Section A

Answer **all** the questions in the spaces provided.

1 A tennis ball of mass 0.060 kg is travelling horizontally in a straight line at a speed of 19 m s^{-1} when it is hit by a tennis racket. The tennis ball is shown just before and just after impact in Fig. 1.1.
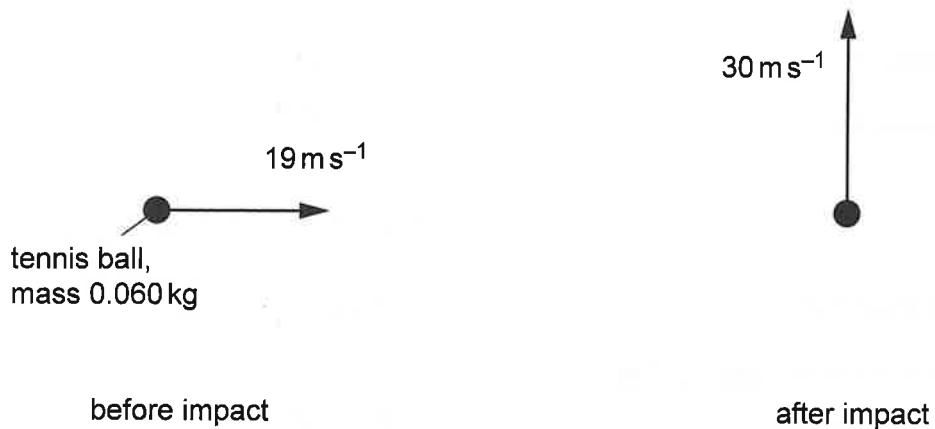

30 m s^{-1}

19 m s^{-1}

tennis ball,
mass 0.060 kg

before impact

after impact

Fig. 1.1

After hitting the tennis racket, the ball travels vertically upwards at a speed of 30 m s^{-1}.

The ball is in contact with the tennis racket for a time of 16 ms.

(a) Calculate:

(i) the increase in kinetic energy of the tennis ball

increase in kinetic energy = ... J [2]

(ii) the magnitude of the average force of the tennis racket on the ball.

average force = ... N [3]

(b) Suggest **two** reasons why the work done by the tennis racket on the ball during impact is greater than the answer given in (a)(i).

1 ....

....

....

2 ....

....

....

[2]

[Total: 7]