

- 3 (a) Force is a vector quantity. State three other vector quantities.

1.
2.
3.

[2]

- (b) Three coplanar forces X , Y and Z act on an object, as shown in Fig. 3.1.

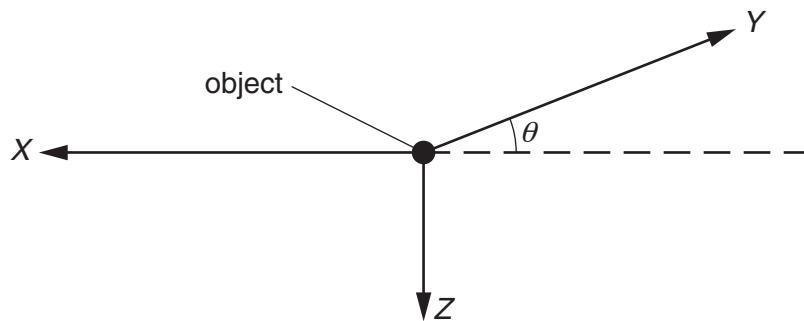


Fig. 3.1

The force Z is vertical and X is horizontal. The force Y is at an angle θ to the horizontal. The force Z is kept constant at 70 N.

In an experiment, the magnitude of force X is varied. The magnitude and direction of force Y are adjusted so that the object remains in equilibrium.

Fig. 3.2 shows the variation of the magnitude of force Y with the magnitude of force X .

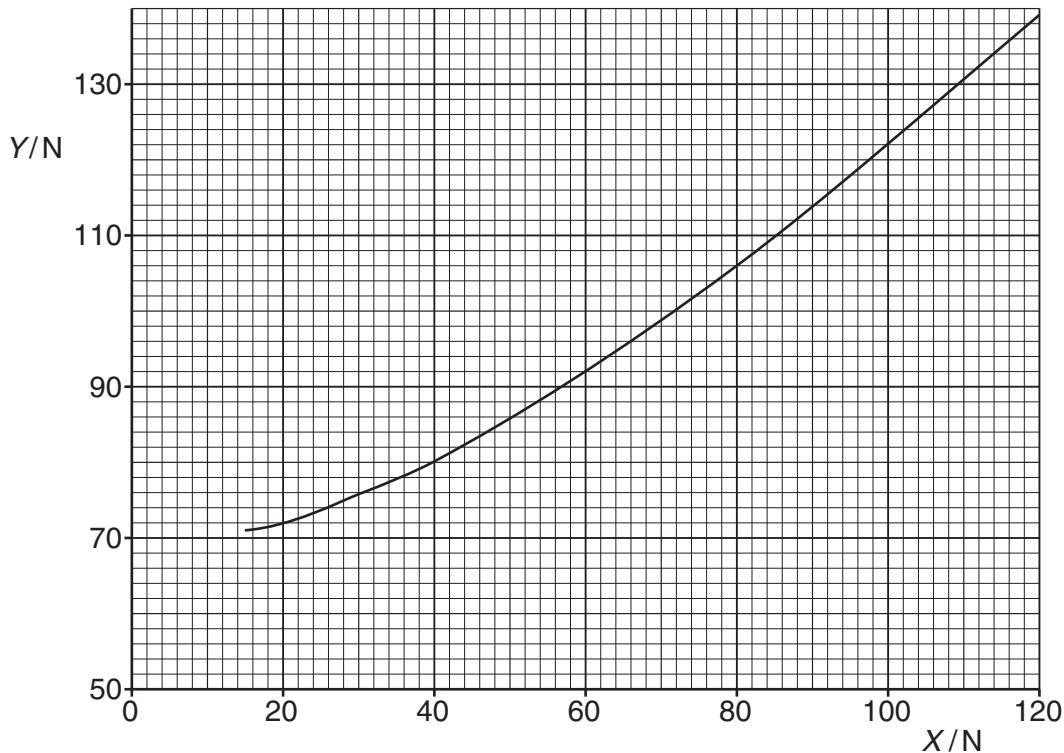


Fig. 3.2

- (i) Use Fig. 3.2 to estimate the magnitude of Y for $X = 0$.

$Y = \dots$ N [1]

- (ii) State and explain the value of θ for $X = 0$.

.....
.....
.....

[2]

- (iii) The magnitude of X is increased to 160 N. Use resolution of forces to calculate the value of

1. angle θ ,

$\theta = \dots$ ° [2]

2. the magnitude of force Y .

$Y = \dots$ N [2]

- (c) The angle θ decreases as X increases. Explain why the object cannot be in equilibrium for $\theta = 0$.

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.....
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[1]