



QUESTION WORKBOOK

Successive impacts and impacts with a wall

Further Mechanics 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Explain why momentum is not conserved when a ball bounces off the floor, and say what does apply. [2]

- A2** A ball is dropped from 3 m onto a floor with $e = 0.7$. Find the height of the first rebound. [3]

SECTION B · Standard

- B1** For the same ball, find the total distance it travels before coming to rest. [4]

- B2** Sphere A of mass 2 kg moving at 6 m/s strikes stationary sphere B of mass 1 kg with $e = 0.5$. B then hits a wall and rebounds with coefficient of restitution $1/3$. Show that A and B collide again. [4]

- B3** A ball strikes a floor at 7 m/s and rebounds to a height of 0.9 m. Find the coefficient of restitution, taking $g = 9.8 \text{ m/s}^2$. [3]

SECTION C · Stretch

- C1** A ball is dropped from height h onto a floor with coefficient of restitution e . Prove that the total distance it travels before coming to rest is $h(1 + e^2)/(1 - e^2)$. [4]