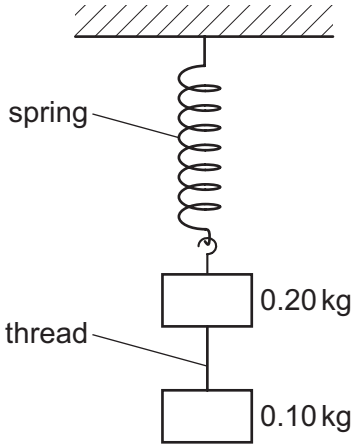
12 A mass of 0.20 kg is suspended from the lower end of a light spring. A second mass of 0.10 kg is suspended from the first mass by a thread. The arrangement is allowed to come into static equilibrium and then the thread is burned through.



At this instant, what is the upward acceleration of the 0.20 kg mass? (Assume $g = 10\,m\,s^{-2}$.)

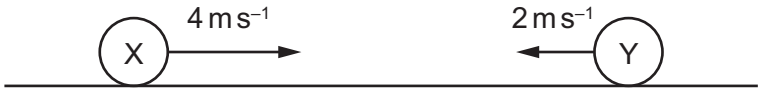
A $5.0\,m\,s^{-2}$ **B** $6.7\,m\,s^{-2}$ **C** $10\,m\,s^{-2}$ **D** $15\,m\,s^{-2}$

13 An object of mass m travelling with speed v has a head-on collision with another object of mass m travelling with speed v in the opposite direction. The two objects stick together after the collision.

What is the total loss of kinetic energy in the collision?

A 0 **B** $\frac{1}{2}mv^2$ **C** mv^2 **D** $2mv^2$

14 Two identical spheres X and Y approach each other with the speeds shown and undergo a head-on elastic collision.



What are the velocities of the spheres after the collision?

	sphere X	sphere Y
A	$0\,m\,s^{-1}$	$2\,m\,s^{-1}$ →
B	$2\,m\,s^{-1}$ →	$4\,m\,s^{-1}$ →
C	$2\,m\,s^{-1}$ ←	$4\,m\,s^{-1}$ →
D	$4\,m\,s^{-1}$ ←	$2\,m\,s^{-1}$ →