

<b>7</b>	<p><b>D is the correct answer</b></p> <p>A is not the correct answer as it contradicts Newton's Third Law.          B is not the correct answer as it also contradicts Newton's Third Law.          C is not the correct answer as the force of Y on X is in the opposite direction to the velocity of X.</p>	<b>(1)</b>
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<b>10</b>	<p><b>The only correct answer is B (3p)</b></p> <p>A is not correct because the change in velocity is the same for both objects so the increase in momentum of S is greater than that of R          C is not correct because S does not double its speed          D is not correct because S moves 1.5 times faster than at the start and has twice the mass of R</p>	<b>1</b>
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<b>10</b>	<p><b>The only correct answer is A (<math>\frac{v}{4}</math>)</b></p> <p>B is not correct because conserving momentum does not lead to this answer          C is not correct because the new speed is not just the difference between the initial speeds          D is not correct because the initial velocities are in opposite directions</p>	<b>1</b>
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<b>8</b>	<p><b>The only correct answer is B (<math>\frac{2}{3} v</math>)</b></p> <p>A is not correct because the momentum and mass of the ball should not be multiplied together          C is not correct because the mass of the ball should not be divided by the momentum of the ball          D is not correct because the momentum and mass of the cricket ball should not be multiplied together</p>	<b>1</b>
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Question Number	Answer	Additional Guidance	Mark
<b>14(a)</b>	<p>The total momentum (of a system) is constant (1)</p> <p>When no external forces act (dependent on MP1)  <b>Or</b> In a closed system (dependent on MP1) (1)</p>		<b>2</b>
<b>14(b)</b>	<p>Use of <math>E_k = \frac{1}{2}mv^2</math> to determine initial velocity of rock B (1)</p> <p>Use of <math>p = mv</math> (1)</p> <p>Use of principle of conservation of momentum (1)</p> <p><math>v = 11 \text{ m s}^{-1}</math> (1)</p>	<p><u>Example calculation</u></p> $v_B = \sqrt{\frac{2 \times 4.1 \times 10^3 \text{ J}}{56 \text{ kg}}} = 12.1 \text{ m s}^{-1}$ <p><math>p_B = 56 \text{ kg} \times 12.1 \text{ m s}^{-1} = 678 \text{ kg m s}^{-1}</math></p> <p><math>p_A = 43 \text{ kg} \times 7.8 \text{ m s}^{-1} = 335 \text{ kg m s}^{-1}</math></p> $335 \text{ kg m s}^{-1} + 678 \text{ kg m s}^{-1} = 43 \text{ kg} \times v_A + 530 \text{ kg m s}^{-1}$ $v_A = \frac{1013 \text{ kg m s}^{-1} - 530 \text{ kg m s}^{-1}}{43 \text{ kg}} = 11.2 \text{ m s}^{-1}$	<b>4</b>
<b>Total for question 14</b>			<b>6</b>