

- N.B. : (1) Question No.1 is compulsory.
 (2) Solve any three questions the remaining questions.
 (3) Assume any suitable data if required,

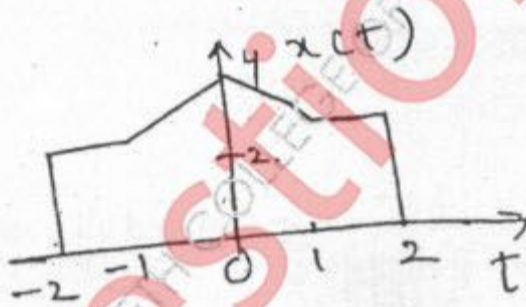
1. Solve any four questions :-

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- (a) Determine whether the signal is periodic or non periodic if periodic find its fundamental period.
 (i) $x(t) = \cos 4 \pi t + \cos 12 \pi t$
 (ii) $x(n) = e^{j(2\pi/3)n} + e^{j(3\pi/4)n}$
 (b) Determine whether the signal is energy / power find its energy/power.
 (i) $x(t) = tu(t)$
 (ii) $x(t) = e^{-2t} u(t)$
 (c) Compute (i) $\delta(t - t_1) \cdot \delta(t - t_2) = \delta(t - t_1 - t_2)$
 (ii) $\delta(t - 1) * u(t - 1) = u(t - 2)$
 (d) Derive the relationship between FT & ZT
 (e) Prove any two properties of z - transform.

2. (a) Sketch the following signal $x(t)$: given as follows :

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- (i) $x_1(t) = x(2t - 2)$
 (ii) $x_2(t) = x(2 - t)$
 (iii) $x_3(t) = x(t/3 + 1)$
 (iv) $x_4(t) = x_3(t) u(t)$

(b) Determine the following system for : Linearity, causality, time variant and stability. 6

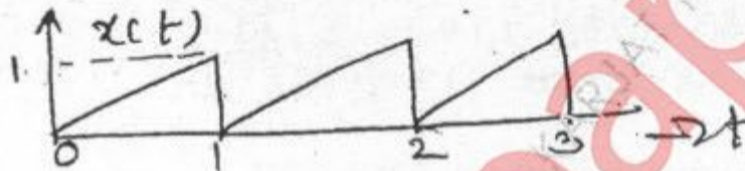
- (i) $y(n) = x^2(n)$
 (ii) $y(n) = x(n^2)$

(c) Sketch the following signal :

4

$$x(t) = u(t) - r(t - 1) + 2r(t - 2) - r(t - 3) + u(t - 4) - 2u(t - 5)$$

3. (a) Define convolution. Find the linear convolution using circular convolution. 16
 (Graphical Method).
 $x(n) = [2, 3, 4, 5]$
 $h(n) = [1, -2, -3]$
- (b) A system is described by second order linear differential equation. 10
 $y''(t) + 5y'(t) + 4y(t) = x(t)$
 With initial conditions are $y(0) = -2$, and $y'(0) = -1$, $x(t) = e^{-2t} u(t)$
 Find (i) Natural Response (ii) Forced response (iii) Total response.
4. (a) State the Dirichlet condition for the existence of fourier series. 4
 (b) State and prove the properties of fourier transform 6
 (c) Find the Trigonometric Fourier series of the following signal and also draw the 10
 magnitude and phase spectrum of the signal $x(t)$.



5. (a) Using the various Laplace transform properties, derive the laplace transform of 10
 the following signal.
 (i) $\delta(t)$ (ii) $tu(t)$ (iii) $e^{-at}u(t)$ (iv) $\cos\omega_0 t u(t)$.
- (b) Find the Inverse laplace transform of the following $x(s)$. 10

$$x(s) = \frac{s^2 + 6s + 7}{s^2 + 3s + 2} \text{ and find all possible ROCs.}$$

6. (a) Find the Inverse z-transform of $x(z) = \frac{1}{(1+z^{-1})(1-2z^{-1})^2}$ and find all possible ROC. 6
- (b) If $h(n) = \{1, 2, 1, -1\}$ & $x(n) = \{1, 2, 3, 1\}$ find the convolution of signal. 4
- (c) Solve the following difference by using z - transform method. 10
 $y(n) + 3y(n-1) + 2y(n-2) = x(n) - 2x(n-1)$
 (i) Find the Impulse Response.
 (ii) Step response to the input $x(n) = (\frac{1}{2})^n u(n)$
 (iii) Draw pole zero plot
 (iv) Comment on Stability



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Course : T.E (INSTRUMENTATION) (SEM V)
(CBSGS)(PROG-537 TO 549)

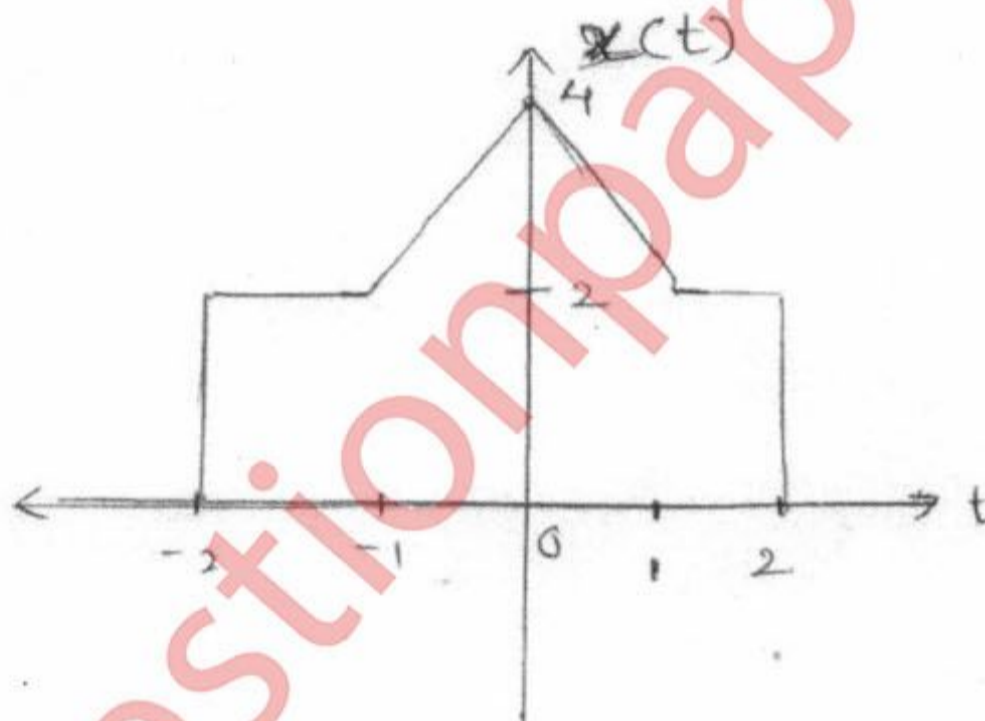
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Correction :

FIND AN IMAGE BELOW AS QUERY

Q. 2 (a)

Q. P code :- 14973



Query Update time : 10/12/2014 04:20 am