

- 1 (a) A property of a vector quantity, that is not a property of a scalar quantity, is direction.
For example, velocity has direction but speed does not.

- (i) State **two** other scalar quantities and **two** other vector quantities.

scalar quantities: and

vector quantities: and

[2]

- (ii) State **two** properties that are possessed by both scalar and vector physical quantities.

1.

2.

[2]

- (b) A ship at sea is travelling with a velocity of 13 m s^{-1} in a direction 35° east of north in still water, as shown in Fig. 1.1.

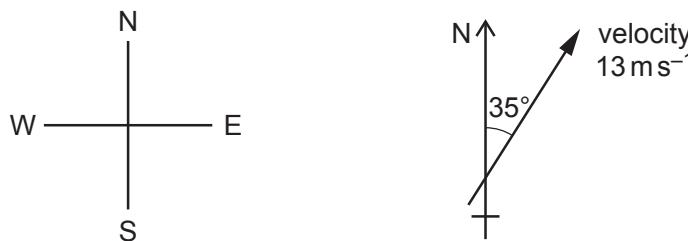


Fig. 1.1

- (i) Determine the magnitudes of the components of the velocity of the ship in the north and the east directions.

north component of velocity = m s^{-1}

east component of velocity = m s^{-1}
[2]

- (ii) The ship now experiences a tidal current. The water in the sea moves with a velocity of 2.7 ms^{-1} to the west.

Calculate the resultant velocity component of the ship in the east direction.

$$\text{resultant east component of velocity} = \dots \text{ms}^{-1} [1]$$

- (iii) Use your answers in (b)(i) and (b)(ii) to determine the magnitude of the resultant velocity of the ship.

$$\text{magnitude of resultant velocity} = \dots \text{ms}^{-1} [2]$$

- (iv) Use your answers in (b)(i) and (b)(ii) to determine the angle between north and the resultant velocity of the ship.

$$\text{angle} = \dots {}^\circ [2]$$