Seat No.	

SE - 462

Total No. of Pages : 3

T.E. (Electronics & Telecommunication) (Semester - V) Examination, November - 2018

SIGNALS AND SYSTEMS (Revised)

Sub. Code : 66316

Day and Date : Monday, 26 - 11 - 2018 **Total Marks : 100**

Time : 10.00 a.m. to 01.00 p.m.

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

Q1) Attempt any Two : **[16]**

a) Explain Classification of Signals.

b) Plot following signals

i) $x(t) = t\,u(t)$

ii) $x(t) = (t-1)\,u(t)$

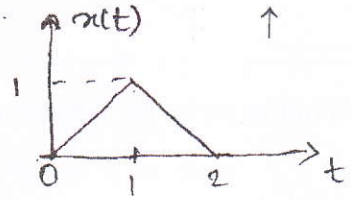
iii) $x(t) = t\,u(t-1)$

iv) $x(t) = (t-1)\,u(t-1)$

c) Determine even and odd part of following signals

i) $x[n] = \{...-1,-1,-1, 1, 1,1,1...\}$

ii)



Q2) Attempt any Two : **[18]**

a) 1) Check whether the following systems are invertible?

i) $y(t) = x(t-4)$ ii) $y[n] = nx[n]$

2) Check the following systems for linearity?

i) $Y(t) = x(t/2)$ ii) $y[n] = x[n] + x[n-1]$

b) Find convolution of two sequences

$X[n] = 2$ for $-2 \le n \le 2$ $Y[n] = 4$ for $0 \le n \le 2$

$= 0$ Elsewhere $= 0$ Elsewhere

P.T.O.

c) Find convolution of two sequences

$x(t) = 1$ for $0 \le t \le 1$ $\quad$ $y(t) = t$ for $0 \le t \le 2$

$= 0$ Elsewhere $\quad$ $= 0$ Elsewhere

Q3) Attempt any Two : **[16]**

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

$y(t) + ady(t)/dt = b0x(t) + bldx(t)/dt$

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) $x(n) = \begin{cases} a^n & ,n \ge 0 \\ 0 & ,n < 0 \end{cases}$

ii) $x(n) = \sin(\omega_0 n)u(n)$

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

$$X(z) = \frac{-4 + 8z^{-1}}{1 + 6z^{-1} + 8z^{-2}}; ROC: |z| > 4$$

c) Explain all the properties of region of convergence.

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 $-1 \le t \le 1$

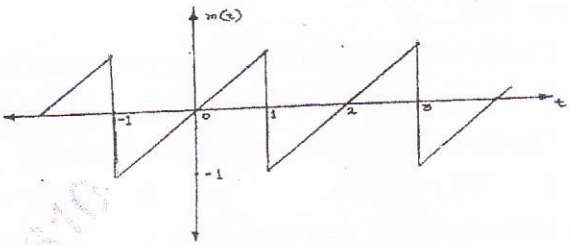


Fig. 5.a.

b) Find the Exponential Fourier series for the following signal.

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

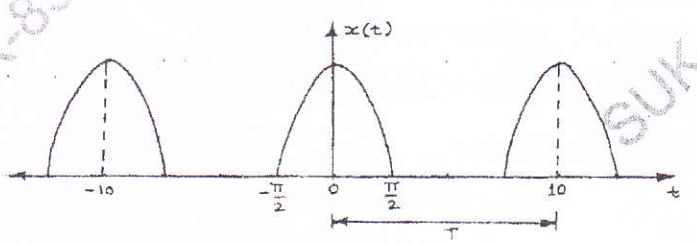


Fig. 5.b.

c) Explain properties of continuous time 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.

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

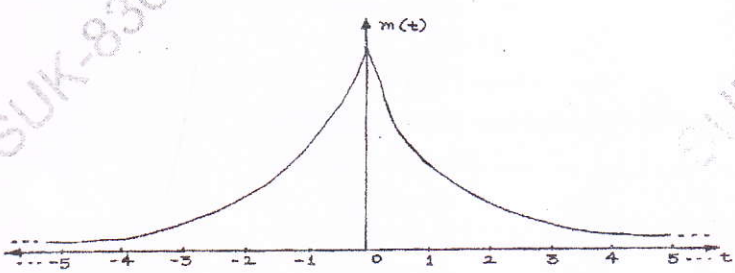


Fig. 6.b.

c) Explain properties of Fourier Transform.

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