A particle of mass m moves in a two dimensional potential $V(x, y) = \frac{1}{2}\left(4x^2 + y^2\right)$ and is in an energy eigen state of energy $E = \frac{5}{2}\hbar\omega$. The corresponding un-normalized eigen function is

(a) $\psi_1(x) = y\exp\left(-\frac{m\omega}{\hbar}(2x^2 + y^2)\right)$

(b) $\psi_1(x) = xy\exp\left(-\frac{m\omega}{\hbar}(2x^2 + y^2)\right)$

(c) $\psi_1(x) = x\exp\left(-\frac{m\omega}{\hbar}(2x^2 + y^2)\right)$

(d) $\psi_1(x) = y\exp\left(-\frac{m\omega}{\hbar}(x^2 + y^2)\right)$

Answer: (a)

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