Phys12 Momentum : Quiz - 30

1) A boy throws a 0.40 kg ball with a velocity of 16 m/s [right].

a) The momentum of the ball is _____ .

b) The impulse on the ball is _____ .

c) The time for the throw is 0.50 s. The force is _____ .

d) The ball is caught by another boy. The impulse exerted by this boy is _____ .

2) A 6.0 kg rifle fires a 25 gram bullet at a velocity of 550 m/s. The recoil of velocity of the gun = _____ .

3) A 1.0 kg ball moving at 2.0 m/s, collides with a stationary 3.0 kg ball along the X-axis. The velocity of the 3.0 kg ball after the collision = 1.0 m/s.

a) The final velocity of the 1.0 kg ball = _____ .

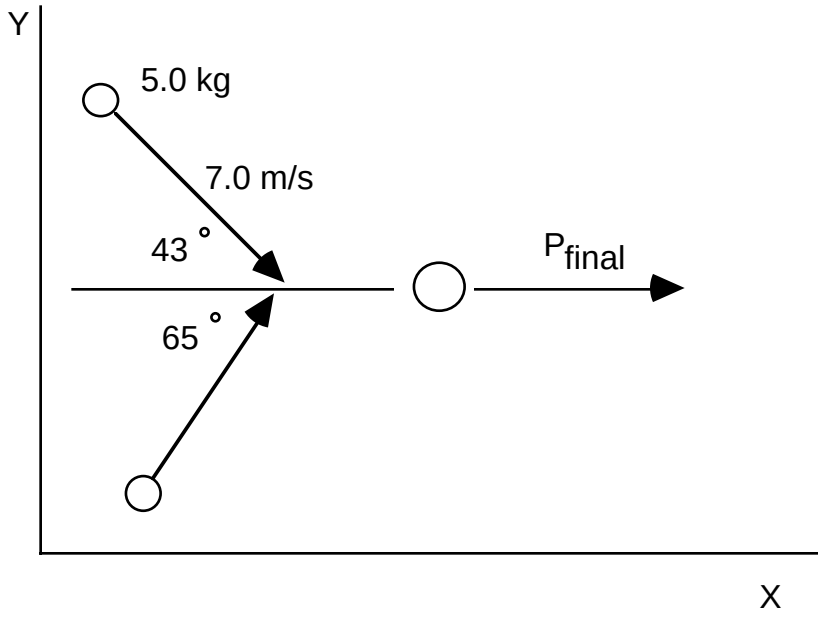
b) Is this collision elastic ? _____ .

4) A 1200 kg car moving west at 8.0 m/s collides with a 950 kg car moving south at 5.0 m/s. The cars lock together. Find the velocity they move off with after the collision.

5) A grenade moves with a momentum of [8,0] kg m/s. It explodes into three pieces. Two of the pieces have the respective momenta of [5,7] and [-3,2] (units are kg m/s). The momentum of the third piece is [,].

6) An object with a momentum of [4.0,0.0] collides obliquely with a stationary object. The second object moves off with a momentum of [3.0,-2.0] (units are kg m/s). The momentum of the first object after the collision is [,].

7) Two objects collide and stick together and move off in the positive X direction. The situation is shown in the diagram below. One of the masses has an unknown mass and speed.



The final momentum of the two connected masses = _____ .

Answers : 1)a) 6.4 kg m/s, b) 6.4 kg m/s, c) 13 N, d) -6.4 kg m/s, 2) -2.3 m/s, 3)a) -1.0 m/s, b) yes, 4) 5.0 m/s [26° S of W], 5) [6,-9] kg m/s, 6) [1.0,2.0], 7) 37 kg m/s [in + X direction].