Question 21 (4 marks)

In his science fiction novel *From the Earth to the Moon*, Jules Verne describes how to launch a capsule from a cannon to land on the moon. To reach the moon, the capsule must leave the cannon with a speed of 1.06×10^4 m s^{-1}. The cannon has a length of 215 m, over which the capsule can be assumed to accelerate constantly.

(a) Calculate the magnitude of the acceleration required to achieve this speed using this cannon. **2**

The capsule would need to accelerate at 49.30 ms⁻¹ (to two dec places) to leave the cannon at 1.06 × 10⁴ m s⁻¹.

(b) Referring to your answer in part (a), explain why Jules Verne's method is unsuitable for sending a living person to the moon. **2**

This is unsuitable for sending a living person to the moon because of the immense g-forces that occur to the human body when accelerating at high speeds like 49.30 ms⁻¹. ~~to do this to the person apart~~ ~~due to the magnitude of the~~ ~~needed to get the~~