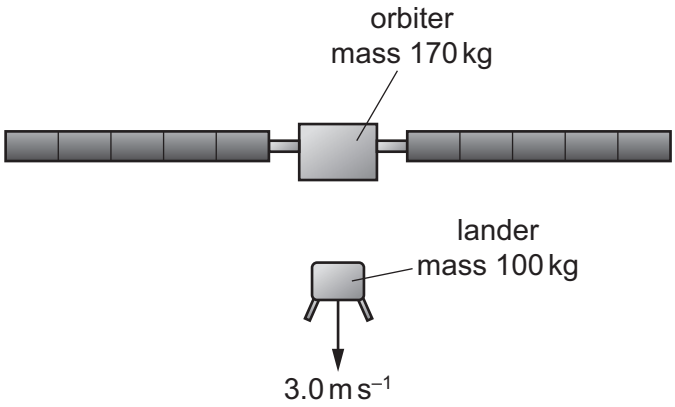
9 The space probe Rosetta was designed to investigate a comet. The probe consisted of an orbiter and a lander. The orbiter had a mass of 170 kg and the lander had a mass of 100 kg. When the two parts separated, the lander was pushed towards the surface of the comet so that its change in velocity towards the comet was $3.0\,m\,s^{-1}$.



Assume that the orbiter and lander were an isolated system.

The orbiter moved away from the comet during the separation.

What was the change in the speed of the orbiter?

A $1.8\,m\,s^{-1}$ **B** $2.3\,m\,s^{-1}$ **C** $3.0\,m\,s^{-1}$ **D** $5.1\,m\,s^{-1}$

10 A positively charged oil droplet falls in air in a uniform electric field that is vertically upwards. The droplet has a constant terminal speed v_0 and the electric field strength is E.

The magnitude of the force due to air resistance acting on the droplet is proportional to the speed of the droplet.

Which graph shows the variation with E of v_0?