Moments, Levers and Stability

Forces and motion · 4 questions · step-by-step answers at the end

Name: Date: Score: / 4

USEFUL EQUATIONS

$M = Fd$ Σ clockwise = Σ anticlockwise

Questions

Show your working in the space under each question.

1. A 15 N force acts on the end of a 0.30 m spanner. What is its moment?

2. A child weighing 400 N sits 1.5 m from the pivot of a seesaw. How far from the pivot must a 600 N adult sit to balance it?

3. A crowbar is pushed down with 100 N at 0.80 m from the pivot. What force does it apply to a nail 0.050 m from the pivot?

4. Why does a double-decker bus carry more passengers downstairs than upstairs when testing its stability?

Step-by-step answers

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1. 15 × 0.30 = **4.5 N m**.

2. 1. Child's moment = 400 × 1.5 = **600 N m**.
2. For balance: 600 × d = 600.
3. d = **1.0 m** on the other side of the pivot.
Answer: 1.0 m

3. 100 × 0.80 = F × 0.050, so F = **1600 N**.

4. A **low centre of mass** must be tilted further before it passes outside the wheelbase, so the bus is harder to topple.