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SARDAR PATEL UNIVERSITY

B.Sc. (3rd Semester) Examination

Electronics

US03CELC21- Signal Processing

Date :- 17/06/2022 **Time :-** 12:00 P.M. to 02:00 P.M.

Day :- Friday **Total Marks :-70**

Q1. Multiple Choice Questions . [10]

1. A signal is physical quantity which contains some information which is function of one or more _____variables.
   (a) input (b)output (c)independent
2. A signal of continuous amplitude and time is known as a continuous time signal or an _____
   (a) Digital signal (b)Microwave signal (c) Analog signal
3. In a communication system the word_____ is very commonly used.
   (a) Signal (b) Control (c) Instrumentation
4. The digital signals can be obtain from the continuous time analog signal by a process called _____ conversion.
   (a) Digital to analog (b) analog to digital (c) analog to analog
5. The simple sine wave generator consists of two main block_____ &_____.
   (a) Attenuator & Op-Amp
   (b) Oscillator & Attenuator
   (c) Frequency & Output
6. Colpitt's Oscillator use_____ to achieve 180^{o} phase shift.
   (a) Tapped Capacitor (b) Tapped Inductor (c) Tapped resistor
7. A function f(x) is said to be periodic with period p, if f(x+p)=_____ for least positive value of p.
   (a) f(x) (b) f(-x) (c) –f(x)
8. A function f(x) is said to be an odd function if f(-x)=_____.
   (a) f(x) (b) f(-x) (c) –f(x)
9. L [cosat] =_____ .
   (a) a/s^2+a^2 (b) a/s^2-a^2 (c) s/s^2+a^2
10. L [e^{at}] =_____
    (a) S/1-a (b)S/1+S (c)1/S-a

Q2. State whether the following statements are True or False. [08]

1. A signal is called as a power signal if its zero normalised power is non zero and finite. True/False.

(P.T.O.)

2. The example of continuous signals are sine wave . True/False . [P.T.O.]
3. In the signal the Audio Frequency range is 2Hz to 20Hz. True/False.
4. If information is in non-electric form it should be converted into electric form. True/False.
5. $L[t^n] = n! / s^{n+1}$. True/False.
6. A signal which cannot be described by any mathematical expression is called as a Random signal. True/False.
7. The Laplace transform of t^n, n>0 is given by 1/S. True/False.
8. $X_e(t)$ = odd components of signal X(t). True/False.

Q3. Answer any ten questions in short. [20]

1. Define discrete time signals with example.
2. What is the important block of signal generator? What is its functions?
3. Define rise time and fall time of a pulse.
4. Give the expressions for a_0, a_n and b_n.
5. Define Even or Odd function.
6. Draw the block diagram of an oscillator.
7. What is function of PAD in piston type attenuator?
8. What is Laplace function ?
9. Find Laplace's transform for t- sinht5t.
10. Find a_0 for the Fourier series to represent x^2 in the interval ($-\pi$ to π).
11. The frequency and amplitude accuracy depends on design of which block of signal generator?
12. Define Attenuator.

Q4. Long answer questions.(Attempt any four out of eight)

I. Discuss in detail pulse characteristics and their terminology. [08]

II. Explain Energy and power signals in detail. [08]

III. Explain in detail working of function generator. [08]

IV. Explain in detail working of phase locked loop system. [08]

V. Find the Fourier series for , $f(x) = -\pi \quad -\pi < X < 0$

$= x \quad 0 < X < \pi$ [08]

VI. Find the Fourier series to represent

$F(x) = x \sin x, \ 0 < x < 2\pi$ [08]

VII. Find Laplace 's transform of (i) $\cos^3 t$

(ii) $\sin^2 at$ [08]

VIII. Prove that : $L[e^{-at}] = 1/s+a$. [08]

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