



QUESTION WORKBOOK

Friction and inclined planes

Mechanics · Year 12–13

6 questions · 23 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

A1 State the friction law $F \leq \mu R$, explaining when the inequality is an equality. [2]

A2 A 6 kg box rests on a rough horizontal floor, $\mu = 0.4$. A horizontal force of 20 N is applied. Show that the box does not move, and state the friction force acting. [4]

SECTION B · Standard

B1 A 6 kg box rests on a rough horizontal floor, $\mu = 0.4$, and the horizontal force applied to it is increased to 30 N. Find the acceleration. [3]

- B2** A block is released on a smooth slope inclined at 30° . Find its acceleration, and explain why the mass does not matter. [3]

- B3** A 3 kg block sits on a rough slope at 20° , $\mu = 0.5$. Show that it remains at rest. [4]

SECTION C · Stretch

- C1** A block of mass 2 kg is projected up a rough slope inclined at 25° with an initial speed of 6 m s^{-1} . The coefficient of friction between block and slope is 0.3. Find the distance the block travels up the slope, and determine whether it then slides back down. [7]