

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  $1.06 \times 10^4 \text{ m s}^{-1}$ . 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

~~.....~~  $v = 1.06 \times 10^4 \text{ m s}^{-1}$        $l = 215 \text{ m}$        $a = ?$   
 .....  
 .....

- (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

*It is impractical. Its velocity must be greater than the earths escape velocity, otherwise it may continue on elliptical orbit, thus, crash into earth. ~~Therefore~~ The capsule could also have its velocity altered during flight.*