

Given $X(k) = \{10, -2, 0, 2\}$

Compute the energy of the signal $x(n)$

From Parseval's Energy theorem,
we have,

$$E = \sum_{n=0}^{N-1} |x(n)|^2 = \frac{1}{N} \sum_{k=0}^{N-1} |X(k)|^2$$

$$\therefore E = \frac{1}{4} \left\{ |X(0)|^2 + |X(1)|^2 + |X(2)|^2 + |X(3)|^2 \right\}$$

$$= \frac{1}{4} \{ 100 + 4 + 0 + 4 \}$$

$$E = 27$$
