



QUESTION WORKBOOK

Direct impact and Newton's law of restitution

Further Mechanics 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** State Newton's law of restitution and the range of values the coefficient can take, saying what each end means. [2]

- A2** A sphere of mass 3 kg moving at 6 m/s strikes a stationary sphere of mass 2 kg directly, with $e = 0.5$. Find both velocities afterwards. [3]

SECTION B · Standard

- B1** For the same collision, find the kinetic energy lost. [4]

- B2** Two spheres of equal mass collide directly with $e = 1$, one moving at u and the other at rest. Show that they exchange velocities. [4]

- B3** Explain why momentum is conserved in a collision but kinetic energy usually is not. [3]

SECTION C · Stretch

- C1** A sphere of mass 4 kg moving at 5 m/s meets one of mass 6 kg moving at 2 m/s towards it. After the impact the 4 kg sphere moves at 1 m/s in the reverse direction. Find the coefficient of restitution. [4]