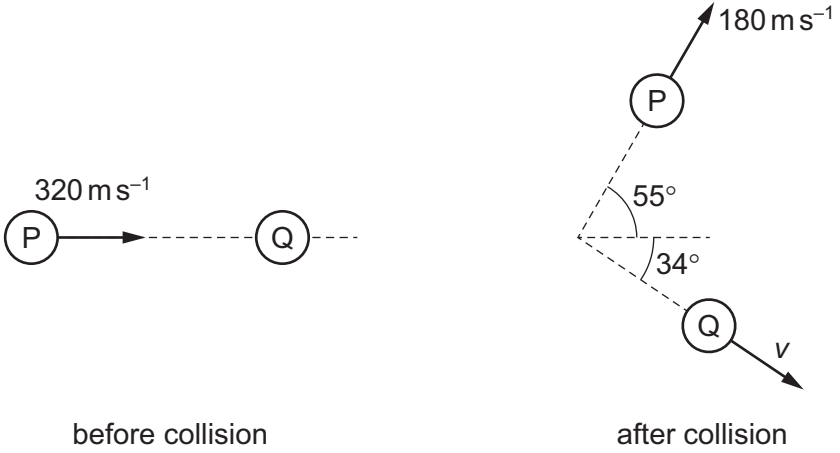
10 A nitrogen molecule P travelling at a speed of $320\,m\,s^{-1}$ in a vacuum collides with a stationary nitrogen molecule Q.

After the collision, P travels at a velocity of $180\,m\,s^{-1}$ at an angle of 55° to its original path.

Q travels in a direction at an angle of 34° to the initial path of P.



before collision after collision

Assume that there are no external forces acting on the molecules.

What is the magnitude v of the velocity of Q after the collision?

A $120\,m\,s^{-1}$ **B** $140\,m\,s^{-1}$ **C** $180\,m\,s^{-1}$ **D** $260\,m\,s^{-1}$