

1.

A car A is travelling on a straight level road at a uniform speed of 60 km/h. It is followed by another car B which is moving at a speed of 70 km/h. When the distance between them is 2.5 km, car B is given a deceleration of 20 km/h^2 . After how much time will car B catch up with car A?

1. 1 hr
2. $1/2$ hr
3. $1/4$ hr
4. $1/8$ hr

2.

A jet airplane travelling at the speed of 500 km h^{-1} ejects its products of combustion at the speed of 1500 km h^{-1} relative to the jet plane. What is the speed of the latter with respect to an observer on the ground?

1. 1000 km h^{-1}
2. 500 km h^{-1}
3. 1500 km h^{-1}
4. 2000 km h^{-1}

3.

A car travelling at a speed of 30 km/h is brought to rest at a distance of 8 m by applying brakes. If the same car is moving at a speed of 60 km/h, then it can be brought to rest with the same brakes in:

- (1) 64 m
- (2) 32 m
- (3) 16 m
- (4) 4 m

4.

A balloon starts from the ground from rest with an upward acceleration of 2 m/s^2 . Just after 1 sec, a stone is dropped from it. The time taken by stone to strike the ground is nearly:

- (1) 0.3 s
- (2) 0.7 s
- (3) 1 s
- (4) 1.4 s

5.

Two balls are projected upward simultaneously with speeds of 40 m/s and 60 m/s. Relative position (x) of the second ball w.r.t. the first ball at time $t = 5 \text{ sec}$ is:

[Neglect air resistance].

- (1) 20 m
- (2) 80 m
- (3) 100 m
- (4) 120 m

6.

A body is thrown vertically up from the ground. It reaches a maximum height of 100 m in 5 sec. After what time it will reach the ground from the maximum height position?

- (1) 1.2 sec
- (2) 5 sec
- (3) 10 sec
- (4) 25 sec

7.

A ball is thrown vertically upwards from the top of a tower at 4.9 ms^{-1} . It strikes the pond near the base of the tower after 3 seconds. The height of the tower is:

- (1) 73.5 m
- (2) 44.1 m
- (3) 29.4 m
- (4) None of these

8.

A particle when thrown moves such that it passes from the same height at 2 sec and 10 sec, the height is:

- (1) g
- (2) $2g$
- (3) $5g$
- (4) $10g$

9.

Four marbles are dropped from the top of a tower one after the other with a one-second interval. The first one reaches the ground after 4 seconds. When the first one reaches the ground the distances between the first and second, the second and third and the third and fourth will be, respectively:

- (1) 35 m, 25 m and 15 m
- (2) 30 m, 20 m and 10 m
- (3) 20 m, 10 m and 5 m
- (4) 40 m, 30 m and 20 m

10.

A body is thrown upward and reaches its maximum height. At that position:

1. its velocity is zero and its acceleration is also zero.
2. its velocity is zero but its acceleration is maximum.
3. its acceleration is minimum.
4. its velocity is zero and its acceleration is the acceleration due to gravity.

11.

The effective acceleration of a body, when thrown upwards with acceleration a will be:

- (1) $\sqrt{a - g^2}$
- (2) $\sqrt{a^2 + g^2}$
- (3) $(a - g)$
- (4) $(a + g)$

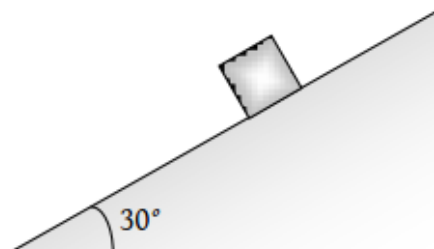
12.

If a body is thrown up with the velocity of 15 m/s, then the maximum height attained by the body is: ($g = 10 \text{ m/s}^2$)

- (1) 11.25 m
- (2) 16.2 m
- (3) 24.5 m
- (4) 7.62 m

13.

The time taken by a block of wood (initially at rest) to slide down a smooth inclined plane 9.8 m long (angle of inclination is 30°) is:



- (1) $\frac{1}{2}$ sec
- (2) 2 sec
- (3) 4 sec
- (4) 1 sec

14.

If a freely falling body travels in the last second a distance equal to the distance travelled by it in the first three seconds, the time of the travel is:

- (1) 6 sec
- (2) 5 sec
- (3) 4 sec
- (4) 3 sec

15.

A ball is released from the top of a tower of height h meters. It takes T seconds to reach the ground. What is the position of the ball in $T/3$ seconds?

- (1) $h/9$ meters from the ground
- (2) $7h/9$ meters from the ground
- (3) $8h/9$ meters from the ground
- (4) $17h/18$ meters from the ground

16.

A person standing on the floor of an elevator drops a coin. The coin reaches the floor in time t_1 if the elevator is moving uniformly and time t_2 if the elevator is stationary. Then:

1. $t_1 < t_2$ or $t_1 > t_2$ depending upon whether the lift is going up or down.
2. $t_1 < t_2$
3. $t_1 > t_2$
4. $t_1 = t_2$

17.

A student is standing at a distance of 50 metres from the bus. As soon as the bus begins its motion with an acceleration of 1 ms^{-2} , the student starts running towards the bus with a uniform velocity u . Assuming the motion to be along a straight road, the minimum value of u , so that the student is able to catch the bus is:

1. 5 ms^{-1}
2. 8 ms^{-1}
3. 10 ms^{-1}
4. 12 ms^{-1}

18.

The distance between two particles is decreasing at the rate of 6 m/sec when they are moving in the opposite directions. If these particles travel with the same initial speeds and in the same direction, then the separation increases at the rate of 4 m/sec. The particles have speeds as:

- (1) 5 m/sec, 1 m/sec
- (2) 4 m/sec, 1 m/sec
- (3) 4 m/sec, 2 m/sec
- (4) 5 m/sec, 2 m/sec

19.

At a metro station, a girl walks up a stationary escalator in time t_1 . If she remains stationary on the escalator, then the escalator takes her up in time t_2 . The time taken by her to walk upon the moving escalator will be:

- (a) $(t_1 + t_2)/2$ (b) $t_1 t_2 / (t_2 - t_1)$ (c) $t_1 t_2 / (t_2 + t_1)$ (d) $t_1 - t_2$

20.

Two trains, each 50 m long are travelling in the opposite direction with velocity 10 m/s and 15 m/s. The time of crossing is:

- (1) 10 sec
- (2) 4 sec
- (3) $2\sqrt{3}$ sec
- (4) $4\sqrt{3}$ sec

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