11 A film involves a gang of bank robbers making a getaway on a bus loaded with gold bars. The bus spins out of control and ends up balancing on the edge of a cliff, as shown.

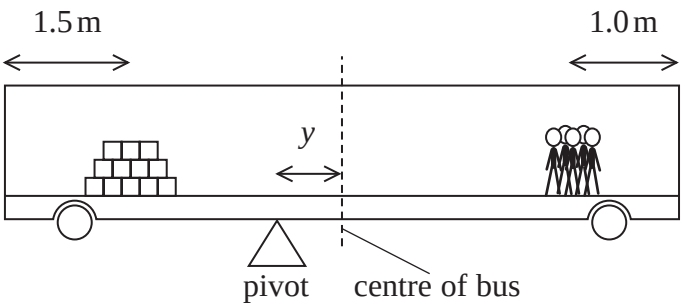
(Source: © maforche/Shutterstock)

(a) State what is meant by the moment of a force about a point.

(1)

(b) The bus is balanced on a pivot that is a distance *y* from the centre of the bus.

The centre of mass of the gold is 1.5 m from one end of the bus. The centre of mass of the bank robbers is 1.0 m from the other end of the bus, as shown.



The unloaded bus can be treated as a uniform body with a weight of 32 000 N.

Calculate the distance *y* when the bus is balanced.

length of bus = 11.0 m
weight of gold bars = 31 000 N
weight of bank robbers = 8700 N

(4)

y = ...

(Total for Question 11 = 5 marks)