

Ques 2. Kinetic energy  
= 2 x Rest mass energy

$$\frac{1}{2}mv^2 = 2 \times m_0 c^2$$

We know

$$m = \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}}$$

$$\frac{1}{2} \frac{m_0}{\sqrt{1 - \frac{v^2}{c^2}}} \cdot v^2 = 2 \times m_0 c^2$$

$$\Rightarrow v^2 = 4c^2 \sqrt{1 - \frac{v^2}{c^2}}$$

$$v^4 = 16c^4 \left(1 - \frac{v^2}{c^2}\right)$$

$$v^2 + 16c^2 v^2 - 16c^4 = 0$$

$$v = 0.972c$$