Consider the following sketch of the potential energy as a function of position.  The particle's total energy is show for some arbitrary amount .

a)  at which of the points:  a, b, c, d or e is the particle's velocity a maximum?  **ANS:  "a"** if this particle has some total energy greater than the PE(a).  The position of minimum U will be the position of maximum Kinetic energy, and therefore max speed.

b)  at which of the points is the velocity zero?  ANS:  in general it will have stopped at places in space where its total energy = potential energy.  so, depending on where the total energy line is, the object's U = Tot Energy when the curve crosses the Tot Energy line.

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  If this was the energy graph, then for E-total1:  the object stops at "d" because Etotal = U(d) and K=0 there.

the object is going the fastest, with the maximum K at "c" becaue Etotal = U(c) + K  and U(c) is the minimum value of U.

