

Signature: Name: Marks:

Force and Impulse Worksheet

Q1.

The figure below shows an object with a mass of 6 kg moves at constant velocity when it is pulled by a horizontal force of 4 N on a level surface. What is the acceleration of the object if the object is pulled with a force of 22 N?

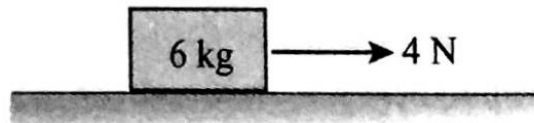



Figure 1.

Q2.

What is the acceleration of the object if the mass is also 6kg?



Figure 2.



A rectangular block is shown on a horizontal surface. An arrow labeled '60 N' points to the right from the left side of the block. Another arrow labeled '30 N' points to the left from the right side of the block.

Figure 3.

Signature: Name: Marks: **Q3.**

The figure below shows three forces acting on a block. Find the acceleration of the block, assuming its mass is also 6 kg.

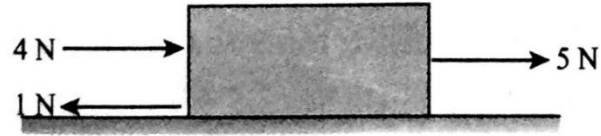


Figure 4.

Q4.

The figure below shows forces 7 N, 4 N and 10 N acting on a point A. Calculate the magnitude of the resultant force acting on point A.

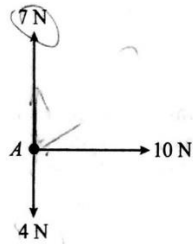


Figure 5.

Signature: Name: Marks: **Q5.**

In the figure below, three forces F_1 , 30 N and W are in equilibrium. What are the values for F_1 and W ?

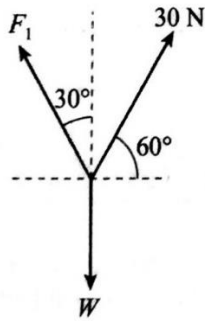
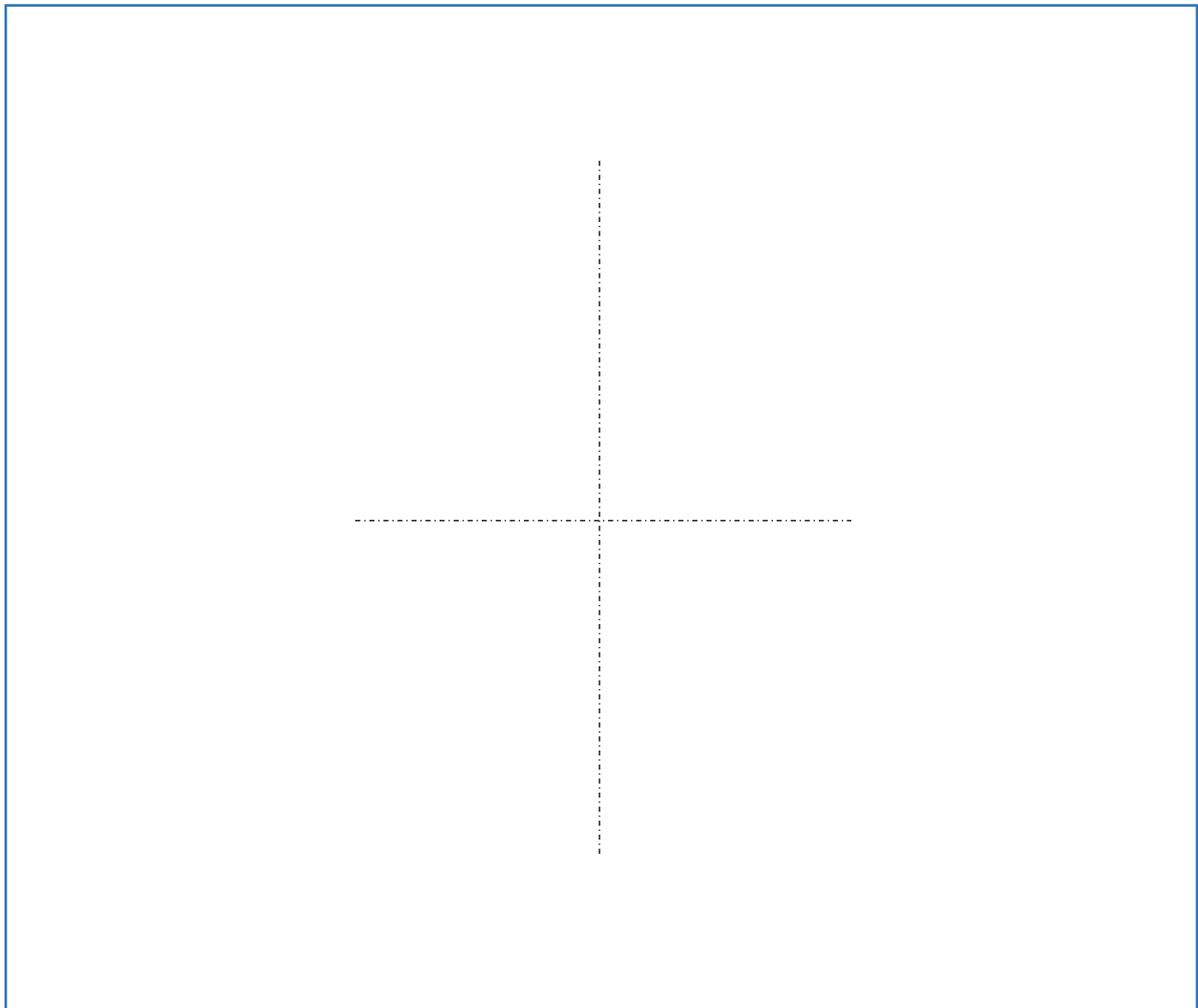


Figure 6



Signature: Name: Marks: **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} .

- What is the impulse acting on the baseball?
- 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.

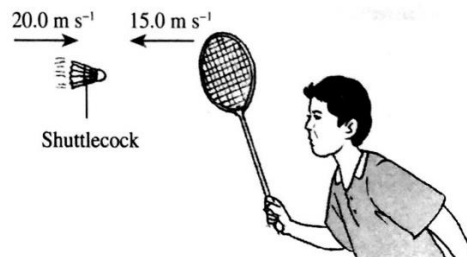


Figure 7

- What is the impulse acting on the racquet?
- Find the force acting on the shuttlecock if the contact time is 0.4s.

Signature: Name: Marks: **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.

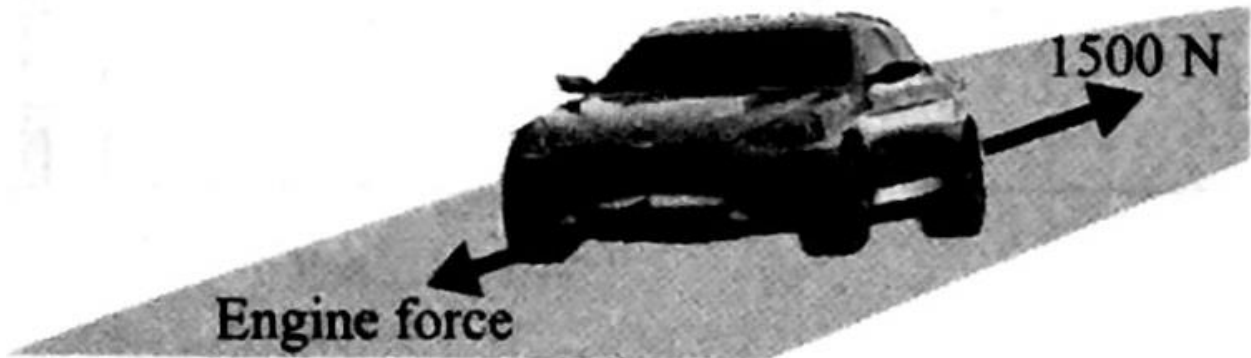


Figure 8

- a)
 - i) Calculate the total distance travelled by the car in 15s.
 - ii) Find the engine force if the velocity is constant at 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.