

Figure 2

Two particles, A and B, are connected by a string.
Particle A has mass m.
Particle B has mass 3m.
The string passes over a small smooth light pulley.
The pulley is fixed at the edge of a smooth horizontal table.
Particle A is held at rest on the table at a distance of 1.5h from the pulley.
Particle B hangs freely with the string taut, at a height h above the horizontal floor, as shown in Figure 2.

Particle A is released from rest and begins to move along the table.

In an initial model,

- the string is light and inextensible
- air resistance is ignored
- *B* hits the floor with speed *V*

Using the model,

(a)	show	that	the	tension	in	the	string is	<u>3mg</u>	
							0	4	

(b) find V in terms of g and h

One limitation of the model is that it ignores air resistance.

(c) State **one other** limitation of the model.

In a refinement to the model,

- air resistance is **not** ignored
- *B* hits the floor with speed *W*
- (d) State which is greater, V or W, giving a reason for your answer.

(5)

(2)

(1)