

Let $C = \{4, 6, 8, 9, 10, \dots\}$ be the set of composite positive integers. For each $n \in C$ let a_n be the smallest positive integer k such that $k!$ is divisible by n . Determine whether the following series converges:

$$\sum_{n \in C} \left(\frac{a_n}{n} \right)^n.$$