☹ qm-que-08020

A particle of mass m moves in a two dimensional potential$V(x,y) = \frac{1}{2}\big(4x^2 + y^2\big)$ and is in an energy eigen state. Following four different un-normalized wave functions are given

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

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

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

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

(e) $\psi_1(x) = \exp\big(-\frac{m\omega}{\hbar}(x^2+2y^2)\big)$

(f) $\psi_1(x) = y\exp\big(-\frac{m\omega}{\hbar}(2x^2+y^2)\big)$

For each of the above functions find if
it is the eigen function of the energy, and
[2]if it is, find the corresponding energy.

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