



QUESTION WORKBOOK

Momentum and impulse

Further Mechanics 1 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Define impulse, state its units, and explain why a rebound needs a larger impulse than being stopped dead. [2]

- A2** A ball of mass 0.2 kg travelling at 12 m/s is struck straight back at 18 m/s. The contact lasts 0.03 s. Find the impulse and the average force. [3]

SECTION B · Standard

- B1** A sphere of mass 5 kg moving at 3 m/s catches up with one of mass 4 kg moving at 1 m/s in the same direction. After the collision the 5 kg sphere moves at 1.8 m/s. Find the velocity of the other. [4]

- B2** A stationary object of mass 8 kg explodes into two pieces of mass 3 kg and 5 kg. The 3 kg piece moves off at 6 m/s. Find the velocity of the other piece. [4]

- B3** Explain, in terms of impulse, why a longer contact time reduces the force in a collision, and give one everyday application. [3]

SECTION C · Stretch

- C1** A ball of mass 2 kg is dropped from 5 m and rebounds to 1.8 m. Find the impulse the ground exerts on it, taking $g = 9.8 \text{ m/s}^2$. [4]