

- 1 Astronauts in space cannot weigh themselves by standing on a bathroom scale. Instead, they measure their mass by oscillating on a large spring. Typically, an astronaut attaches one end of a large spring to his belt and the other end of the spring is hooked to the wall of the space capsule. A fellow astronaut then pulls him away from the wall and releases him.

The period T of oscillation of the astronaut is given by

$$T = 2\pi \sqrt{\frac{m}{k}}$$

where m is the mass of the astronaut and k the force constant of the spring.

If $T = (3.20 \pm 0.01)$ s and $k = (250 \pm 5)$ N m $^{-1}$, express the mass of the astronaut and its associated uncertainty. Show your working clearly below.

mass = kg [3]

[Total: 3]

