

## Momentum : Quiz-40

1) A 12 gram bullet is fired from a 2.4 kg gun with a velocity of 270 m/s.

- a) The momentum of the bullet is \_\_\_\_\_ .
- b) The impulse on the bullet delivered by the gun is \_\_\_\_\_ .
- c) The impulse on the gun is \_\_\_\_\_ .
- d) The recoil velocity of the gun is \_\_\_\_\_ .

2) A man driving a car applies the brakes. The momentum was originally 12,000 kg m/s. The final momentum is 9,200 kg m/s. The brakes were applied for 3.8 s.

- a) The impulse is \_\_\_\_\_ .
- b) The force exerted by the brakes is \_\_\_\_\_ .

3) In two dimensions, the initial momentum of a body is [11,-2]. If the final momentum is [8,3], what was the impulse acting on the body. Units are kg m/s or N s.

Impulse = [      ,      ]

4) State the: "**Law of Conservation of Momentum**".

5) An (initially stationary) object explodes into three pieces. The momenta for two of the pieces are; [82,-24] and [-45,70] respectively. Find the momentum of the third piece. (units are kg m/s)

The momentum of the third piece is [      ,      ]

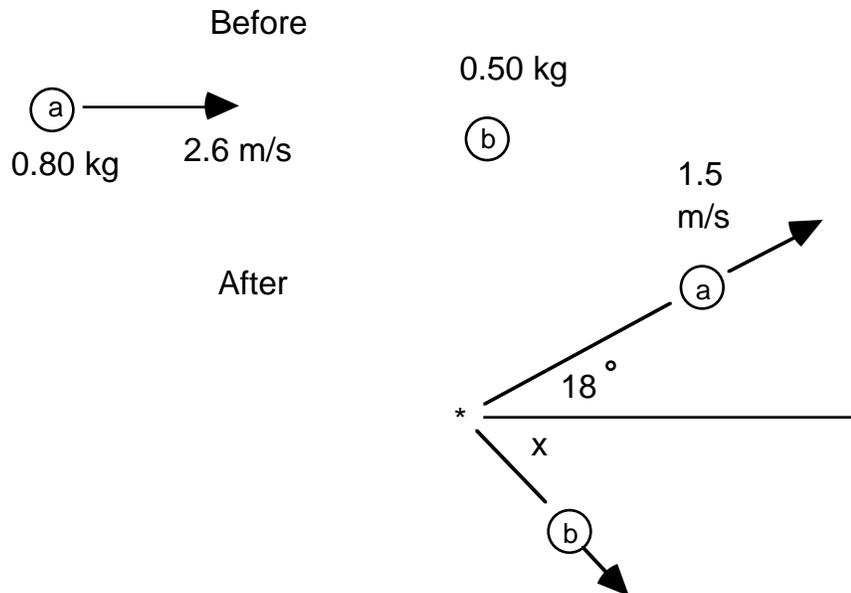
6) A 6.0 kg object moves with a velocity of [-5.7, 2.3] m/s. It hits a stationary 4.5 kg object. They stick together and move off. Friction is zero.

- a) The initial momentum is [      ,      ]

b) The final momentum is [      ,      ]

c) The final velocity is [      ,      ]

7) A moving object collides with a stationary object. Both objects move off as shown. Friction is zero.



a) Find the final velocity of object b. (hint; find its momentum first)

b) Find angle x.

c) Find the energy lost in the collision. (to the nearest 0.1 J)

Answers: 1)a) 3.2 kg m/s, b) 3.2 kg m/s, c) -3.2 N s, d) -1.4 m/s, 2)a) -2800 N s, b) -740 N, 3) [-3, 5] N s, 4) In an isolated system (no external forces), the total momentum remains constant., 5) [-37, -46] kg m/s, 6)a) [-34, 14] kg m/s, b) [-34, 14] kg m/s, c) [-3.3, 1.3] m/s, 7)a) [1.9, -0.74] m/s, b) 22°, c) 0.80 J.