(احمدرضا کشاورز پارسا) (۹۹۲۹۸۱۳)

(تمرین سری سوم درس سیگنال و سیستم ها)

(استاد علیرضا احمدی فرد)

۱-

$$x[n] = \delta[n] + 2\delta[n+1] \qquad h[n] = 2\delta[n+1] - \delta[n-2]$$

$$x[n+1] * h[n-1] = (\delta[n+1] + 2\delta[n+2]) * (2\delta[n] - \delta[n-3]) = 2\delta[n+1] + 4\delta[n+2] - \delta[n-3] - 2\delta[n-4]$$

۲-

$$x[n] = \left(\frac{1}{2}\right)^{n-1}(u[n] - u[n-10]) \qquad h[n] = 2^n u[-n+2]$$

$$y[n] = \sum_{m=-\infty}^{+\infty} \left(\frac{1}{2}\right)^{n-m-1}(u[n-m] - u[n-m-10])\, 2^m u[m+2] = \left(\frac{1}{2}\right)^{n-4}\sum_{m=-\infty}^{+\infty} 4^m (u[n-m] - u[n-m-10])\cdot u[m+2]$$

$$= \left(\frac{1}{2}\right)^{n-1}\sum_{m=-\infty}^{2} 4^m (u[n-m] - u[n-m-10])$$

۳-

$$h(t) = e^{t+1}(u(t) - u(t-3)) \qquad x(t) = 2e^{t-1}u(-t)$$

$$y(t) = \int_{-\infty}^{+\infty} e^{\lambda+1}(u(\lambda) - u(\lambda-3))\, 2e^{t-\lambda-1}\, u(\lambda-t)\, d\lambda = 2e^t \int_{-\infty}^{+\infty} u(\lambda-t)\, d\lambda - \int_{-\infty}^{+\infty} u(\lambda-3)u(\lambda-t)\, d\lambda$$

$$\Rightarrow y(t) = \left(\infty - t(2e^t)\right) - \infty - 3$$