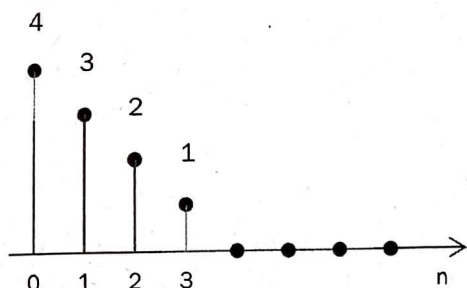


信号処理 第2回 解答例

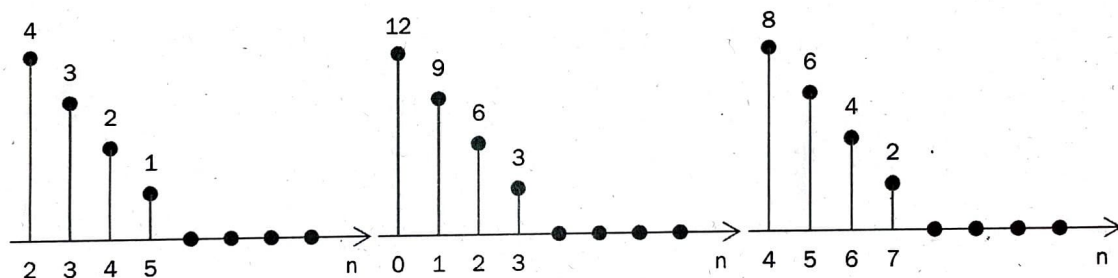
①



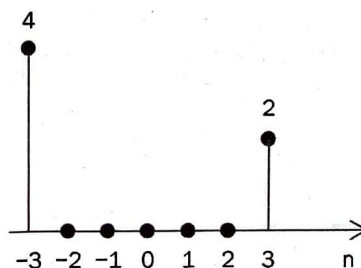
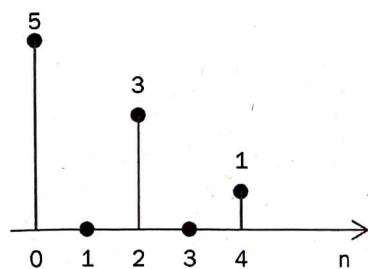
のとき, 次の波形を描け.

(a) $x(n-2)$, (b) $3x(n)$, (c) $2x(n-4)$

A.

(a) $x(n-2)$ (b) $3x(n)$ (c) $2x(n-4)$ 

② 次の波形を描け.

(a) $5\delta(n) + 3\delta(n-2) + \delta(n-4)$ (b) $4\delta(n+3) + 2\delta(n-3)$ A. (a) $5\delta(n) + 3\delta(n-2) + \delta(n-4)$ (b) $4\delta(n+3) + 2\delta(n-3)$ 

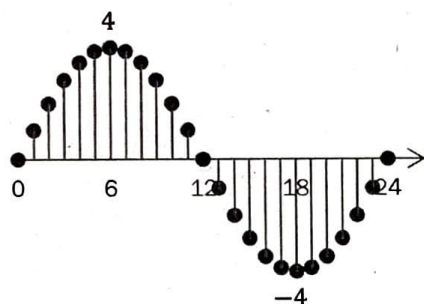
③ 次の波形を描け.

(a) $4\sin(\frac{\pi}{12}n)$

(b) $2\cos(\frac{\pi}{8}n)$

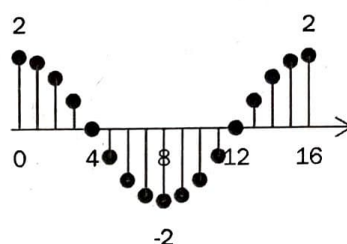
A. (a) $4\sin(\frac{\pi}{12}n)$

$$= 4\sin(2\pi \cdot \frac{1}{24}n)$$



(b) $2\cos(\frac{\pi}{8}n)$

$$= 2\cos(2\pi \cdot \frac{1}{16}n)$$



④ ③の(a),(b)の信号の周波数 f_a, f_b を求めよ。

A. $f_a = \frac{1}{24} [\text{Hz}]$

$$f_b = \frac{1}{16} [\text{Hz}]$$

⑤ 次の値を求めよ.

(a) $e^{j\frac{\pi}{2}}$

(b) $e^{j2\pi}$

(c) $2e^{j\frac{\pi}{4}}$

A. (a) $e^{j\frac{\pi}{2}}$

$$= \cos \frac{\pi}{2} + j \sin \frac{\pi}{2}$$

$$= 0 + j \cdot 1$$

$$= j$$

(b) $e^{j2\pi}$

$$= \cos 2\pi + j \sin 2\pi$$

$$= 1 + j \cdot 0$$

$$= 1$$

$$\begin{aligned}
 & \text{(c) } 2e^{j\frac{\pi}{4}} \\
 &= 2 \cos\left(\frac{\pi}{4}\right) + 2j \sin\left(\frac{\pi}{4}\right) \\
 &= 2 \cdot \frac{1}{\sqrt{2}} + 2j \cdot \frac{1}{\sqrt{2}} \\
 &= \frac{2}{\sqrt{2}} + \frac{2}{\sqrt{2}}j \\
 & (= \sqrt{2} + \sqrt{2}j)
 \end{aligned}$$