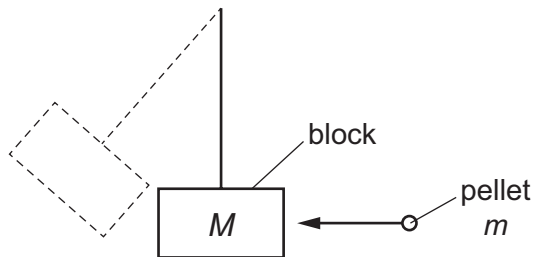


11 The diagram shows a 'ballistic pendulum'.



A pellet of mass  $m$  travelling at a speed  $u$  hits a stationary block of mass  $M$ . The pellet becomes embedded in the block and causes the block to move at a speed  $v$  immediately after the impact.

When a pellet of mass  $2m$ , travelling at a speed  $2u$ , hits a block of mass  $2M$ , what is the speed of the block immediately after the impact? (Neglect the small increase in the mass of the block as the pellet's mass is added during the collision.)

- A**  $v$                       **B**  $v\sqrt{2}$                       **C**  $2v$                       **D**  $4v$

12 A particle of mass  $m$  is moving with a constant speed  $u$  in a straight line. At a certain instant, it is deflected by a force  $F$  acting at an angle  $\theta$  to its original direction of motion. The deflection is such that the particle's speed remains constant at  $u$ . The magnitude of the impulse is