Exam.Code:0936
Sub. Code: 6988

1019

B.E. (Electrical and Electronics Engineering)
Sixth Semester
EE-612: Signal and System

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Section.

x-x-x

Q.No.1 (i) What do you mean by singularity functions?

(ii) Show that if $x(t) \overset{FT}{\longleftrightarrow} X(j\omega)$ then $x(at) \overset{FT}{\longleftrightarrow}$ .....?

(iii) State the Dirichlet conditions for fourier series.

(iv) Find the Laplace transform of $t^n u(t)$?

(v) If $X(z) = 1+2z^{-1}+z^{-2}$, determine the initial and final values of the corresponding sequence x(n). (5x2=10)

Section – A

Q.No.2 (a) Explain in detail the classification of signals. (5)

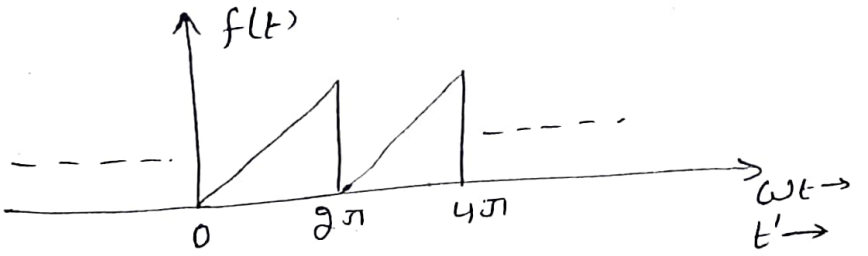
(b) Find the impulse response h(n) for each of the LTI discrete time systems given by the difference equations as below. Indicate whether each system is an FIR or an IIR system.

(i) $y(n) = x(n) - 2x(n-2) + x(n-3)$

(ii) $y(n) + 2y(n-1) = x(n) + x(n-1)$

(iii) $y(n) = (1/2)y(n-2) + 2x(n) - x(n-2)$ (5)

Q.No.3 (a) Find the exponential form of fourier series of the given waveform:



(5)

(b) An LTI system is described by differential equation:

$$\frac{d^2y(t)}{dt^2} + 4\frac{dy(t)}{dt} + 3y(t) = \frac{dx(t)}{dt} + 2x(t)$$

P.T.O.

(i) Find the impulse response of the system.

(ii) If $x(t) = e^{-t}u(t)$, find the output $y(t)$. (5)

Q. No.4 (a) Define sampling theorem. Also, explain aliasing. (5)

(b) Determine the discrete fourier series representation for the sequence $x(n) = \left(\cos\frac{\pi}{2}n + \sin\frac{\pi}{4}n\right)$ (5)

Section-B

Q.No.5 (a) Determine the fourier transform of the following sequences:

(i) $x(n) = 1$ (ii) $\delta(n-n_0)$ (iii) $(n+1)\,a^n u(n)$ (5)

(b) Mention atleast seven properties of discrete time fourier transform. (5)

Q.No.6 (a) Find the inverse Laplace transform h(t), given $H(s) = \frac{s-1}{(s+1)(s-2)}$ and comment on stability and causality of the system for various ROC's. (5)

(b) Find the Z- transform of following signals:

(i) $x(n) = \cos n\omega_0 u(n)$

(ii) $x(n) = (1/2)n(n-1)u(n)$ (5)

Q.No.7 (a) What is Hilbert transform? List the properties of Hilbert transform. (5)

(b) List down the properties of Z-transform. (5)

x-x-x