10 An astronaut of mass m in a spacecraft experiences a gravitational force $F = mg$ when stationary on the launchpad.

What is the gravitational force on the astronaut when the spacecraft is launched vertically upwards with an acceleration of $0.2g$?

A $1.2mg$ **B** mg **C** $0.8mg$ **D** 0

11 A beam of α-particles collides with a lead sheet. Each α-particle in the beam has a mass of 6.6×10^{-27} kg and a speed of $1.5 \times 10^{7}\,\text{m s}^{-1}$.

5.0×10^{4} α-particles per second collide with an area of $1.0\,\text{cm}^2$ of lead. Almost all of the α-particles are absorbed by the lead so that they have zero speed after collision.

What is an estimate of the average pressure exerted on the lead by the α-particles?

A 5.0×10^{-15} Pa

B 5.0×10^{-13} Pa

C 5.0×10^{-11} Pa

D 5.0×10^{-9} Pa

12 An object in air is thrown upwards and towards the left.

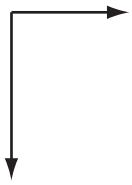
Which diagram shows the force(s) acting on the body when it is at its highest point?

A

B

C

D



Space for working