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1. Fig. 6.1 shows a crane lifting some bricks during the building of a house.



The weight of the bricks produces a turning effect, or moment, on the arm of the crane about the point P. The weight of the bricks is 12000 N.

1. Calculate the moment of this force, using the distance marked on Fig. 6.1.

Moment =……………………………

(b) (i) Explain why the counterweight is necessary.

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(ii) Suggest one advantage of being able to move the counterweight along the arm.

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(c) State the principle of moments.

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1. Fig. 9.1 shows a thin sheet of metal suspended from a hole in one corner at A. The weight of the metal is 0.10N and the center of mass is at B. The diagram is drawn full scale.



**(a)** Describe in detail how you would experimentally determine the position of the centre of mass of the sheet of metal.

**(b)** The sheet turns because of the moment of the weight about point A.

**(i)** Define what is meant by the *moment of a force*.

**(ii)** Using a distance measured on Fig. 9.1, calculate the moment of the weight about point A. State clearly which distance you measured and give the unit of your final answer.

**(c)** Fig. 9.2 and Fig. 9.3 show a thick piece of wood with one corner on a table. Fig. 9.4 shows the same piece of wood balanced on the table. B is the centre of mass.



(i) Explain why in Fig. 9.2 the piece of wood falls to the right and in Fig. 9.3 it falls to the left.

(ii) Explain why the piece of wood in Fig. 9.4 does not fall over.

(iii) Suggest how the thickness of the wood in Fig. 9.4 affects its stability.