



QUESTION WORKBOOK

Momentum and impulse

Further Mechanics 1 · Year FM

6 questions · 25 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. [3]

- 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 rest at a height of 5 m and rebounds to a height of 1.8 m. It is in contact with the ground for 0.05 s. Find the impulse the ground exerts on it and the average force, first ignoring the weight during the impact and then allowing for it. Take $g = 9.8 \text{ m/s}^2$. [8]