

9- A ball of mass 0.15 kg is dropped from rest from a height of 1.25 m. It rebounds from the floor to reach a height of 0.96 m. What impulse was given to the ball by the floor?

- a) 3.4 kg m/s      b) 1.4 kg m/s      c) 4.3 kg m/s      d) 6.7 kg m/s      e) 9.3 kg m/s

10- A 0.1 kg ball is thrown straight up into the air with an initial speed of 15 m/s. Find the momentum of the ball at its maximum height.

- a) 15 kg m/s      b) 1.5 kg m/s      c) 0 kg m/s      d) 150 kg m/s      e) 0.15 kg m/s

11- An object of mass 3 kg, with an initial velocity of  $5 \mathbf{i}$  m/s, collides with an object of mass 2 kg with an initial velocity of  $-3 \mathbf{j}$  m/s and they stick together. Find the final velocity of the composite object.

- a)  $(3 \mathbf{i} - 1.2 \mathbf{j})$  m/s      b)  $(5.1 \mathbf{i} - 2.2 \mathbf{j})$  m/s      c)  $(4.2 \mathbf{i} - 3.2 \mathbf{j})$  m/s      d)  $(1.7 \mathbf{i} - 2.1 \mathbf{j})$  m/s      e)  $(7 \mathbf{i} - 6.2 \mathbf{j})$  m/s

9 11- A volleyball is hit so that its incoming velocity of 4 m/s is changed to an outgoing velocity of -20 m/s. The mass of the volleyball is 0.35 kg. What impulse does the player apply to the ball?

- a) 5.4 kg m/s      b) 7.8 kg m/s      c) -9.6 kg m/s      d) -7.2 kg m/s      e) -8.4 kg m/s

9 12- A man of mass 91 kg jumps straight down from a bridge (with zero velocity in x-direction) into a boat of mass 510 kg. The velocity of the boat is initially 11 m/s. What is the velocity of the boat (in x-direction) after the man lands in it?

- a) 4.3 m/s      b) 18.7 m/s      c) 12.7 m/s      d) 9.3 m/s      e) 7.8 m/s

9 13- A proton collides elastically with another proton initially at rest. The incoming proton has an initial speed of  $3.5 \times 10^5$  m/s and makes a not straightforward collision with the second proton. After the collision, one proton moves at angle of  $37^\circ$  to the original direction of motion with a speed of  $2.8 \times 10^5$  m/s, and the second proton deflects at an angle  $\phi$  to the same axis with a speed of  $2.11 \times 10^5$  m/s. Find the angle  $\phi$ ?

- a)  $37^\circ$       b)  $44^\circ$       c)  $25^\circ$       d)  $33^\circ$       e)  $53^\circ$

9 7- A 2.0 kg object moving with a velocity of 5.0 m/s in the positive x direction strikes and sticks to a 3.0 kg object moving with a speed of 2.0 m/s in the same direction. What is the speed of the two cars after the collision?

a) 9.6 m/s

b) 3.2 m/s

c) 2.4 m/s

d) 5.4 m/s

e) 1.6 m/s



8- A 3.0-kg ball with an initial velocity of  $(4\mathbf{i} + 3\mathbf{j})$  m/s collides with a wall and rebounds with a velocity of  $(-4\mathbf{i} + 3\mathbf{j})$  m/s. What is the impulse exerted on the ball by the wall?

a)  $-24\mathbf{i}$  N.s

b)  $+18\mathbf{j}$  N.s

c)  $+24\mathbf{i}$  N.s

d)  $+8\mathbf{i}$  N.s

e)  $-18\mathbf{j}$  N.s

9 (5) A ball of mass 0.15 kg is dropped from rest to hit the floor with velocity of 5 m/s (down). It rebounds from the floor with velocity of 4.38 m/s (up). What impulse was given to the ball by the floor?

- a) 5.4 kg.m/s      b) 0.09 kg.m/s      c) 1.4 kg.m/s      d) 3.4 kg.m/s      e) 2.3 kg.m/s

9 (6) A 0.2-kg ball is thrown straight up into the air with an initial speed of 20 m/s. Find the momentum of the ball at its maximum height.

- a) 0 J      b) 8 J      c) 2 J      d) 4 J      e) 12 J

9 (7) A 2.0-kg object moving 5.0 m/s collides with and sticks to an 8.0-kg object initially at rest. Determine the kinetic energy lost by the system as a result of this collision.

- a) 5 J      b) 25 J      c) 15 J      d) 0 J      e) 20 J

11- A tennis ball hits a wall so that its momentum change is  $10.5 \text{ kg}\cdot\text{m/s}$ . If the duration of the impact is  $0.0025 \text{ s}$ , what is the average force on the ball?

a)  $4200 \text{ N}$

b)  $5000 \text{ N}$

c)  $2400 \text{ N}$

d)  $3200 \text{ N}$

e)  $6000 \text{ N}$