

- 10 A cyclist is riding at a steady speed on a level road.

According to Newton's third law of motion, what is equal and opposite to the backward push of the back wheel on the road?

- A the force exerted by the cyclist on the pedals
  - B the forward push of the road on the back wheel
  - C the tension in the cycle chain
  - D the total air resistance and friction force
- 11 In perfectly elastic collisions between two atoms, it is always true to say that
- A the initial speed of one atom will be the same as the final speed of the other atom.
  - B the relative speed of approach between the two atoms equals their relative speed of separation.
  - C the total momentum must be conserved, but a small amount of the total kinetic energy may be lost in the collision.
  - D whatever their initial states of motion, neither atom can be stationary after the collision.
- 12 Two railway trucks of masses  $m$  and  $3m$  move towards each other in opposite directions with speeds  $2v$  and  $v$  respectively. These trucks collide and stick together.

What is the speed of the trucks after the collision?

- A  $\frac{v}{4}$                       B  $\frac{v}{2}$                       C  $v$                       D  $\frac{5v}{4}$

- 13 The diagrams show three forces acting on a body.

In which diagram is the body in equilibrium?

