



QUESTION WORKBOOK

Elastic potential energy

Further Mechanics 1 · Year FM

6 questions · 23 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Write down the formula for the energy stored in a stretched elastic string, and explain where the factor of one half comes from. [2]

- A2** An elastic string of natural length 2 m and modulus 80 N is stretched by 0.5 m. Find the energy stored. [2]

SECTION B · Standard

- B1** A particle of mass 0.2 kg on a smooth horizontal table is attached to an elastic string of natural length 1 m and modulus 20 N. It is pulled out to an extension of 0.4 m and released. Find its speed when the string reaches its natural length. [4]

- B2** A particle of mass 0.5 kg hangs from an elastic string of natural length 1 m and modulus 39.2 N attached to a ceiling. It is pulled down until the string is 1.5 m long and released. Find its speed when the string returns to its natural length, taking $g = 9.8 \text{ m/s}^2$. [5]

- B3** State the two commonest slips in setting up an energy equation with an elastic string, and how to avoid each. [3]

SECTION C · Stretch

- C1** A particle of mass 1 kg lies against a spring of natural length 0.5 m and modulus 50 N, compressed by 0.1 m, on a rough horizontal surface with coefficient of friction 0.2. Find the speed of the particle as it leaves the spring and the total distance it travels before coming to rest. Take $g = 9.8 \text{ m/s}^2$. [7]