

Seat No : _____

SARDAR PATEL UNIVERSITY

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Bachelor of Science (Semester 3) Examination -2022

US03CELC21 : Signal Processing

Date : 19/11/2022, Saturday

Time : 10.00 A. M. to 1.00 P.M.



Total 70 Marks

	Note : Figure to the right indicate full marks of the questions.	
Q-1	Multiple Choice Questions	[10]
1.	The electrical signals derived in proportion with physical quantities such as Temperature, Pressure, Sound etc. are generally _____ signals. (a) Analog (b) Discrete (C) Digital (D) Discrete	
2.	Which signals have values only at certain interval of time? (a) Periodic (b) Discrete (C) Continuous (D) Both (a) and (c)	
3.	An Integrator circuit has _____ in the input network. (a) Resistor (b) Capacitor (c) Inductor (d) Diode	
4.	The unit of attenuation is (a) Decible (b) Current (c) Resistance (d) None of these	
5.	The differentiator circuit has _____ in the feedback path. (a) Inductor (b) Capacitor (c) Diode (d) Resistor	
6.	In case of Hartley Oscillator, tapped _____ is used. (a) Capacitor (b) Inductor (c) Both Capacitor and Inductor (d) switch	
7.	$2 \sin A \sin B =$ _____ (a) $\sin(A+B) + \sin(A-B)$ (b) $\sin(A+B) - \sin(A-B)$ (c) $\cos(A-B) - \cos(A+B)$ (d) None of these	
8.	The Laplace transform of $\sinh at$ is (a) s/s^2+a^2 (b) s/s^2-a^2 (c) a/s^2+a^2 (d) $a/s^2 - a^2$	
9.	A function is said to be odd if $f(-X) =$ _____ for x in all the domain. (a) $f(X)$ (b) $-f(x)$ (c) 0 (d) 1	
10.	A signal of continuous _____ is known as continuous time signal. (a) Amplitude (b) Time (c) Both (a) and (b) (d) Frequency	
Q -2	Short Answer Question (Attempt any TEN out of TWELVE)	[20]
1.	Find the laplace transform of $\cos(at+b)$.	
2.	Give expressions for a_0 , a_n and b_n .	
3.	Define Even and Odd Functions.	

[4]

(P.T.O.)

4.	Which types of waveforms are generated in piston type attenuator?	
5.	Find a_0 for the Fourier series to represent X^2 in the interval $(-\pi$ to $\pi)$	
6.	Define Deterministic signal. Give suitable example.	
7.	Define : Power signal and Energy signal.	
8.	Classify different types of signals.	
9.	Find laplace transform of $T\cos at$.	
10.	Define : Rise Time and Fall Time of a pulse.	
11.	With proper diagram explain continuous time (CT) signals.	
12.	Draw important blocks of Signal generator.	
Q-3	(A) Explain Pulse Characteristics with neat sketch.	[5]
	(B) Describe pulse terminology.	[5]
	<u>OR</u>	
Q-3	(A) Write classification of signals and its definition.	[5]
	(B) Discuss in detail any two types of signals with proper sketch.	[5]
Q-4	(A) Explain how sinewave is generated ?	[5]
	(B) Explain working of Function generator.	[5]
	<u>OR</u>	
Q-4	(A) With proper schematics explain Phase Lock Loop.	[5]
	(B) If the decibel attenuation is $20\log N$, derive an expression for resistors R_1 , R_2 and R_3 in Pi attenuator.	[5]
Q-5	(A) Find the fourier series expansion of $f(x) = e^{-ax}$ in the interval $-\pi < x < \pi$	[5]
	(B) Find the fourier series expansion of $f(x) = e^{-x}$ in the interval $0 < x < 2\pi$	[5]

	<u>OR</u>	
Q-5	(A) Find a_0 for the function $f(x) = X + X^2$ in the fourier series for the interval $-\pi < x < \pi$ &Find a_0 for the function $f(x) = X \sin x$ in the fourier series for the interval $-\pi < x < \pi$	[5]
	(B) Differentiate Even and Odd functions	[5]
Q-6	(A) Find the laplace transform of $t^2 \sin at$.	[5]
	(B)) Find the laplace transform of $\cos^2 2t$	[5]
	<u>OR</u>	
Q-6	(A) Find the laplace transform of $e^{3t} \sin^2 t$	[5]
	(B)) Find the laplace transform of $e^{6t} \sin 4t \cos 7t$	[5]

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