2 **(a)** Momentum is conserved when two objects collide.

State the condition under which momentum is conserved.

……

……[1]

(b) Fig. 2.1 shows the variation with time of the momentum of two colliding trucks A and B.

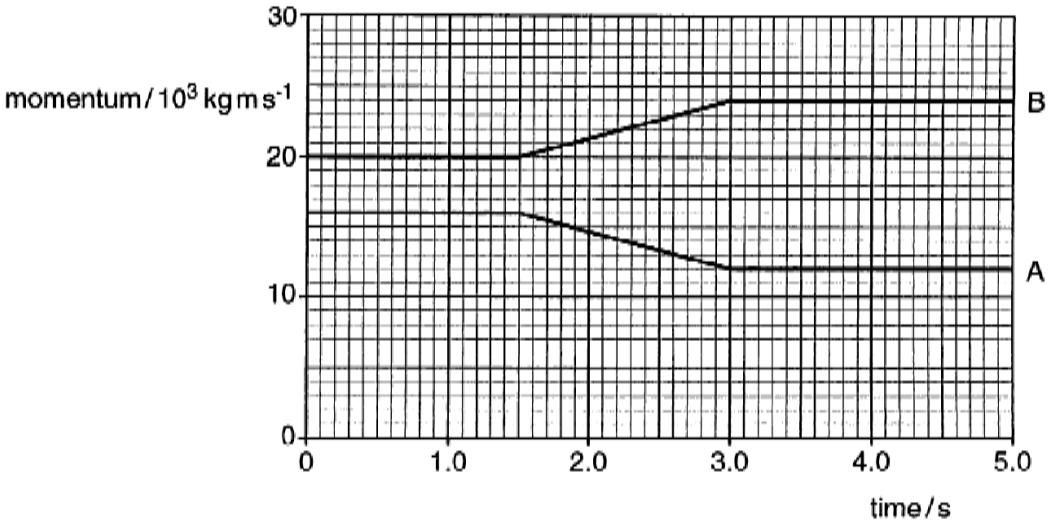

Fig. 2.1

The masses of trucks A and B are 2000 kg and 4000 kg respectively. The period of collision is between 1.5 s and 3.0 s.

(i) Calculate the force acting on truck B during the collision

force = …… N [2]

(ii) Explain using Newton's laws, the relationship between the gradients of both graphs during the collision.

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……

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……[2]

(iii) Using the concepts of impulse and momentum, explain why the total momentum of the two trucks is conserved during collision.

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……

……[2]

(iv) Calculate the change in the total kinetic energy of the trucks before and after the collision. State the type of collision.

change in kinetic energy = …… J [2]

type of collision: ……[1]

[Total: 10]