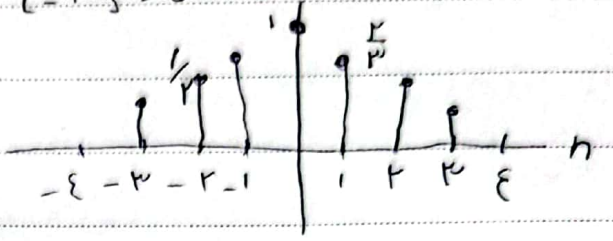
Subject: ۴۰۲۱۲۳۴۰۵۱۱۹۰۱۰
Date

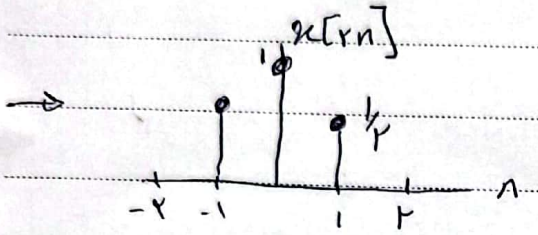
حافظه تصاویر تمارین سری دوم سیگنال ۰۴ ،۱۷،۲۲

① $y[n] = x[2n] \rightarrow y[-2] = x[-4] = 0$

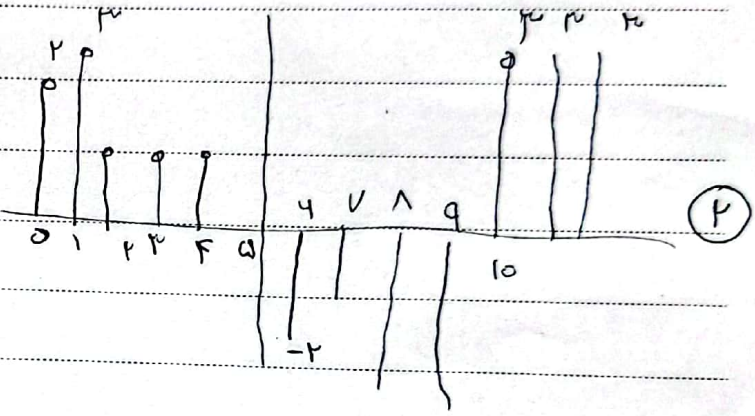
$y[-1] = x[-2] = \frac{1}{2}$



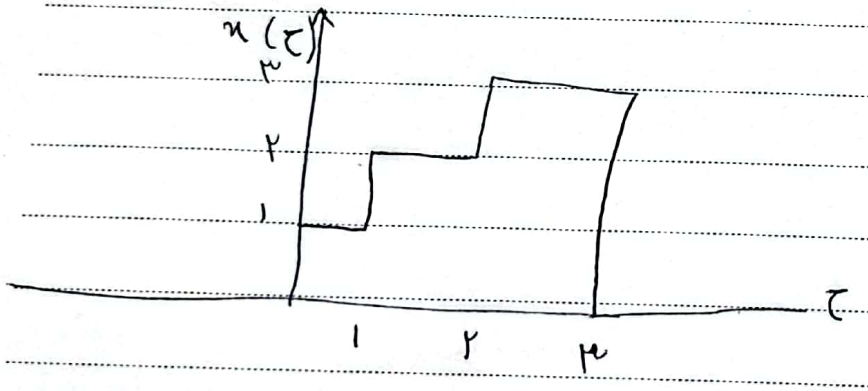
$y[0] = x[2] = 1 \quad y[2] = x[4] = 0$



② $x[2n]$, $x[\frac{1}{4}n] \xrightarrow{\text{بازسازی}} x[n] =$



③ سیگنال زیر را بیابید.

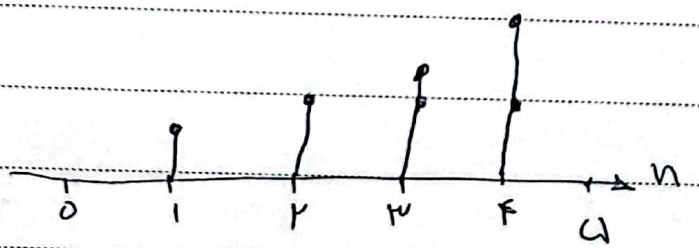


حل: $x(t) = u(t) + u(t-1) + u(t-2) - u(t-3)$

④ سیگنال زیر را رسم کنید.

$x[n] = n\{u[n] - u[n-5]\}$

حل:



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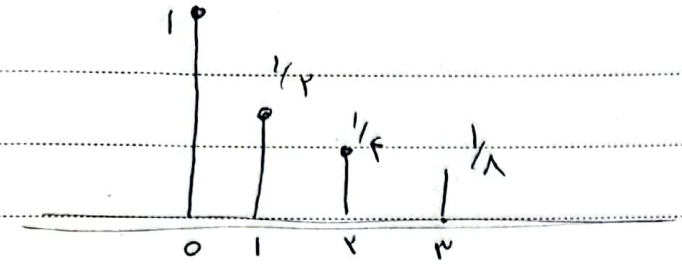
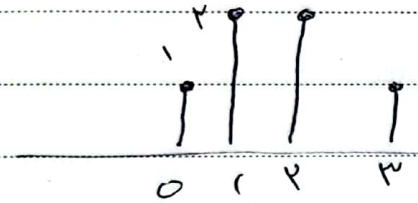
۵) ضابطه دنباله نشان داده شده را بیابید:



حل: $x[n] = (\frac{1}{2})^n \{ u[n] - u[n-4] \}$

۶) اگر $x[n]$ بصورت زیر باشد مطلوب است $x[1-n]$

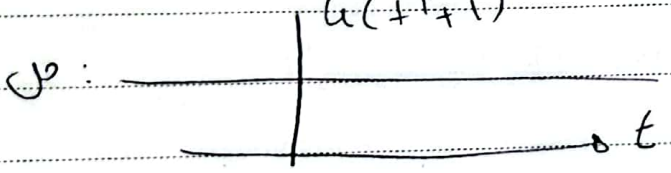


حل: $x[-(n-1)] = x[-n+1]$

$y[n] = x[3n] \quad y[0] = x[0] \quad y[1] = x[3] \quad y[2] = x[6]$

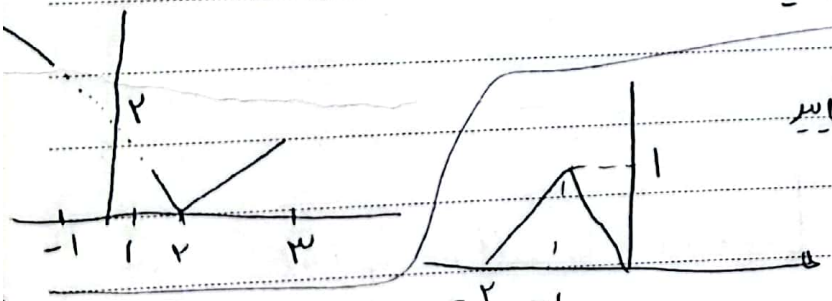
۷) تابع $u(t^2+2t+1)$ را رسم کنید.

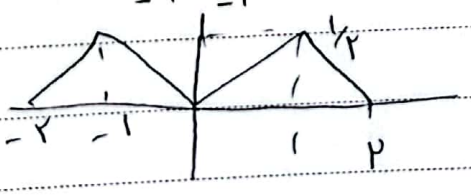
حل:



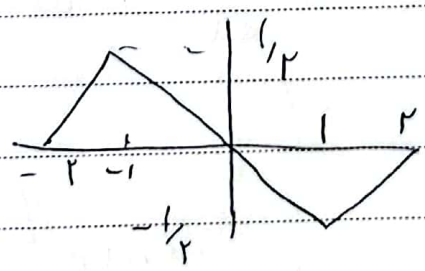
۸) تابع $x(t) = |t-2| u(t^2-1)$ را رسم کنید.

۹) مشتق‌های زوج و فرد تابع را مشخص نمایید.





حل:



۱۰) $\int_{-\infty}^{\infty} x^2(t)\,dt = \int_{-\infty}^{\infty} x_e^2(t)\,dt + \int_{-\infty}^{\infty} x_o^2(t)\,dt + 2\int_{-\infty}^{\infty} x_o(t)\,x_e(t)\,dt$

$\int_{-\infty}^{\infty} x^2(t)\,dt = \int_{-\infty}^{\infty} x_e^2(t)\,dt + \int_{-\infty}^{\infty} x_o^2(t)\,dt \qquad E_x = E_{x_e} + E_{x_o}$

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(۱۱) انتگرال زیر را محاسبه کنید

الف) $I = \int_{-\infty}^{\infty} (t^2 + 3t - 1)\delta(1-t)\,dt$

حل: $= -3\int_{-\infty}^{\infty} \delta(t+1)\,dt = -3$

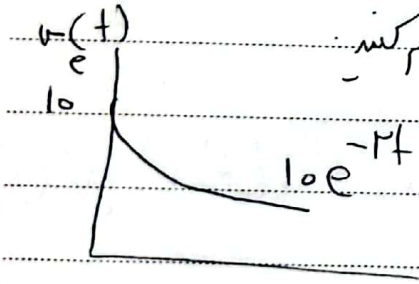
ب) $II = \int_{-2}^{2} t^2 [\delta(t) + 2\delta(t+1) + \delta(3-t)]\,dt$

حل: $\int_{-2}^{2} t^2\delta(t)dt + 2\int_{-\infty}^{\infty} t^2\delta(t+1)dt + \int_{-2}^{2} t^2\delta(t-2)\,dt$

$= 0 + 2(-1)^2 \int_{-2}^{2} \delta(t+1)\,dt + 4\int_{-2}^{2} \delta(t-2)\,dt$

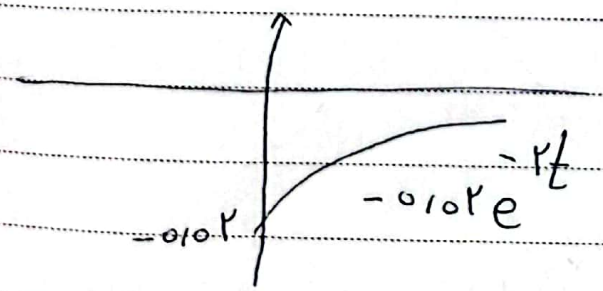
$= 0 + 2(-1)^2 + 0 = 2$

(۱۲) سیگنال ولتاژ دو سر خازن را به $C = 1mF$ منبع جریان را رسم کنید.



$v_c(t) = 10e^{-2t}u(t)$

حل: $i_c(t) = \frac{dv_c(t)}{dt} = 0.001 \times [10 \times -2 \times e^{-2t} u(t) + 10e^{-2t}\delta(t)$



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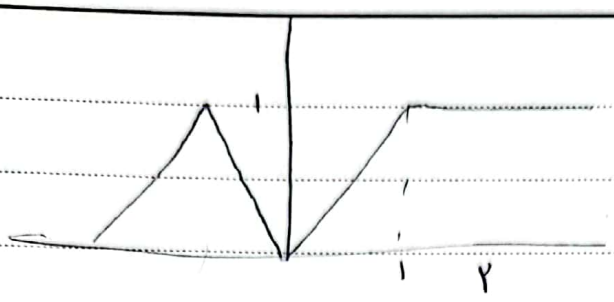
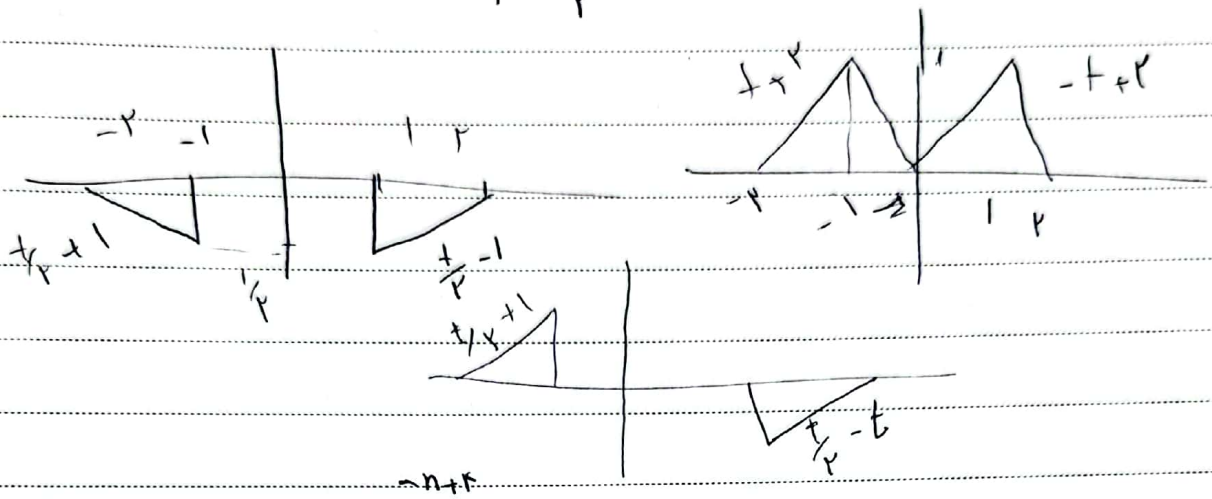
(۱۴) صحت های زوج و فرد سیگنال $x(t)$ را بیابید



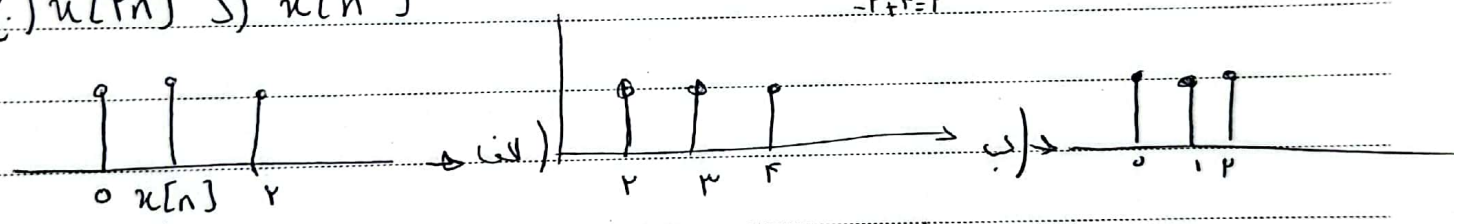
حل:

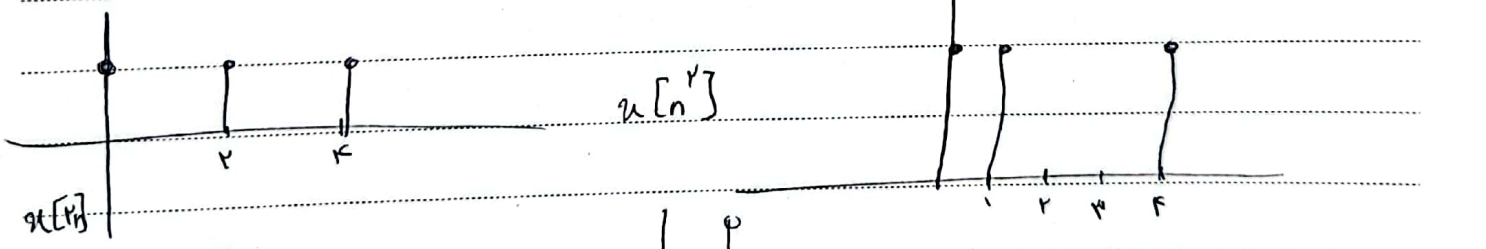


(۱۵) برای دنباله های زیر نمودار رسم کنید

الف) $x[n-2]$ ب) $x[4-n]$

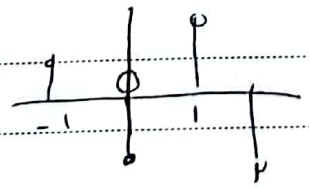
ج) $x[2n]$ د) $x[n^2]$





(۱۶) حاصل ضرب دنباله زیر را بیابید

$$h[n] = \sum_{k=-\infty}^{\infty} (-1)^k \delta[n-k]$$



(۱۷) $x[n]$ را با ضابطه $x[n] = 0.5^n$ رسم کنید.