

MOMENT OF A FORCE-CENTRE OF MASS-SET-1-QP-MS

1

A wheel on a car needs changing. Fig. 8.2 shows a spanner being used to turn a wheel nut.

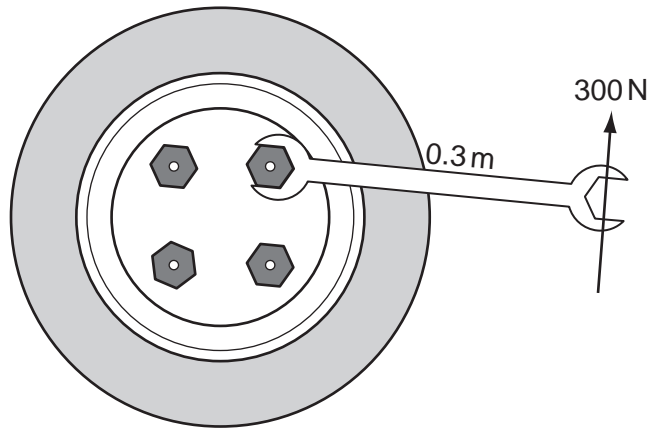


Fig. 8.2

(i) Calculate the turning effect (moment) of the spanner.

State the formula that you use and show your working.

formula

working

..... [2]

(ii) Give **two** ways in which you could increase the spanner's turning effect.

1

.....

2

..... [2]

MARKING SCHEME

- (i) (turning effect =) force \times distance ;
= $0.3 \times 300 = 90 \text{ Nm}$; [2]
- (ii) increase force ;
increase distance / use a longer spanner ; [2]

2

Fig. 7.1 shows a crane for use on building sites.

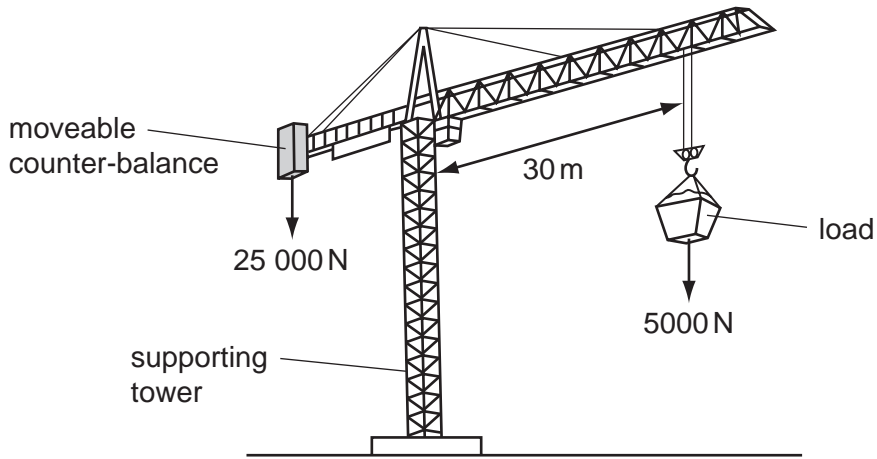


Fig. 7.1

(a) Explain in terms of forces why the crane needs a counter-balance.

.....

.....

..... [2]

(b) The crane in Fig. 7.1 is balanced.

Calculate the moment of the load about the crane's supporting tower. Then calculate the distance of the counterbalance from the crane's supporting tower.

State the formula that you use for your calculations and show your working.

formula used

working

moment of load

distance of counterbalance

[3]

MARKING SCHEME

- (a) clockwise moment has to equal anticlockwise moment/ $F_1d_1 = F_2d_2$, owtte ; [2]
to stop crane tipping over when lifting weight ;
- (b) (moment =) force \times distance/weight \times distance ;
(= 5000×30) = 150 000 Nm ;
(150 000/25 000) = 6 m ; [3]