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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  $pc_p(n)$ . As an application, we show Stanton's conjecture is true for small  $p$ 's. (Received October 04, 2009)