



QUESTION WORKBOOK

Equilibrium, suspension, toppling and sliding

Further Mechanics 2 · Year FM

6 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State where the centre of mass lies when a body is suspended freely, and why.

[2]

A2 A lamina has its centre of mass 2 units horizontally and 3 units vertically from the corner it is hung from. Find the angle the vertical edge makes with the vertical.

[3]

SECTION B · Standard

B1 A uniform block 0.5 m wide and 1.2 m tall stands on a rough plane with coefficient of friction 0.5. The plane is slowly tilted. Find whether it topples or slides, and at what angle.

[4]

- B2** For the same block, find the coefficient of friction at which toppling and sliding would happen at the same angle, and say what happens above and below it.

[4]

- B3** Explain why the toppling condition is about the line of the weight rather than the height of the centre of mass.

[3]

SECTION C · Stretch

- C1** A uniform solid cylinder of radius 0.3 m and height h stands on a rough plane with $\mu = 0.6$. Find the values of h for which it topples before it slides.

[4]