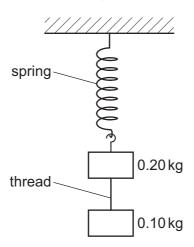
12 A mass of 0.20 kg is suspended from the lower end of a light spring. A second mass of 0.10 kg is suspended from the first mass by a thread. The arrangement is allowed to come into static equilibrium and then the thread is burned through.



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

- **A**  $5.0 \,\mathrm{m \, s^{-2}}$
- **B**  $6.7 \,\mathrm{m \, s^{-2}}$
- $C 10 \,\mathrm{m\,s^{-2}}$
- **D**  $15 \,\mathrm{m\,s^{-2}}$
- **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**  $\frac{1}{2} m v^2$  **C**  $m v^2$
- **D**  $2mv^2$
- 14 Two identical spheres X and Y approach each other with the speeds shown and undergo a headon elastic collision.



What are the velocities of the spheres after the collision?

	sphere X	sphere Y
Α	0 m s <sup>-1</sup>	2 m s <sup>-1</sup> →
В	2 m s <sup>-1</sup> —►	4 m s <sup>-1</sup> ──►
С	2 m s <sup>-1</sup>	4 m s <sup>-1</sup> ──►
D	4 m s <sup>-1</sup> ◀	2 m s <sup>-1</sup> →