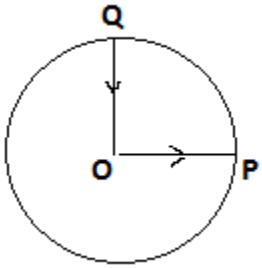
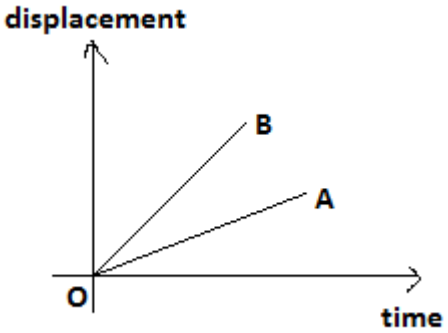
1. A balloon is moving vertically upwards with a velocity of 29 m/s. A stone is dropped from it and it reaches the ground in 10 sec. The height of the balloon when the stone was dropped is (take g = 9.8 ms^{-2})
   (a) 100 m (b) 200 m (c) 400 m (d) 150 m
2. A bullet moving with a speed of 100 m/s can just penetrate two planks of equal thickness. What number of such planks does the bullet penetrate if its speed is doubled?
   (a) 4 (b) 8 (c) 6 (d) 10
3. From the top of a tower two stones whose masses are in the ratio 1 : 2 are projected, one straight up and the other straight down, both with the same speed. Neglecting air resistance,
   (a) Heavier stone hits the ground with greater speed
   (b) Lighter stone hits the ground with greater speed
   (c) Both the stones will have the same speed while hitting the ground
   (d) The speed cannot be determined with the given data



4. A person starts from the centre O of a circular track of radius 1 km, reaches the edge P and then moves along the circumference to return to the centre along QO. If the round trip takes 10 min what is the net displacement and the average speed of the cyclist? (in meter and km/hr)
   (a) 0, 1 (b) $\frac{\pi+4}{2}, 0$ (c) 21.4, $\frac{\pi+4}{2}$ (d) 0, 21.4
5. The maximum height attained by the projectile when thrown an angle θ with the horizontal is found to be half the horizontal range. Then θ is
   (a) $\tan^{-1}\left(\frac{1}{2}\right)$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{6}$ (d) $\tan^{-1} 2$
6. A body is projected vertically upwards. The times corresponding to height h while ascending and while descending are t_1 and t_2 respectively. The velocity of projection is (g is acceleration due to gravity)
   (a) $g\sqrt{t_1 t_2}$ (b) $\frac{g t_1 t_2}{t_1 + t_2}$ (c) $\frac{g\sqrt{t_1 t_2}}{2}$ (d) $\frac{g(t_1 + t_2)}{2}$
7. A body of mass m moving along a straight line covers half the distance with a speed of 2 m/s. The remaining half of the distance is covered in two equal intervals of time with a speed of 3 m/s and 5 m/s respectively. The average speed of the particle for the entire journey in m/s is
   (a) 8/3 (b) 4/3 (c) 16/3 (d) 3/8
8. A train is moving slowly on a straight track with a constant speed of 2 m/s. A passenger in that train starts walking at a steady speed of 2 m/s to the back of the train in the opposite direction to the motion of the train. To an observer standing on the platform right in front of that passenger, the velocity of the passenger appears to be
   (a) 2m/s in the opposite direction of the train
   (b) Zero

(c) 4 m/s in the direction of the train
(d) 4 m/s opposite to the motion of the train

9. A motor boat covers a given distance in 6 hr moving downstream in a river. It covers the same distance in 10 hr upstream. The time it takes to cover the same distance in still water is
(a) 6.5 hr (b) 8 hr (c) 9 hr (d) 7.5 hr



10. The displacement-time graph of two particles A and B are shown. They make angles 30^0 and 45^0 respectively with the X-axis. Ratio of their velocities is
(a) $\sqrt{3}:2$ (b) 1 : 1 (c) 1 : 2 (d) $1:\sqrt{3}$
11. The height y and the distance x along the horizontal plane of a projectile on a certain planet with no atmosphere are given by $y = 8t - 5t^2$ meter and $x = 6t$ meter where t is in seconds. The velocity with which the projectile is projected in m/s is
(a) 6 (b) 8 (c) 10 (d) 14
12. A body of mass 5 kg is thrown vertically up with a kinetic energy of 490 J. The height at which the kinetic energy becomes half of the original value is ($g = 9.8\ ms^{-2}$)
(a) 5 m (b) 2.5 m (c) 10 m (d) 12.5 m
13. A person throws balls into air vertically upwards at regular intervals of 1 sec. The next ball is thrown when the velocity of the previous has become zero. The height to which the balls rise is ($g = 10\ ms^{-2}$)
(a) 5 m (b) 10 m (c) 7.5 m (d) 20 m
14. In a lift moving up with an acceleration of 5 ms^{-2} a ball is dropped from a height of 1.25 m. The time taken by the ball to hit the floor of the lift is nearly ($g = 10\ ms^{-2}$)
(a) 0.3 s (b) 0.2 s (c) 0.16 s (d) 0.4 s
15. A projectile is projected at 10 m/s at an angle of 60^0 with the horizontal. After some time its velocity makes an angle of 30^0 with the horizontal. Its speed at that instant in m/s is
(a) $\frac{10}{\sqrt{3}}$ (b) $10\sqrt{3}$ (c) $\frac{5}{\sqrt{3}}$ (d) $5\sqrt{3}$
16. A car moves from A to B with a speed of 30 km/hr and returns from B to A with a speed of 20 km/hr. What is the average speed of the car in km/hr?
(a) 25 (b) 24 (c) 50 (d) 10
17. A body starts from rest and moves with a constant acceleration for t seconds. It travels a distance S_1 in the first half of time and S_2 in the next half. Then
(a) $S_1 = S_2$ (b) $S_2 = 2S_1$ (c) $S_2 = 3S_1$ (d) $S_2 = 4S_1$
18. A stone is thrown at a speed of 30 m/s making an angle of 45^0 with the horizontal. What is the maximum height reached by the stone? ($g = 10\ ms^{-2}$)
(a) 30 m (b) 22.5 m (c) 15 m (d) 10 m