

FALLING OBJECTS

- 1 The apparatus shown in Fig. 5.1 is used to demonstrate how a coin and a piece of paper fall when they are released from rest.

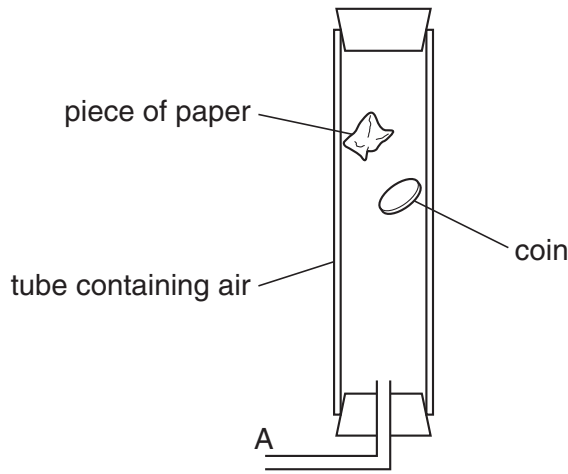


Fig. 5.1

- (a) At the positions shown in Fig. 5.1, the paper is descending at constant speed but the coin still accelerates.

In terms of the forces acting, explain these observations.

paper

.....

.....

coin

.....

..... [4]

- (b) A vacuum pump is now connected at A and the air in the tube is pumped out.

The paper and coin are again made to fall from rest.

State one difference that would be observed, compared with what was observed when air was present.

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..... [1]

[Total: 5]

Ignore upthrust throughout this question

- (a) paper:
 drag / air resistance / friction (upwards) (seen anywhere in (a)) B1
 drag /air resistance / friction = weight / force of gravity B1
 no resultant (force) / forces balance / upwards force = downwards force
AND no acceleration B1

- coin:
 weight / force of gravity (always) bigger than air resistance
 OR force down bigger than force up
 OR air resistance hasn't time / distance to equal weight B1

- (b) fall at same speed / acceleration / rate, ignore fall at same time)
 hit bottom at same time/together)
 paper now accelerates (all the way)) any 1 B1
 paper no longer flutters side-side)
 they/paper NOT coin fall(s) faster)
 the paper (ignore coin) hits sooner)
 NOT constant speed/rate

[5]