

1- An arrow shot straight up is moving at 25 ms^{-1} as it passes a point A on its way up. How fast will it be moving when it passes the same point on its way down?

- a) 12.5 ms^{-1} b) 25 ms^{-1} c) 37.5 ms^{-1} d) 50 ms^{-1} e) 100 ms^{-1}

2- A ball rises 20 m as it travels horizontally 30 m, and then begins to drop. What was its initial speed?

- a) 10.2 m/s b) 18.7 m/s c) 24.7 m/s d) 45.2 m/s e) 16.9 m/s

3- A ball is thrown horizontally from a window and hits the ground 2 s later, landing 10 m from the building. How high is the window above the ground?

- a) 10.7 m b) 100.6 m c) 30.4 m d) 40.5 m e) 19.6 m

4- A motorist drives along a straight road at a constant speed of 15 m/s. Just as she passes a parked motorcycle police officer, the officer starts to accelerate at 2 m/s^2 to overtake her. Assuming the officer maintains his acceleration; determine the time it takes the police officer to reach the motorist.

- a) 15 s b) 30 s c) 50 s d) 75 s e) 100 s

5- A ball is thrown straight upward from ground level with an initial velocity of 20 ms^{-1} . At the highest point it reaches,

- a) the acceleration is zero b) the velocity is zero c) the velocity is 20 ms^{-1} d) the acceleration is a minimum e) the velocity is negative

1- An airplane lands with a speed of 63 m/s. If the airplane touches down at position $x_i = 0$ and stops after 2 s, what is its final position?

a) 77 m

b) 63 m

c) 41 m

d) 88 m

e) 113 m

2-On planet X, the acceleration due to the gravity is 2 m/s^2 . If an astronaut can jump 0.5 m vertically on earth, how high can he jump on planet X?

a) 2 m

b) 4 m

c) 0.5 m

d) 1 m

e) 2.5 m

3- If the instantaneous velocity of an object is zero

a) This means the acceleration is constant

b) This tells us nothing about acceleration

c) This means the acceleration is zero

d) This means the acceleration is negative

e) This means the acceleration is positive

(1) A particle starts from rest along the x axis with a constant acceleration. After 2 s it moves from $x=10\text{m}$ to $x=50\text{m}$. If its velocity after the 2 s becomes 10 m/s, what is its acceleration?

a) -15 m/s^2

b) -10 m/s^2

c) 5 m/s^2

d) -20 m/s^2

e) 15 m/s^2

(2) A rocket is fired vertically upward with an initial velocity of 80 m/s. It accelerates upward at 4 m/s^2 until it reaches an altitude of 1000 m. At that point, its engines fail. What is its maximum altitude?

a) 2.1 km

b) 1.0 km

c) 1.4 km

d) 1.7 km

e) 1.9 km

11- An electron, starting from rest and moving with a constant acceleration, travels 750 m in 1.0 s. What is the magnitude of this acceleration?

a) 1.0 km/s^2

b) 1.5 km/s^2

c) 2.5 km/s^2

d) 2.0 km/s^2

e) 0.5 km/s^2

1- A rock is thrown downward from an unknown height above the ground with an initial speed of 10 m/s. It strikes the ground 3.0 s later. Determine the initial height of the rock above the ground.

- a) 14 m b) 75 m c) 44 m d) 60 m e) 30 m
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Q(1): The acceleration of a particle is given as: $a = kr^m v^n$ where k is a dimensionless, r is given in meters and v is given in m/s. Dimensional analysis tells us that m and n respectively are:

a) 2 and 1

b) -1 and 2

c) -2 and -1

d) -1 and -2

Q(2): If there is 39.37 in, in a meter and 100 cm in a meter then the number of inches in 20 cm are:

a) 50.8 cm

b) 50.80 in

c) 2.54 cm

d) 7.87 in

Q(3): A moving box stops with constant acceleration in 2m from an initial velocity of 20m/s. The acceleration of the box is:

a) -200ms^{-2}

b) 200ms^{-2}

c) -100ms^{-2}

d) 100ms^{-2}

Q(4): A stone is thrown vertically upward from a bridge with an initial velocity of 19.6m/s. It strikes the water after 8 seconds. The velocity of the stone when touched the water?

a) -59m/s

b) 98.4m/s

c) -98.4m/s

d) 59m/s

Q(5): A car traveling with a velocity of 30m/s stops with a uniform acceleration in 50 seconds. What is the distance traveled before coming to rest?

a) 750m

b) 1255m

c) 15m

d) 30m

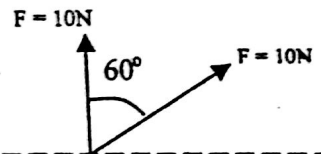
Q(6): The $|R|$ and θ_R of the resultant (R) of the two forces are:

a) 29.5N and 60°

b) 17.3N and 60°

c) 17.3N and 30°

d) zero



Q(7): A box is in free fall. If the air drag is the same as its weight, then the acceleration of the box is:

a) 9.8ms^{-2}

b) 19.6ms^{-2}

c) zero

d) 4.9ms^{-2}

3- A straight track is 1600 m in length. A runner begins at the starting line, runs due east for the full length of the track, turns around, and runs halfway back. The total time for this run is five minutes. What is the runner's average velocity, and what is his average speed?

- a) 2.7 m/s, 8 m/s b) 3 m/s, 9 m/s c) 6 m/s, 8 m/s d) 4.4 m/s, 10 m/s e) 1.5 m/s, 5 m/s

4- A boat is moving with a constant acceleration of 2 m/s^2 . If the initial velocity of the boat is 6 m/s, find its displacement after 8.0 seconds.

- a) 151 m b) 330 m c) 45 m d) 234 m e) 112 m

5- A boy tosses a coin up with an initial speed of 5.00 m/s. In the absence of air resistance, what is the total time the coin is in the air before returning to its release point?

- a) 5 s b) 4 s c) 3 s d) 2 s e) 1 s

6- A tire 0.500 m in radius rotates at a constant rate of 200 rev/min. what is the radial acceleration of a small stone lodged in the tread of the tire (on its outer edge)?

- a) 250 m/s^2 b) 219 m/s^2 c) 320 m/s^2 d) 78 m/s^2 e) 115 m/s^2

7- A boat, starting from rest, maintains a constant acceleration. After a certain time t , its displacement and velocity vectors are r and v . At time $2t$, what would be its displacement and velocity?

- a) r, v b) $2r, 4v$ c) $4r, 4v$ d) $4r, 2v$ e) $2r, 2v$

8- A motorcycle starts from rest and is moving with a constant acceleration. In a certain time interval, its displacement triples. Within the same time interval, by what factor does its velocity change?

- a) 4.23 b) 1.73 c) 6.62 d) 2.15 e) 3.31

1- A motorcycle has a constant acceleration of 2.5 m/s^2 . Both the velocity and acceleration of the motorcycle point in the same direction. How much time is required for the motorcycle to change its speed from 21 to 31 m/s?

a) 9 s

b) 2 s

c) 5 s

d) 8 s

e) 4 s

14- Stone A is thrown upward at the same time as stone B and with half the speed of stone B. How much higher does stone B go than stone A?

a) 16 times

b) 4 times

c) 10 times

d) 25 times

e) 8 times

1- A ball is released from rest from the top of a very tall building; calculate the position of the ball (relative to the release point) after 2 s

- a) 20 m b) 30 m c) 10 m d) -30 m e) -20 m

2- A particle moving in the xy plane with a constant acceleration has a velocity of $\mathbf{v}_i = (3 \mathbf{i} - 2 \mathbf{j})$ m/s at $t = 0$. At $t = 3$ s, the particle's velocity is $\mathbf{v} = (9 \mathbf{i} + 7 \mathbf{j})$ m/s. Find the acceleration of the particle

- a) $(2 \mathbf{i} + 3 \mathbf{j}) \text{ m/s}^2$ b) $(3 \mathbf{i} - 2 \mathbf{j}) \text{ m/s}^2$ c) $(4 \mathbf{i} + 6 \mathbf{j}) \text{ m/s}^2$ d) $(6 \mathbf{i} - 4 \mathbf{j}) \text{ m/s}^2$ e) $(1 \mathbf{i} + 2 \mathbf{j}) \text{ m/s}^2$

3- A ball is thrown horizontally from the top of a 35 m high building. The ball strikes the ground at a point which is 80 m from the base of the building. Find the time the ball takes during its flight.

- a) 4.7 s b) 1.5 s c) 2.6 s d) 5.4 s e) 3.2 s

4- A car travels north at 30 m/s for 30 minutes. It then travels south at 40 m/s for 15 minutes. The total distance the car has traveled and its displacement are:

- a) 18 km, 18 km South. b) 36 km, 36 km South. c) 36 km, 36 km North. d) 90 km, 18 km North. e) 90 km, 36 km North.