Two identical balls collide head- on .The initial velocity of one is (4 m/s) east, while that of the other is (6 m/s) west , if the collision is elastic ,then the final velocity of each ball after collision is :*
(2 نقطة)

$v_1f = 4, east, v_2f = 6, west$

$v_1f = 5, west, v_2f = 8, east$

$v_1f = 8, east, v_2f = 5, west$

$v_1f = 6, west, v_2f = 4, east$

A particle moving initially with momentum(7.00 **i** - 2.00 **j**) kg m/s is acted on by a force given by

F = (6.00 t **i** – 2.00 **j**) N, where t is in seconds. The momentum (in kg m/s) of the particle after 3 s is:

Select one:

- 27.0 **i** – 8.0 **j**
- 25.0 **i** – 8.0 **j**
- 34.0 **i** – 8.0 **j**
- 18.0 **i** – 6.0 **j**
- -11.0 **i** + 4.0 **j**

A small box of mass m and moving in the positive x-direction with a speed v makes an elastic one-dimensional collision with a box that has three times its mass, and rebounds with a speed 2v in the opposite direction. The initial velocity of the larger box is:

Select one:

(-5/3) v

-v

3 v

(5/3) v

5 v

A small box of mass m and moving in the positive x-direction with a speed v makes an elastic one-dimensional collision with a box that has four times its mass, and rebounds with a speed 5v in the opposite direction. The initial velocity of the larger box is:

Select one:

- (7/2) v
- (-11/4) v
- 14 v
- 11 v
- (-7/2) v

A 2.0-kg ball moving at 6.0 m/s makes a one-dimensional elastic collision with a 4.0-kg ball moving at 6.0 m/s in the *opposite* direction. Calculate the magnitude of the change in momentum (in kg.m/s) of the 4.0-kg ball as a result of this collision:

(A) 16
(B) 24
(C) 32
(D) 8.0
(E) 4.0

*Take g= 9.8 m/s²

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Three masses are placed on the y-axis : 2 kg at y=300 cm, 6 kg at y=150 cm , and 2 kg at y= -100 cm. Find their center of ?mass (in m) *
(2 نقطة)

1.1

0.7

1.3

0.9

A particle moving initially with momentum(6.00 i - 2.00 j) kg m/s is acted on by a force given by

F = (7.00 t i + 2.00 [illegible] N, where t is in seconds. The momentum (in kg m/s) of the particle after 4 s is:

Select one:

- 28.0 i + 8.0 j
- 34.0 i + 6.0 j
- 56.0 i + 6.0 j
- 62.0 i + 6.0 j
- -22.0 i - 10.0 j

A particle moving initially with momentum (2.00 **i** + 4.00 **j**) kg m/s is acted on by a force given by

F = (3.00 t **i** − 4.00 **j**) N, where t is in seconds. The momentum (in kg m/s) of the particle after 4 s is:

Select one:

- 12.0 **i** − 16.0 **j**
- -10.0 **i** + 20.0 **j**
- 26.0 **i** − 12.0 **j**
- 24.0 **i** − 12.0 **j**
- 14.0 **i** − 12.0 **j**

A proton collides elastically with another proton that is initially at rest. the incoming proton has an initial speed of 3.5×10^{5} m/s . After the collision one proton moves off at an angle of 37° to the original direction of motion and the second defects at an angle of ϕ. The angle ϕ is: