1 **(a)** State the principle of conservation of linear momentum.

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…….. [2]

(b) Two microscopic particles are travelling along the same straight line in the same direction, as shown in Fig. 1.1.

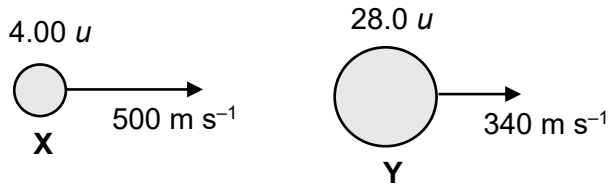

Fig. 1.1

Particle **X** has mass 4.00 *u* and horizontal velocity 500 m s^{-1} whereas particle **Y** has mass 28.0 *u* and horizontal velocity 340 m s^{-1}.

After the two particles collide, **X** has a horizontal velocity of 220 m s^{-1} in the same direction as before and **Y** has horizontal velocity *v*.

(i) Determine the magnitude of velocity *v*.

v = …….. m s^{-1} [2]

(ii) Deduce whether the above collision is elastic or not. Show your workings clearly.

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…… [2]

(iii) Use Newton's third law to explain why, during the collision, the change in momentum of **X** is equal and opposite to the change in momentum of **Y**.

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…… [2]

[Total: 8]