**1** **(a)** The spacing between two atoms in a crystal is $3.8 \times 10^{-10}$ m. State this distance in pm.

spacing = ..... pm [1]

**(b)** Calculate the time of one day in Ms.

time = ..... Ms [1]

**(c)** The distance from the Earth to the Sun is 0.15 Tm. Calculate the time in minutes for light to travel from the Sun to the Earth.

time = ..... min [2]

**(d)** Underline all the vector quantities in the list below.

distance energy momentum weight work [1]

**(e)** The velocity vector diagram for an aircraft heading due north is shown to scale in Fig. 1.1. There is a wind blowing from the north-west.

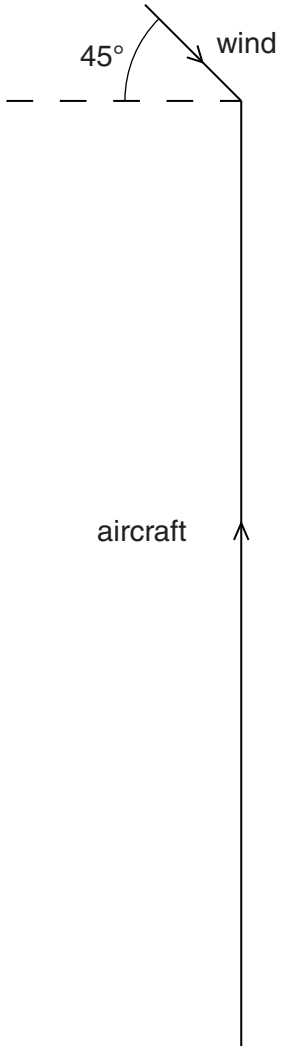


**Fig. 1.1**

The speed of the wind is 36 m s$^{-1}$ and the speed of the aircraft is 250 m s$^{-1}$.

**(i)** Draw an arrow on Fig. 1.1 to show the direction of the resultant velocity of the aircraft. [1]

**(ii)** Determine the magnitude of the resultant velocity of the aircraft.

resultant velocity = ..... m s$^{-1}$ [2]