Sohag university
3th year

Faculty of Engineering
Signals and systems

SHEET NO (1)

1.1. A continuous-time signal $x(t)$ is shown in Fig. 1-17. Sketch and label each of the following signals.

(*a*) $x(t-2)$; (*b*) $x(2t)$; (*c*) $x(t/2)$; (*d*) $x(-t)$

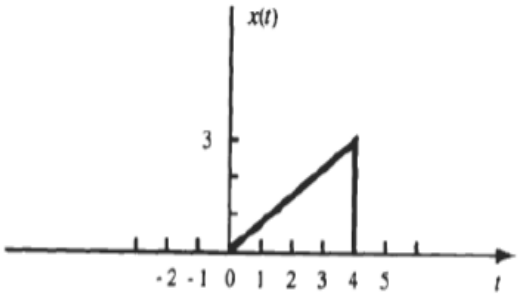

Fig. 1-17

1.34. Consider the system shown in Fig. 1-35. Determine whether it is (*a*) memoryless, (*b*) causal, (*c*) linear, (*d*) time-invariant, or (*e*) stable.

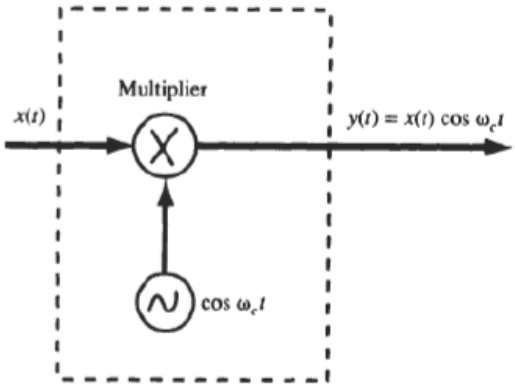

Fig. 1-35

1.35. A system has the input-output relation given by

$$y = \mathbf{T}\{x\} = x^2$$

Show that this system is nonlinear.

1.36. The discrete-time system shown in Fig. 1-36 is known as the *unit delay* element. Determine whether the system is (*a*) memoryless, (*b*) causal, (*c*) linear, (*d*) time-invariant, or (*e*) stable.

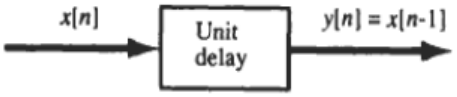

Fig. 1-36 Unit delay element

1.41. The system represented by **T** in Fig. 1-39 is known to be time-invariant. When the inputs to the system are $x_1[n]$, $x_2[n]$, and $x_3[n]$, the outputs of the system are $y_1[n]$, $y_2[n]$, and $y_3[n]$ as shown. Determine whether the system is linear.

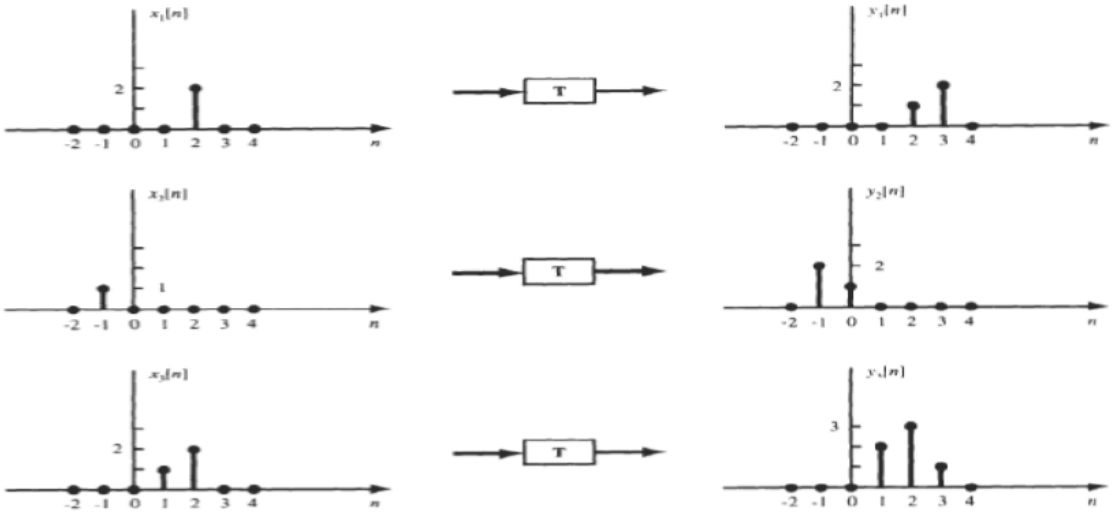

Fig. 1-39

1.58. Consider a discrete-time system with the input-output relation

$$y[n] = \mathbf{T}\{x[n]\} = x^2[n]$$

Determine whether this system is (*a*) linear, (*b*) time-invariant.