InkMaths

QUESTION WORKBOOK

Hooke's law and elastic strings

Further Mechanics 1 · Year FM

6 questions · 20 marks

PRINT EDITION

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SECTION A · Warm-up

A1 State Hooke's law, defining every symbol, and say what the modulus of elasticity is measured in. [2]

A2 An elastic string of natural length 2 m and modulus 80 N is stretched to a length of 2.5 m. Find the tension. [3]

SECTION B · Standard

B1 A particle of mass 3 kg hangs in equilibrium from an elastic string of natural length 1.2 m and modulus 147 N. Find the extension and the total length, taking $g = 9.8$ m/s^2. [4]

B2 Two points A and B are 3 m apart on a smooth horizontal table. A particle is joined to A by a string of natural length 1.2 m and modulus 24 N, and to B by a string of natural length 1.2 m and modulus 36 N. Find the tension in equilibrium. [4]

B3 State two ways in which a spring differs from a string in these problems. [3]

SECTION C · Stretch

C1 A particle of mass 2 kg rests on a smooth plane inclined at 30° to the horizontal, held by an elastic string of natural length 1 m and modulus 49 N running up the line of greatest slope to a fixed point. Find the extension. [4]