Question 9 **(4 marks)**

The Lorentz transformation equation for total relativistic energy states

$$E = \frac{mc^2}{\sqrt{1 - \frac{v^2}{c^2}}}$$

This can be simplified to $E = \gamma mc^2$ where

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

With reference to the graph of γ vs β (v/c) and the equation for relativistic energy, explain why it is impossible for any particle with mass to achieve the speed of light.