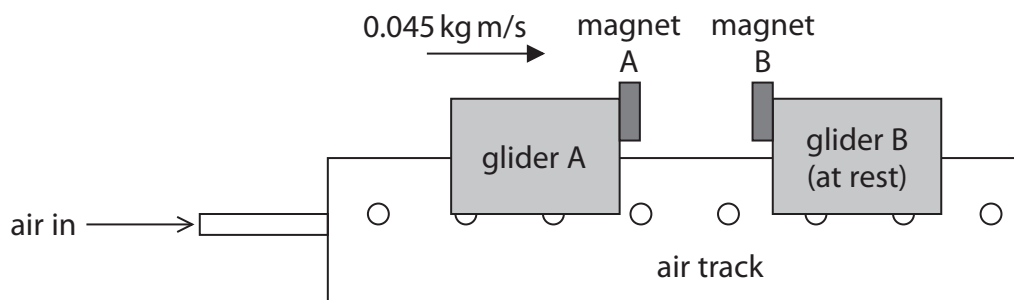**3** The diagram shows an air track that can be used to investigate motion without friction.

Air comes out through a series of small holes in the air track, which lifts the gliders slightly above the track.

There are two gliders on the track.

Each glider has a magnet.

The poles of the magnets nearest each other are alike.

(a) Explain the direction of the force acting on magnet A from magnet B.

(2)

....

....

....

....

(b) The gliders collide and the magnets cause them to rebound.

Before the collision, the momentum of glider A is 0.045 kg m/s to the right and glider B is at rest.

(i) State the total momentum of glider A and glider B after the collision.

(1)

total momentum = ... kg m/s

(ii) After the collision, the momentum of glider A is 0.021 kg m/s to the left.

Calculate the momentum of glider B after the collision.

(2)

momentum of glider B = ... kg m/s

(iii) The time taken for glider B to change its momentum is 0.19 seconds.

Calculate the average force on glider B that causes this change in momentum.

(2)

average force = ... N

(iv) Give the direction of the force on glider B from glider A.

(1)

....

(Total for Question 3 = 8 marks)