Phys11 Momentum : Test - 70

1) Define : Momentum -

2) a) A car with a mass of 850 kg travels with a velocity of 7.0 m/s. The momentum is _____ .

b) The velocity of the car is increased to 9.0 m/s in a time of 2.0 seconds. The new momentum is _____. The change in momentum of the car is _____. The impulse is _____ The force exerted by the motor is _____ .

3) a) A bullet is fired from a gun towards the right with a speed of 7.0×10^2 m/s. It has a mass of 15 grams. The momentum is _____ .

b) What is the impulse required to stop the bullet? _____

c) The time the bullet is in the barrel is 0.0010 s. Find the impulse on the gun _____. Find the initial force on the gun. _____ .

4) A ball of mass 2.0 kg moves with a velocity of 4.0 m/s. A force of -6.0 N is applied for 3.0 sec. Find the final velocity. ____

5) Define : The Law of Conservation of Momentum.

6) A train car (mass 15,000 kg) moving right with a velocity of 4.0 m/s collides with a stationary train car (mass 12000 kg) They both move off stuck together. What is the final velocity? _____ .

7) A boy (mass 45 kg) and his father (mass 70. kg) are standing on ice with their skates on. They push each other for 0.50 sec. The boy moves left with a velocity of -2.0 m/s. Find :

a) The impulse on the boy is _____ .

b) The impulse on the father is _____ .

c) The father's velocity is _____

d) The force on the boy is _____

e) The force on the father is _____

8) A 3.0 kg bowling ball moves with a velocity of 5.0 m/s. It collides with a stationary smaller ball with a mass of 1.0 kg. The bowling ball slows down to 3.5 m/s. Find the final velocity the smaller ball. _____

9) A 1.4 kg brick is dropped vertically onto a 4.3 kg cart that is moving with an initial speed of 1.1 m/s. Find the speed of the cart and brick after the brick has been dropped. _____ .

10) A 0.48 kg ball is dropped to the floor. The speed it hits the floor is 6.2 m/s. The time of contact with the floor is 0.085 s. Find the impulse on the ball by the floor if the speed does not change. _____ . Find the force exerted by the floor on the ball. _____ . Find the force exerted by the ball on the floor. _____

Answers : 1) It is the quantity of motion., 2)a) 6.0×10^3 kg m/s, b) 7.7×10^3 kg m/s, 1.7×10^3 kg m/s, 1.7×10^3 N-s, 8.5×10^2 N, 3)a) +11 kg m/s, b) -11 N-s, c) -11 N-s, -1.1×10^4 N, 4) -5.0 m/s, 5) In an isolated system, the total momentum of that system remains constant. ($P_f = P_i$), 6) 2.2 m/s, 7)a) -90. N-s, b) +90. N-s, c) 1.3 m/s, d) -180 N, e) 180 N, 8) 4.5 m/s, 9) 0.83 m/s, 10) 6.0 kg m/s, 70. N, -70. N.