AQA – Dimensional analysis – A2 Further Mathematics Mechanics

1. June/2021/Paper_7367/3M/No.4

A spring has stiffness k

(a) Determine the dimensions of k

[1 mark]

(b) One end of the spring is attached to a fixed point. A particle of mass m kg is attached to the other end of the spring.

The particle is set into vertical motion and moves up and down, taking t seconds to complete one oscillation.

A possible model for t is

$$t = pm^a g^b k^c$$

where p is a dimensionless constant and $g\,\text{m}\,\text{s}^{-2}$ is the acceleration due to gravity.

Find the values of a, b and c for this model to be dimensionally consistent.

[3 marks]