20 In an experiment to demonstrate Brownian motion, smoke particles in a container are illuminated by a strong light source and observed through a microscope.

The particles are seen as small specks of light that are in motion.

What causes the Brownian motion?

A collisions between the smoke particles and air molecules

B collisions between the smoke particles and the walls of the container

C convection currents within the air as it is warmed by the light source

D kinetic energy gained by the smoke particles on absorption of light

21 In describing the behaviour of a spring, the spring constant is used.

Different loads are used to extend the spring by different amounts.

To find the spring constant, which quantities are required?

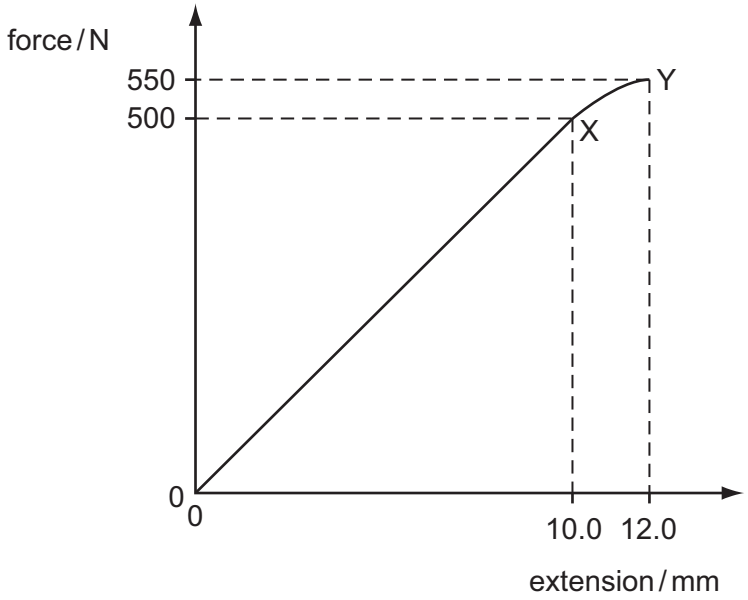
A the elastic limit and the loads

B the elastic limit, extensions and the length of the spring

C the loads and the extensions of the spring

D the loads and the length of the spring

22 The graph shows the behaviour of a sample of a metal when it is stretched until it starts to undergo plastic deformation.



What is the total work done in stretching the sample from zero extension to 12.0 mm?
Simplify the calculation by treating the region XY as a straight line.

A 3.30 J **B** 3.55 J **C** 3.60 J **D** 6.60 J