- 2. Two particles A and B, of mass 3 kg and 2 kg respectively, are moving in the same direction on a smooth horizontal table when they collide directly. Immediately before the collision, the speed of A is 4 m s⁻¹ and the speed of B is 1.5 m s⁻¹. In the collision, the particles join to form a single particle C.
 - (a) Find the speed of C immediately after the collision.

(3)

Two particles P and Q have mass 3 kg and m kg respectively. They are moving towards each other in opposite directions on a smooth horizontal table. Each particle has speed 4 m s⁻¹, when they collide directly. In this collision, the direction of motion of each particle is reversed. The speed of P immediately after the collision is 2 m s⁻¹ and the speed of Q is 1 m s⁻¹.

- (b) Find
 - (i) the value of m,

(3)

(ii) the magnitude of the impulse exerted on Q in the collision.

(2)

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f mass 0.6 kg , which speed 2 m s^{-1} and Q	ing with speed $u \text{ m s}^{-1}$ in a sides directly with a particle after the particles collide, P motion of P is reversed by the	ble. The particle P the table. Immediat	horizontal tab is at rest on th
(4)	*	e of u,	(a) the value
(2)	erted by P on Q .	nitude of the impuls	(b) the magn
	instant force of magnitude R are direction of motion of Q .	on directly opposite	
(4)		value of R .	(c) Find the
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1. Two particles A and B have masses 4 kg and m kg respectively. They are moving a each other in opposite directions on a smooth horizontal table when they collide a Immediately before the collision, the speed of A is 5 m s ⁻¹ and the speed of B is 1 Immediately after the collision, the direction of motion of A is unchanged and the of A is 1 m s ⁻¹ .	directly. 3 m s ⁻¹ .
(a) Find the magnitude of the impulse exerted on A in the collision.	(2)
Immediately after the collision, the speed of B is 2 m s ⁻¹ .	
(b) Find the value of m.	
	(4)
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3. Two particles A and B are moving on a smooth horizontal plane. The mass of A is km , where $2 < k < 3$, and the mass of B is m . The particles are moving along the same straight line, but in opposite directions, and they collide directly. Immediately before they collide the speed of A is $2u$ and the speed of B is $4u$. As a result of the collision the speed of A is halved and its direction of motion is reversed.
(a) Find, in terms of k and u , the speed of B immediately after the collision. (3)
(b) State whether the direction of motion of B changes as a result of the collision, explaining your answer.(3)
Given that $k = \frac{7}{3}$, (c) find, in terms of m and u , the magnitude of the impulse that A exerts on B in the
collision. (3)

1.	Another particle B of mass m kg is moving along the same straight line, in the direction to A , with speed 8 m s^{-1} . The particles collide. The direction of mot is unchanged by the collision. Immediately after the collision, A is moving with 3 m s^{-1} and B is moving with speed 4 m s^{-1} . Find	opposite ion of A	
	(a) the magnitude of the impulse exerted by B on A in the collision,	el constantino	
		(2)	
	(b) the value of m .		
		(4)	

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1.	Two particles B and C have mass m kg and 3 kg respectively. They are moving towards each other in opposite directions on a smooth horizontal table. The two particles collide directly. Immediately before the collision, the speed of B is 4 m s^{-1} and the speed of C is 2 m s^{-1} . In the collision the direction of motion of C is reversed and the direction of motion of C is unchanged. Immediately after the collision, the speed of C is C i	bl
	Find	
	(a) the value of m , (3)	
	(b) the magnitude of the impulse received by C . (2)	990000000000000000000000000000000000000
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1.	A railway truck P , of mass m kg, is moving along a straight horizontal track with speed $15 \mathrm{ms^{-1}}$. Truck P collides with a truck Q of mass 3000 kg, which is at rest on the same track. Immediately after the collision the speed of P is $3 \mathrm{ms^{-1}}$ and the speed of Q is $9 \mathrm{ms^{-1}}$. The direction of motion of P is reversed by the collision.	blank
	Modelling the trucks as particles, find	
	(a) the magnitude of the impulse exerted by P on Q ,	
	(2)	
	(b) the value of m . (3)	
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- 2. Two particles A and B have mass 0.4 kg and 0.3 kg respectively. They are moving in opposite directions on a smooth horizontal table and collide directly. Immediately before the collision, the speed of A is 6 m s⁻¹ and the speed of B is 2 m s⁻¹. As a result of the collision, the direction of motion of B is reversed and its speed immediately after the collision is 3 m s⁻¹. Find
 - (a) the speed of A immediately after the collision, stating clearly whether the direction of motion of A is changed by the collision,

(4)

(b) the magnitude of the impulse exerted on *B* in the collision, stating clearly the units in which your answer is given.

(3)



and the speed of B is $3u$. The magnitude of the impulse receive collision is $\frac{7mu}{2}$.	ed by each particle in the
Find	
(a) the speed of A immediately after the collision,	
(a) the speed of A initiodiately after the comston,	(3)
(b) the speed of B immediately after the collision.	
(b) the speed of B initiodiately after the comston.	(3)
	2.5

1.	Two particles P and Q have mass 0.4 kg and 0.6 kg respectively. The particles are initia at rest on a smooth horizontal table. Particle P is given an impulse of magnitude 3 N s the direction PQ .	lly in bland
	(a) Find the speed of P immediately before it collides with Q .	
	50 90 San All 1975	(3)
	Immediately after the collision between P and Q , the speed of Q is 5 m s ⁻¹ .	
	(b) Show that immediately after the collision <i>P</i> is at rest.	
		(3)
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2.	Particle P has mass $m \log a$ and particle Q has mass $3m \log a$. The particles are moving in opposite directions along a smooth horizontal plane when they collide directly. Immediately before the collision P has speed $4u \text{ m s}^{-1}$ and Q has speed $ku \text{ m s}^{-1}$, where k is a constant. As a result of the collision the direction of motion of each particle is reversed and the speed of each particle is halved.	
	(a) Find the value of k .	(4)
	(b) Find, in terms of m and u , the magnitude of the impulse exerted on P by Q .	(3)
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2.	2. Particle <i>P</i> has mass 3 kg and particle <i>Q</i> has mass 2 kg. The particles are moving in opposite directions on a smooth horizontal plane when they collide directly. Immediately before the collision, <i>P</i> has speed 3 m s ⁻¹ and <i>Q</i> has speed 2 m s ⁻¹ . Immediately after the collision, both particles move in the same direction and the difference in their speeds is 1 m s ⁻¹ .		
	(a) Find the speed of each particle after the collision.		
	A Zo	(5)	
	(b) Find the magnitude of the impulse exerted on P by Q .	(3)	
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1. Two particles A and B, of mass 5m kg and 2m kg respectively, are moving in opposite directions along the same straight horizontal line. The particles collide directly. Immediately before the collision, the speeds of A and B are 3 m s^{-1} and 4 m s^{-1} respectively. The direction of motion of A is unchanged by the collision. Immediately after the collision, the

	Two particles P and Q have masses $4m$ and m respectively. The particles are moving towards each other on a smooth horizontal plane and collide directly. The speeds of P and Q immediately before the collision are $2u$ and $5u$ respectively. Immediately after the		
	collision, the speed of P is $\frac{1}{2}u$ and its direction of motion is reversed.		
	(a) Find the speed and direction of motion of Q after the collision.	(4)	
	(b) Find the magnitude of the impulse exerted on P by Q in the collision.	(3)	
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1.	Particle P has mass 3 kg and particle Q has mass m kg. The particles are moving in ordirections along a smooth horizontal plane when they collide directly. Immediately the collision, the speed of P is 4 m s ⁻¹ and the speed of Q is 3 m s ⁻¹ . In the colliderection of motion of P is unchanged and the direction of motion of Q is resulting after the collision, the speed of P is 1 m s ⁻¹ and the speed of Q is 1.5	y before sion the eversed.
	(a) Find the magnitude of the impulse exerted on P in the collision.	(0)
		(3)
	(b) Find the value of m.	
		(3)
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