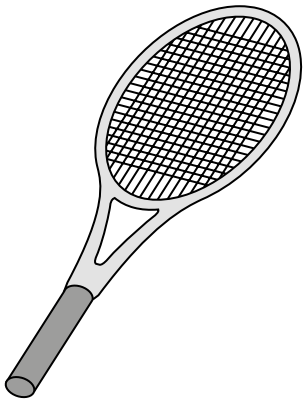
Answer ALL questions. Write your answers in the spaces provided.

1 A tennis racket is used to hit a tennis ball.

The ball is in contact with the racket for 0.20 seconds and leaves the racket with a horizontal velocity of 46 m/s.



(a) (i) State the equation relating acceleration, change in velocity and time taken.

(1)

.....

(ii) Calculate the acceleration of the tennis ball assuming it is at rest when it is hit.

Give the unit.

(3)

acceleration = ... unit .....

(b) The tennis ball has a mass of 57 grams.

(i) State the equation relating momentum, mass and velocity.

(1)

.....

(ii) Calculate the momentum of the tennis ball when its velocity is 46 m/s.

(3)

momentum = ... kg m/s

(c) The bottom of a tennis player's shoes are thick and made from a material that compresses when the player's feet land on the ground.

Explain why these shoes reduce the risk of injury to the tennis player.

(3)

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(Total for Question 1 = 11 marks)