option C:	Time shifted signal
Option D:	Amplitude scaled signal by factor 1/5
Q4.	The given pair $x(t)$ and $y(t)$ is _____
Option A:	$Y(t) = d/dt [x(t)]$
Option B:	$Y(t) = \int x(t).dt$
Option C:	$Y(t) = x(t) - 1$
Option D:	$Y(t) = x(t) / 2$
Q5.	The area under the pulse defines _____ of the impulse.
Option A:	Strength
Option B:	Energy
Option C:	Power
Option D:	Duration
Q6.	Which of the following is an example of a physical device which adds the signals?
Option A:	Radio
Option B:	Audio mixer
Option C:	Frequency divider
Option D:	Subtractor

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Q7.	The type of systems which are characterized by input and the output capable of taking any value in a particular set of values are called as
Option A:	Analog
Option B:	Discrete
Option C:	Digital
Option D:	Continuous
Q8.	When we take up design of systems, ideally how do we define the stability of a system?
Option A:	A system is stable, if a bounded input gives a bounded output, for some values of the input
Option B:	A system is unstable, if a bounded input gives a bounded output, for all values of the input
Option C:	A system is stable, if a bounded input gives a bounded output, for all values of the input
Option D:	A system is unstable, if a bounded input gives a bounded output, for some values of the input
Q9.	Which one of the following systems is causal?
Option A:	$y(t)=x(t)+x(t-3)+x(t^2)$
Option B:	$y(n)=x(n+2)$
Option C:	$y(t)=x(t-1)+x(t-2)$
Option D:	$y(n)=x(2n^2)$
Q10.	Which among the following is a LTI system?
Option A:	$dy(t)/dt+ty(t)=x(t)$
Option B:	$y(t)=x(t)\cos\pi t$
Option C:	$y(n)=x(n)+nx(n-1)$
Option D:	$y(n)=x^3(n+1)$
Q11.	Comment on the causality of the following discrete time system: $y[n] = x[-n]$.
Option A:	Causal
Option B:	Non Causal
Option C:	Both Casual and Non casual
Option D:	None of the mentioned
Q12.	The response of any discrete time system can be decomposed as
Option A:	Total Response=Impulse+step
Option B:	Total Response=Impulse+ramp
Option C:	Total Response=zero-output response
Option D:	Total Response=zero-state response + zero-input response
Q13.	Find the ROC of $x(t) = e^{-2t} u(t) + e^{-3t} u(t)$.
Option A:	$\sigma > 2$
Option B:	$\sigma > 3$

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Option C:	$\sigma > -3$
Option D:	$\sigma > -2$
Q14.	Find the Laplace transform of $e^{-at} \cos \omega t u(t)$
Option A:	$\frac{s+a}{(s+a)^2 + \omega^2}$
Option B:	$\frac{s+a}{(s+a)^2 - \omega^2}$
Option C:	$\frac{\omega}{(s+a)^2 + \omega^2}$
Option D:	$\frac{\omega}{(s+a)^2 - \omega^2}$
Q15.	Find the initial value of $f(t)$ if $F(s) = (s-1)/(s(s^2-1))$
Option A:	0
Option B:	-1
Option C:	∞
Option D:	1
Q16.	The Laplace transform of the function $\sin(4t) \cos(2t)$ is _____
Option A:	$2/(s^2+16)$
Option B:	$2/(s^2-16)$
Option C:	$(s^2+16)/2$
Option D:	$(s^2-16)/2$
Q17.	The Laplace transform of signal $u(t-2)$ is _____
Option A:	$-e^{-2s}/2$
Option B:	$e^{-2s}/2$
Option C:	$e^{-2s}/s+1$
Option D:	0
Q18.	Find the Z-transform of $y(n) = x(n+2)u(n)$.
Option A:	$z^2 X(Z) - z^2 x(0) - zx(1)$
Option B:	$z^2 X(Z) + z^2 x(0) - zx(1)$
Option C:	$z^2 X(Z) - z^2 x(0) + zx(1)$
Option D:	$z^2 X(Z) + z^2 x(0) + zx(1)$
Q19.	The z-transform of $\delta[n+k] > 0$ is _____
Option A:	$Z^{-k}, Z \neq 0$
Option B:	$Z^k, Z \neq 0$
Option C:	Z^{-k} , for all Z
Option D:	Z^k , for all Z
Q20.	Find the Z-transform of the causal sequence $x(n) = \{1, 0, -2, 3, 5, 4\}$. (1 as the reference variable)
Option A:	$1 - 2z^{-2} + 3z^{-3} + 5z^{-4} + 4z^{-5}$

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Option B:	$1 - 2z^2 + 3z^3 + 5z^4 + 4z^5$
Option C:	$z^{-1} - 2z^2 + 3z^3 + 5z^4 + 4z^5$
Option D:	$z - 2z^3 + 3z^4 + 5z^5 + 4z^6$
Q21.	The z-transform of $0.25^a u[-n]$ is _____
Option A:	$4z/(4z-1), Z >14$
Option B:	$4z/(4z-1), Z <14$
Option C:	$1/(1-4z), Z >14$
Option D:	$1/(1-4z), Z <14$
Q22.	Find the fourier transform of an exponential signal $f(t) = e^{-at} u(t), a>0$.
Option A:	$1/(a+j\omega)$
Option B:	$1/(a-j\omega)$
Option C:	$1/(-a+j\omega)$
Option D:	$1/(-a-j\omega)$
Q23.	The Fourier transform of a function $x(t)$ is $X(\omega)$. What will be the Fourier transform of $dx(t)/dt$?
Option A:	$X(f)/jf$
Option B:	$J2\pi fX(f)$
Option C:	$dX(f)/dt$
Option D:	$jfX(f)$
Q24.	Find the inverse Fourier transform of $X = (1+3j\omega)/(3+j\omega)^2$
Option A:	$3e^{-3t} u(t) + 8 e^{-3t} u(t)$
Option B:	$3te^{-3t} u(t) - 8 e^{-8t} u(t)$
Option C:	$3e^{-3t} u(t) + 8t e^{8t} u(t)$
Option D:	$3e^{-3t} u(t) - 8t e^{-3t} u(t)$
Q25.	Find the inverse Fourier transform of $\delta(\omega)$
Option A:	12π
Option B:	2π
Option C:	1π
Option D:	π