

MOMENTUM AND SUVAT PAST PAPER QUESTIONS OCR ALEVEL
YEAR 1

1.

Fig. 2.1 shows two masses **A** and **B** tied to the ends of a length of string. The string passes over a pulley. The mass **A** is held at rest on the floor.

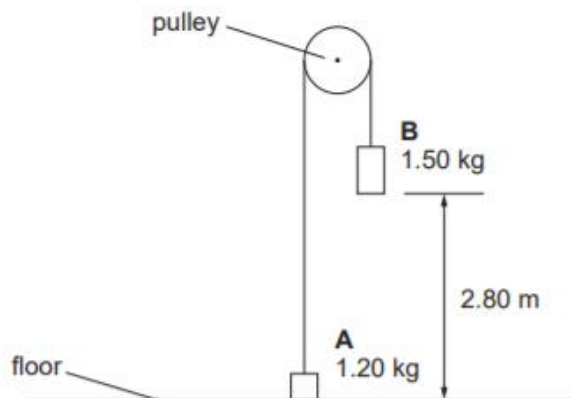


Fig. 2.1

The mass **A** is 1.20 kg and the mass **B** is 1.50 kg.

(a) Calculate the weight of mass **B**.

weight = N [1]

(b) Mass **B** is initially at rest at a height of 2.80 m above the floor. Mass **A** is then released. Mass **B** has a constant downward acceleration of 1.09 ms^{-2} . Assume that air resistance and the friction between the pulley and the string are negligible.

(i) In terms of forces, explain why the acceleration of the mass **B** is less than the acceleration of free fall g .

.....
 [1]

(ii) Calculate the time taken for the mass **B** to fall 1.40 m.

(iii) Calculate the velocity of mass **B** after falling 1.40 m.

velocity = m s^{-1} [2]

(iv) Mass **B** hits the floor at a speed of 2.47 m s^{-1} . It **rebounds** with a speed of 1.50 m s^{-1} . The time of contact with the floor is $3.0 \times 10^{-2} \text{ s}$. Calculate the magnitude of the average acceleration of mass **B** during its impact with the floor.

acceleration = m s^{-2} [2]

[Total: 9]

