

11 June 2010

T. E. Electronics Sem V / Rev
continuous time signals & system

Con. 3718-10.

(REVISED COURSE)

AN-4219

(3 Hours)

[Total Marks : 100

- N.B. : (1) Q. No. 1 is compulsory. (a) State initial and final value theorem. Find initial and final values of a signal and find initial and final values of a signal and find initial and final values of a signal.
- (2) Attempt any **four** questions out of remaining **six** questions. the signals with a slope transformer given below.
- (3) **Figures** to the **right** indicate marks.

1. Solve any **four** of the following :- 20
- (a) Find whether $e^{-at}u(t)$ is energy or power signal. Find its energy or power correspondingly. (b) Obtain state space equations for given T/F.
- (b) Find whether the following system with impulse response given is stable or not : $H(s) = \frac{12(s+1)}{(s+4)(s+2)}$

$$h(t) = \int_0^t x(t) dt$$

- (c) Obtain the forced response of the system with T/F for unit step input :

$$H(s) = \frac{1}{\left(s + \frac{1}{2}\right)(s + 1)}$$

- (d) Find the even and odd components of the following signal :-
 $x(t) = 1 + 2 \sin t + \sin t \cos t$
- (e) Evaluate the following integral :-

$$\int_{-5}^5 t^2 \delta(t + 2) dt$$

2. (a) Plot the following signals :- 10
- (i) $x_1(t) = r(t) + 2u(t - 1) - 2u(t - 2) - r(t - 3) - 3u(t - 4)$
- (ii) $x_2(t) = 2u(t) - u(t - 1) - u(t - 2) - u(t - 3) + 4(t - 4)$

- (b) Find the convolution of $x(t)$ and $h(t)$:- 10
- $x(t) = e^{-2t} u(t)$
- $h(t) = e^{-t} u(t)$
- Do not use transform.

3. (a) Find the Fourier transform of signum function. 10
- (b) Draw the amplitude and phase spectrum of full wave rectified time domain signal. 10

4. (a) What are random functions ? Explain moments of random functions with suitable examples. 10
- (b) Find the system response to the input $x(t) = 4e^{-2t} u(t)$ and initial conditions $y(0) = 3$ and $y'(0) = 4$. The T/F of the system is $H(s) = \frac{1}{s^2 + 3s + 2}$. 10

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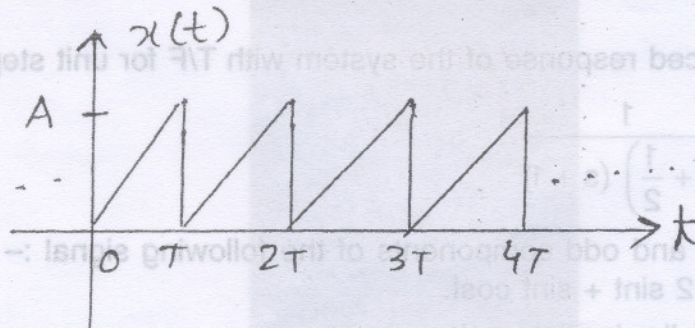
5. (a) State initial and final value theorem. Find initial and final values, if any exists of the signals with Laplace transform given below :- 10

$$X(s) = \frac{12(s+1)}{s(s^2+4)}$$

- (b) Obtain state space equations for given T/F 10

$$H(s) = \frac{s^2 + 3s + 4}{s^2 + 7s + 13}$$

6. (a) Find the Exponential Fourier series of the given signal :- 10



- (b) Find the Laplace transform of the signal :- 10
 $x(t) = \sin w_0 t \cdot u(t)$

7. Write short notes on the following :- 20

- (a) Parseval's Theorem
- (b) Autocorrelation
- (c) Modulation property
- (d) PDF and CDF of Gaussian distribution.