Let \( p \) be a prime number. The generating function for the number of \( p \)-core partitions of \( n \) is

\[
\sum_{n=0}^{\infty} pc_p(n)q^n = \prod_{n=1}^{\infty} \frac{(1 - q^{pn})^p}{1 - q^n}.
\]

We use the theory of modular forms, and the circle method of Hardy and Ramanujan to derive explicit bounds on \( pc_p(n) \). (Received September 21, 2009)