Oxford Cambridge and RSA

GCSE Physics B (Twenty First Century Science)

J259/02 Depth in physics (Foundation Tier)

Question Set 17

1 This question is about gears and levers.

(a) A wristwatch with its back cover removed is shown in **Fig. 1.1**.

Fig. 1.1

You can see some of the gears inside the wristwatch.

Two gears **Q** and **R** are shown in **Fig. 1.2**.

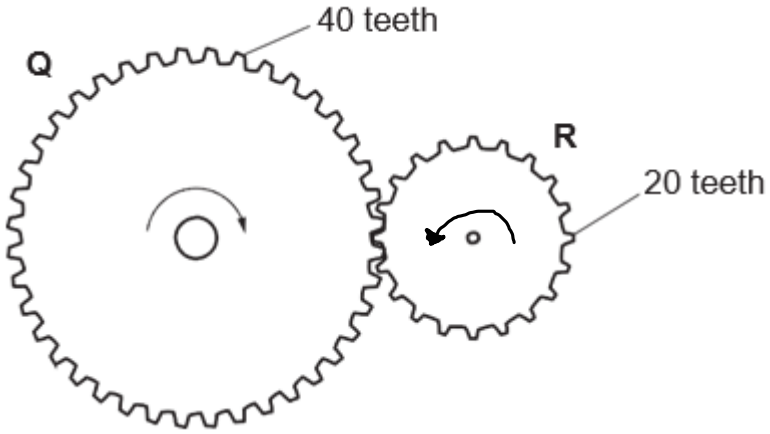

Fig. 1.2

The gear **Q** has 40 teeth and gear **R** has 20 teeth. Both gears have the same size teeth.

The gear **Q** moves in a clockwise direction.

Gear **Q** rotates at 6 revolutions per minute.

(i) On **Fig. 1.2**, show the direction of rotation of gear **R**. **[1]**

(ii) How many revolutions are completed by gear **R** in one minute?

$6 \times \frac{40}{20} = 12$

Number of revolutions = ... 12 ..... per minute **[2]**

(b) The lid of a can of paint has a lip which makes it easier to open, using a lever.

The diagram below shows a screwdriver placed under the lip.

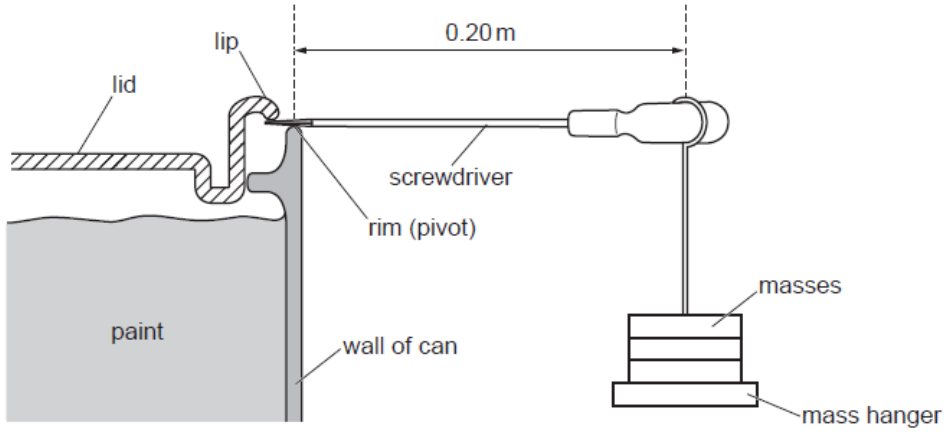

Fig. 1.3

In an experiment, masses are added to the mass hanger to open the lid.

The mass hanger hangs at a distance of 0.20 m from the rim (pivot) of the can.

A total weight of 32 N of the hanging masses opens the lid.

Calculate the moment of this force.

$M = Fd = 32 \times 0.2 = 6.4 \text{ Nm}$

Moment = 6.4 Nm **[3]**

Total Marks for Question Set 17: 6

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