



QUESTION WORKBOOK

Centre of mass of a discrete distribution

Further Mechanics 2 · Year FM

6 questions · 22 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** Explain why the centre of mass is a weighted average rather than a plain average of the positions. [2]

- A2** Masses of 3 kg, 5 kg and 2 kg lie at $x = 0, 4$ and 10 on a light rod. Find the centre of mass. [3]

SECTION B · Standard

- B1** Masses of 1, 2, 3 and 4 kg are placed at $(0, 0)$, $(2, 0)$, $(2, 3)$ and $(0, 3)$. Find the centre of mass. [4]

- B2** Masses of 4 kg and m kg are placed at $x = 2$ and $x = 8$. The centre of mass is at $x = 5$. Find m . [4]

- B3** State two physical facts about a rigid body that follow directly from knowing where its centre of mass is. [3]

SECTION C · Stretch

- C1** Particles of mass 2 kg, 3 kg and 5 kg are attached to a light rectangular framework at the points $(1, 4)$, $(-2, 0)$ and $(3, -2)$ respectively. A fourth particle, of mass m kg, is attached at $(5, 6)$. Given that the centre of mass of the four particles lies on the line $y = x$, find m . [6]