

- 1 (a) A body has an initial velocity u and an acceleration a . After a time t , the body has moved a displacement s and has a final velocity v . One of the equations of motion of this body is

$$s = ut + \frac{1}{2}at^2$$

State the conditions that must be satisfied for the above equation to be valid.

.....
.....
.....
.....
.....
.....
.....
..... [2]

- (b) A hot air balloon is moving at a constant velocity of 11.7 m s^{-1} , at an angle of 59° from the horizontal, as shown in Fig. 1.1 below.

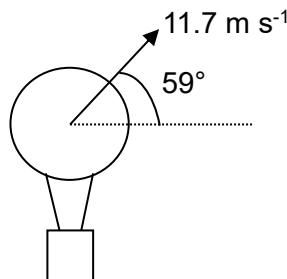
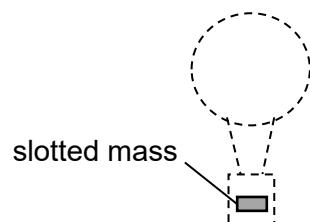


Fig. 1.1

- (i) Determine the vertical component of the velocity of the balloon.

vertical component of the velocity = m s^{-1} [1]

- (ii) A slotted mass is released from the balloon. Fig. 1.2 shows the subsequent path of the slotted mass. The dotted figure shows the position of the hot air balloon at the instant when the slotted mass is released.



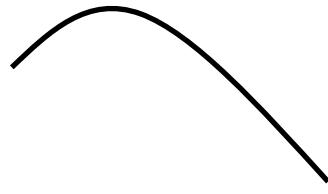


Fig. 1.2

1. Throughout the motion, the slotted mass is observed to be directly below the hot air balloon. Explain why this is so.

.....

.....

.....

..... [1]