

- 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 $6.6 \times 10^{-27} \text{ kg}$ and a speed of $1.5 \times 10^7 \text{ m s}^{-1}$.

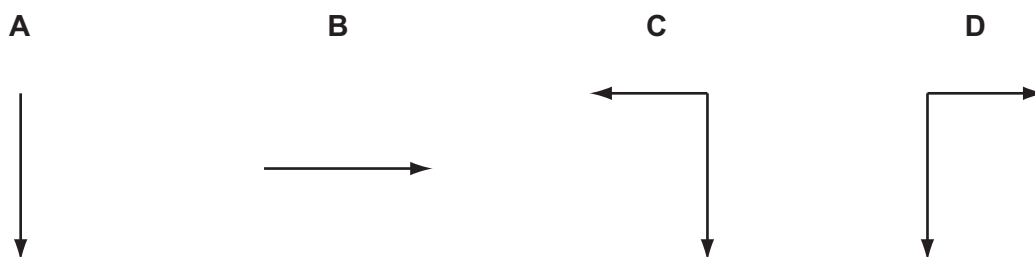
5.0×10^4 α -particles per second collide with an area of 1.0 cm^2 of lead. Almost all of the α -particles are absorbed by the lead so that they have zero speed after collision.

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

- A $5.0 \times 10^{-15} \text{ Pa}$
B $5.0 \times 10^{-13} \text{ Pa}$
C $5.0 \times 10^{-11} \text{ Pa}$
D $5.0 \times 10^{-9} \text{ Pa}$

- 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?



Space for working