

SV-447

Total No. of Pages : 3

Seat No.	
----------	--

T.E. (Electronics & Telecommunication)(Semester-V)(Revised)

Examination, May - 2019

SIGNALS AND SYSTEMS

Sub. Code : 66316

Day and Date : Friday, 3 - 05 - 2019.

Total Marks : 100

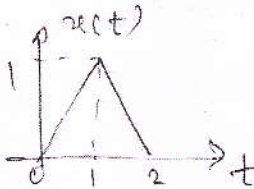
Time : 2.30 p.m. to 5.30 p.m.

- Instructions :
- 1) All questions are compulsory.
  - 2) Figures to right indicates full marks.
  - 3) Assume suitable data if required.

Q1) Attempt any two.

[16]

- a) Explain classification of signals.
- b) Plot following signals  $x[n] = \{1, 1, 1, 1, 1, 1/2\}$ 
  - i)  $x[4-n]$
  - ii)  $x[2n+1]$
  - iii)  $x[n] u[2-n]$
  - iv)  $x[n-1] \delta[n-3]$
- c) Determine even and odd part of following signals.
  - i)  $x[n] = \{-1, 2, 2, 1, 1, 2, 1, -1\}$
  - ii)  $x(t) =$



Q2) Attempt any two.

[18]

- a) i) Check whether the following systems are invertible?
  - 1)  $y(t) = x(t-4)$
  - 2)  $y[n] = nx[n]$

P.T.O.

ii) Check the following systems for linearity?

1)  $Y(t) = x(t/2)$

2)  $Y[n] = x[n] + x[n-1]$

b) Find convolution of two sequences.

$x[n] = 2$  for  $-2 \leq n \leq 2$

$= 0$  Elsewhere

$Y[n] = 4$  for  $0 \leq n \leq 2$

$= 0$  Elsewhere

c) Find convolution of two sequences.

$x(t) = 1$  for  $0 \leq t \leq 1$

$= 0$  Elsewhere

$Y(t) = t$  for  $0 \leq t \leq 2$

$= 0$  Elsewhere

Q3) Attempt any two.

[16]

a) Explain singularity function and construct the block diagram for the system for following Equation.

$$y(t) + a \frac{dy(t)}{dt} = b_0 x(t) + b_1 \frac{dx(t)}{dt}$$

b) Explain interpolation techniques.

c) Explain effect of under sampling and aliasing.

Q4) Solve any two.

[16]

a) Determine the Z-transform of the following signals & sketch region of convergence.

i)  $x(n) = n^2 u(n)$

ii)  $x(n) = \left(\frac{1}{2}\right)^n \{u(n) - u(n-10)\}$

b) Determine the inverse Z-transform of given  $X(z)$ , using P.F.E. method.

$$X[Z] = \frac{(4Z^2 - 2Z)}{(Z^3 - 5Z^2 + 8Z - 4)}$$

c) Determine  $x[n]$  using residue method.

$$X[z] = \frac{10Z}{(Z-1)(Z-2)}$$

Q5) Solve any two.

[18]

- a) Find the trigonometric Fourier series for the periodic signal  $m(t)$  shown in Fig. 5.a.  $m(t) = t$  for  $-1 \leq t \leq 1$ .

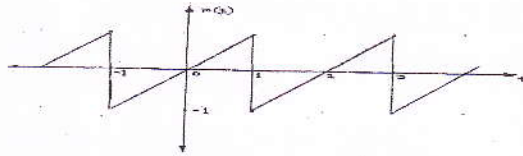


Fig. 5.a

- b) Find the exponential Fourier series for the following signal.

$$x(t) = \cos(\Omega_0 t) \text{ for } -\frac{\pi}{2} < t < \frac{\pi}{2}$$

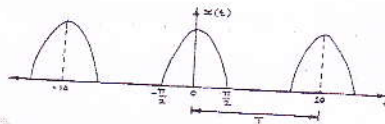


Fig. 5.b.

- c) Explain properties of Fourier series.

Q6) Solve any two.

[16]

- a) Find the Fourier transform of the signal  $x(t) = \cos(\Omega_0 t)$ . Also sketch the magnitude & phase spectrum.
- b) Find the Fourier transform of the signal given below. Also sketch magnitude & phase spectrum.

$$m(t) = e^{-|t|}$$

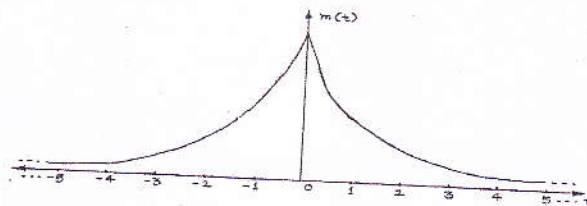


Fig. 6.b.

- c) Explain properties of Fourier Transform.

