

Answer **all** questions in the spaces provided

- 1(a) A massive truck is parked along the roadside on a flat surface. Adam pushes the truck, and it does not move. He justifies this by saying that the two forces that he and the truck exert on each other are equal and opposite, so they cancel out each other. Using Newton's laws of motion, comment on his explanation and explain why the truck does not move. [4]

- (b)(i) State the principle of conservation of momentum. [1]

- (ii) In Figure 1.1 below, an 80 kg man is on a ladder hanging from a balloon that has a total mass of 320 kg (including the basket passenger). The balloon is initially stationary relative to the ground. The man on the ladder begins to climb at 2.5 m s^{-1} as seen by an observer on the ground.



Fig. 1.1

- (1) Determine the speed and direction that the balloon moves at. [3]

- (2) The man decides to stop climbing. State the speed of the balloon. [1]