T.E. Sem VI OLD Nov Dec-15 (Electrical)

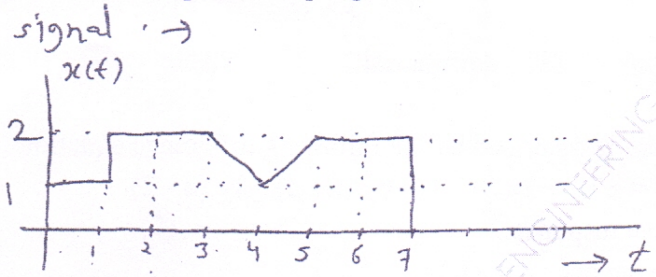
SP
02-12-15

Q.P. Code : **1956**

(3 Hours) [Total Marks : 100

N.B. : (1) Questions **No.1** is **compulsory.**
(2) **Attempt** any **four** out of remaining **six** questions.
(3) Assume **suitable** data wherever **necessary.**

1. (a) Find z transform of the following $x(n) = (1 + n)\, u(n)$. 5
(b) Impulse response of DT-LTI system is h(n) = {-2, 1, 3, 0, -4}, Find out y(n) to the input $x(n)$ = {-1, 2, 1}. 5
(c) Separate out the event and odd component $x(n)$ = {1, 3, 2, 1, -2}. 5
(d) Expenses $x(t)$ in term of step and ramp signal : 5



2. (a) Check the following systems for static / dynamic, linear / non-linear, causal / ant causal and time variant / invariant. 10
(1) $y(n) = 2x(n) - y(n - 1)$.
(2) $y(n) = e^{x(n)}$
(b) Sketch the magnitude response for : $h(n) = \{1, -\frac{1}{2}\}$. Draw pole zero plot. 10

3. (a) Find out circular convolution of the following sequence using DFT and IDFT method : 12
$x(n) = \{1, -2, 3, 0\}$
$h(n) = \{1, 2, -2, 4\}$
(b) Prove : $x_1(n) * x_2(n) \underline{z}\ X_1(z) \cdot X_2(z)$. (Convolution Property) 8

4. (a) State and prove any **four** properties of Fourier transform. 10
(b) Determine whether the following systems are minimum, maximum on mixed phase. 10

(1) $H_1(z) = 1 - \frac{5}{2} z^{-1} - \frac{3}{2} z^{-2}$

(2) $H_2(z) = 1 - \frac{5}{3} z^{-1} - \frac{2}{3} z^{-2}$

TURN OVER

5. (a) Obtain linear convolution using circular convolution for : 5

$$x(n) = \{\underset{\uparrow}{1}, 2, 3\} \text{ and } h(n) = \{\underset{\uparrow}{1}, 2\}$$

(b) What is ROC? How stability can be obtained by ROC, explain with example. 5

(c) Determine the inverse z-transform for : 10

$$x(z) = \frac{z^{-1}}{\left(1 - \frac{1}{2} z^{-1}\right)\left(1 - \frac{1}{3} z^{-1}\right)}$$

(1) Causal (2) Anti causal (3) Stable

6. (a) A LTI system is described by the following difference equation : 10

$$y(n) = x(n) + 2x\,(n - 1) - 6y\,(n - 1) - 8y\,(n - 2)$$

Find Impulse response.

(b) A 8 point sequence is given by 10

$$x(n) = \{2, 2, 2, 2, 1, 1, 1, 1\}$$

Compute radix - 2 DITFFT.

7. Write short note on any **two** : 20

(a) Properties of z - transform

(b) DSP processor

(c) Energy / power signal
