Let $n = {p_0}^{a_0} {p_1}^{a_1} \cdots {p_{m-1}}^{a_{m-1}}$.

Set

$$G = \prod_{i=0}^{m-1} \mathbb{Z}_{a_i+1}$$

with $\rho : G \times \{p_i\}_{i=0}^{m-1} \to \mathbb{N}$ such that if $g = (b_0, b_1, \ldots b_i \ldots b_{m-1})$ then $\rho(g, p_i) = b_i$ where b_i is the least nonnegative representative of $b_i \in \mathbb{Z}_{a_i}$.

Define

$$k = \frac{1}{2} \sum_{g \in G} \prod_{i=0}^{m-1} {p_i}^{\rho(g,p_i)}.$$

Then n is perfect if and only if $n = k$.