Impulse Worksheet

Q6.

A pitcher throws a 200 g baseball with a speed of 15 ms^{-1}. The ball is hit by a batter using a baseball bat and return to the pitcher with a speed of 45 ms^{-1}.

> a) What is the impulse acting on the baseball?
> b) Find the force acting on the baseball bat if it is in contact with the ball for 0.03s

Q7.

The figure shows a badminton player receiving a shot with a shuttlecock of mass 60 g travelling horizontally at 20 ms^{-1}. The player returns the shot at 15 ms^{-1} in the opposite direction.
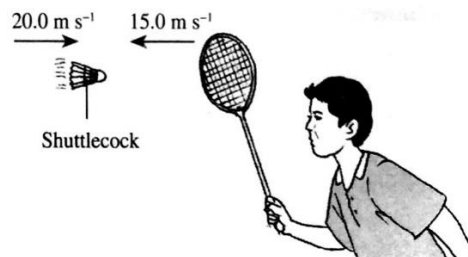

Figure 7

> a) What is the impulse acting on the racquet?
> b) Find the force acting on the shuttlecock if the contact time is 0.4s.

Q8.

The diagram shows a car with mass 1200 kg travelling at constant velocity of 20 ms^{-1} on a straight road. The frictional force acting on the car is 1500 N.
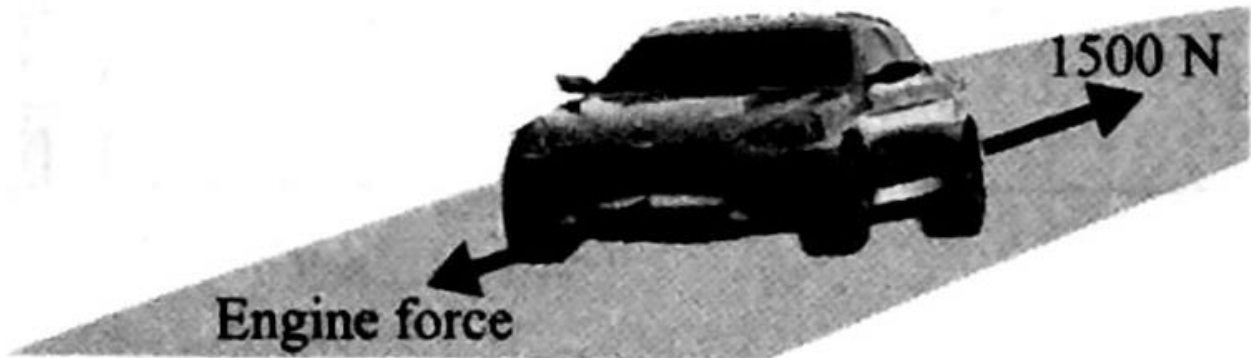

1500 N

Engine force

Figure 8

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a) i) Calculate the total distance travelled by the car in 15s.

ii) Find the engine force if the constant velocity of 10 ms^{-1}

b) i) Calculate the acceleration of the car if the engine force acting on the car is increased to 13500 N

ii) What is the time needed for the car to reach a velocity of 40 ms^{-1}?

c) When the car is travelling at 40 ms^{-1}, the driver steps on the brake pedal and it takes 8s before the car comes to a stop. Calculate the magnitude of force needed for the car to stop.