

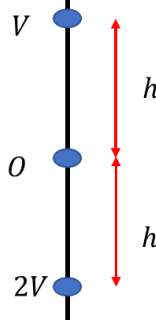


## DPP - 3

- Q 1. A ball is thrown vertically upwards in air. If the air resistance cannot be neglected (assume it to be directly proportional to velocity), then the acceleration of the ball at the highest point will be:
- (a) 0                      (b)  $g$                       (c)  $> g$                       (d)  $< g$
- Q 2. A ball is dropped from the roof of a tower of height  $h$ . The total distance covered by it in the last second of its motion is equal to the distance covered by it in first three seconds. The value of  $h$  in metres is: ( $g = 10 \text{ m/s}^2$ )
- (a) 125                      (b) 200                      (c) 100                      (d) 80
- Q 3. A ball is thrown up with a certain velocity so that it reaches a height  $h$ . Find the ratio of the times in which it is at  $h/3$ .
- (a)  $\frac{\sqrt{2}-1}{\sqrt{2}+1}$                       (b)  $\frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$                       (c)  $\frac{\sqrt{3}-1}{\sqrt{3}+1}$                       (d)  $\frac{1}{3}$
- Q 4. A particle is projected vertically upward with initial velocity  $25 \text{ ms}^{-1}$ . During third second of its motion, which of the following statement is correct? ( $g = 10 \text{ m/s}^2$ )
- (a) displacement of the particle is 30 m  
(b) distance covered by the particle is 30 m  
(c) distance covered by the particle is 2.5 m  
(d) none of these
- Q 5. A stone is allowed to fall from the top of a tower and cover half the height of the tower in the last second of its journey. The time taken by the stone to reach the foot of the tower is ( $g = 10 \text{ m/s}^2$ )
- (a)  $(2 - \sqrt{2})\text{s}$                       (b) 4 s  
(c)  $(2 + \sqrt{2})\text{s}$                       (d)  $(2 \pm \sqrt{2})\text{s}$
- Q 6. A particle is projected in vertically upward direction its maximum height is  $H$ , and total time of flight is  $T$ . Find Its height after time  $\frac{3T}{4}$  after projection
- (a)  $\frac{H}{4}$                       (b)  $\frac{H}{2}$                       (c)  $\frac{2H}{3}$                       (d)  $\frac{3H}{4}$
- Q 7. A juggler maintains four balls in motion, making each of them to rise a height of 20 m from his hand. What time interval should he maintain, for the proper distance between them? ( $g = 10 \text{ m/s}^2$ )
- (a) 3 s                      (b)  $\frac{3}{2}$  s                      (c) 1 s                      (d) 2 s



- Q 8. A particle is dropped from point A at a certain height from ground. It falls freely and passes through three points B, C and D with  $BC = CD$ . The time taken by the particle to move from B to C is 2 s and from C to D is 1s. The time taken to move from A to B is
- (a) 0.5 s                      (b) 1.5 s                      (c) 0.75 s                      (d) 0.25 s
- Q 9. From the top of a tower of height 200 m, a ball A is projected up with 10 m/s and two seconds later another ball B is projected vertically down with the same speed. Then : (Take  $g = 10 \text{ m/s}^2$ )
- (a) both a and b will reach the ground simultaneously  
(b) the ball a will hit the ground 2 seconds later than b hitting the ground  
(c) both the balls will hit the ground with the same velocity  
(d) both (a) & (c)
- Q 10. A particle is released from rest from a tower of height  $3h$ . The ratio of times to fall equal heights  $h$ , i.e.,  $t_1 : t_2 : t_3$  is
- (a)  $\sqrt{3} : \sqrt{2} : 1$                       (b)  $3 : 2 : 1$   
(c)  $9 : 4 : 1$                       (d)  $1 : (\sqrt{2} - 1) : (\sqrt{3} - \sqrt{2})$
- Q 11. A body when projected vertically up, covers a total distance  $D$  during its time of flight. If there were no gravity, the distance covered by it during the same time is equal to
- (a) 0                      (b)  $D$                       (c)  $2D$                       (d)  $4D$
- Q 12. A particle is projected in vertically upward direction. In last two seconds of its downward motion it travels distance 60 m. Find total time of flight? ( $g = 10 \text{ m/s}^2$ )
- (a) 4 s                      (b) 6 s                      (c) 8 s                      (d) 10 s
- Q 13. Two particles A & B are projected from same point with same speed 40 m/s in vertically upward direction. B is projected 2 seconds after A, find height of particles at the instant of their collision? ( $g = 10 \text{ m/s}^2$ )
- (a) 20 m                      (b) 35 m                      (c) 60 m                      (d) 75 m
- Q 14. A ball is projected in upward direction. During its motion when ball is at  $h$  metre high from a point O, its velocity is  $v$ . When it is  $h$  m below O, its velocity is  $2v$ . Find the maximum height from O it will acquire



- (a)  $2h/3$                       (b)  $5h/3$   
(c)  $3h/2$                       (d)  $2h$



- Q 15. From a tap 10 m high drops fall at regular intervals. When the first drop reaches the ground, the 5<sup>th</sup> drop is about to leave the tap. Find the separation between 2<sup>nd</sup> and 3<sup>rd</sup> drops. ( $g = 10 \text{ m/s}^2$ )  
(a)  $35/8 \text{ m}$  (b)  $31/8 \text{ m}$   
(c)  $27/8 \text{ m}$  (d) none of these
- Q 16. If air provides a constant retardation  $6 \text{ m/s}^2$  to a ball projected in vertically upward direction. Find ratio of time of ascent to time of descent ? ( $g = 10 \text{ m/s}^2$ )  
(a)  $\frac{1}{2}$  (b) 2 (c) 1 (d) none of these
- Q 17. A particle is thrown vertically upwards from ground. It takes time  $t_1$  to reach a height  $h$ . It continues to move and takes time  $t_2$ , to reach the ground. Its maximum height is  
(a)  $\frac{g}{2} \frac{t_1 + t_2}{2}$  (b)  $\frac{g}{2} \sqrt{t_1^2 + t_2^2}$   
(c)  $\frac{g}{8} (t_1 + t_2)^2$  (d)  $g(t_1^2 + t_2^2)$
- Q 18. A ball is projected in upward direction at  $t = 0$ . At  $t = 6 \text{ sec}$  and at  $t = 8 \text{ sec}$ , it is at same height  $h$  from ground. Find  $h$ ?  
(a) 240 m (b) 350 m (c) 170 m (d) 420 m

Solution on Website:-

<https://physicsaholics.com/home/courseDetails/52>

Solution on YouTube:-

<https://youtu.be/FcmpOCSBRt8>

## Answer Key

<b>Q.1 b</b>	<b>Q.2 a</b>	<b>Q.3 b</b>	<b>Q.4 c</b>	<b>Q.5 d</b>
<b>Q.6 d</b>	<b>Q.7 c</b>	<b>Q.8 a</b>	<b>Q.9 d</b>	<b>Q.10 d</b>
<b>Q.11 c</b>	<b>Q.12 c</b>	<b>Q.13 d</b>	<b>Q.14 b</b>	<b>Q.15 d</b>
<b>Q.16 a</b>	<b>Q.17 c</b>	<b>Q.18 a</b>		