

Q.1 (2014 HL)

(a)



The picture shows the brake of a bicycle. When the cyclist wishes to slow down, she pulls a lever which pushes the rubber brake-pad against the rim of the wheel.

Explain why the brakes may not work as well after it has been raining. (6)

Water lubricates (reduces friction)

Q2 (2013 HL)

(h) When one surface in contact with another surface moves, frictional forces arise. Friction makes movement more difficult. Sometimes friction is useful, other times it is unhelpful.

(i) Give one example where friction can be useful.

Example (i) Friction is useful in brakes

(ii) Give one example where friction can be unhelpful.

Example (ii) trying to push something along ground

(iii) How can unhelpful friction be reduced?

How? Lubricate

(iv) How can friction between air and a moving vehicle be reduced?

How? Polish smooth surface of vehicle / slow down

Q3 (2013 HL)

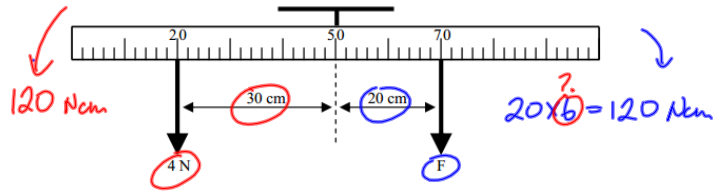
(a)(i) Distinguish between mass and weight. (6)

Mass is the amount of matter in something (kg)

Weight force of gravity on object (N)  
( $W=10m$ )

(ii) Define moment of a force. (6)

Definition force by perpendicular distance from fulcrum.  
( $M=F \times d$ ) (Nm)



The diagram shows a metre stick suspended from its centre of gravity.  
A force of 4 N acts on the stick at the 20 cm mark and a force of F N acts on the stick at the 70 cm mark. The metre stick is balanced horizontally.  
Calculate force F. (6)

F = 6 N

(iii) Give one everyday application of levers. (3)

Application door handle

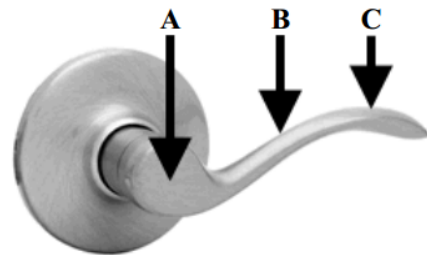
Q4 (2011 HL)

(b) The door handle is an application of a lever.

The labels and arrows show three points.

Which of the points A, B or C represent

- (i) the fulcrum (turning point),
- (ii) the point where the smallest force will open the door lock.



(i) A (ii) C

(c) Explain the term friction. How can friction be reduced?

Explain friction is a force that opposes motion, happens when surfaces meet (N)

How? Oil

Q5 (2008 HL)

(b) State the *law of the lever*.

If a lever is balanced then the sum of clockwise moments equals the sum of anti-clockwise moments

(c) The globular cluster shown is a group of stars (like a small galaxy). **Gravity is the force that holds the stars together** in this formation.

Give **two effects** that gravity has on your everyday life.

- 1 It keeps you on the ground
- 2 It makes things fall

