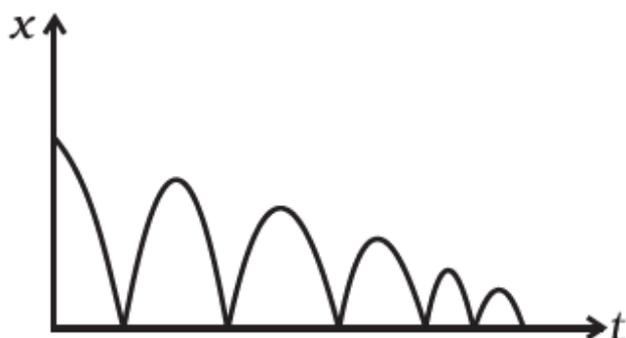
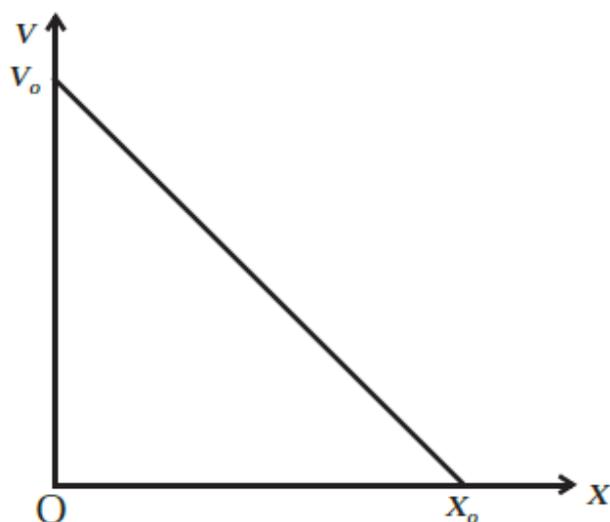


Class XI – PHYSICS

1. A ball is dropped and its displacement vs time graph is as shown in Fig. below (displacement x is from ground and all quantities are +ve upwards). (a) Plot qualitatively velocity vs time graph. (b) Plot qualitatively acceleration vs time graph.



2. A particle executes the motion described by $x(t) = x_0(1 - e^{-\gamma t})$; $t \geq 0, x_0 > 0$. (a) Where does the particle start and with what velocity? (b) Find maximum and minimum values of $x(t), v(t), a(t)$. Show that $x(t)$ and $a(t)$ increase with time and $v(t)$ decreases with time. [Ans. $x=0, v=\gamma x_0$]
3. The velocity-displacement graph of a particle is shown in Fig. below. (a) Write the relation between v and x . (b) Obtain the relation between acceleration and displacement and plot it.



4. A man runs across the roof-top of a tall building and jumps horizontally with the hope of landing on the roof of the next building which is of a lower height than the first. If his speed is 9 m/s, the (horizontal) distance between the two buildings is 10 m and the height

difference is 9 m, will he be able to land on the next building? (take $g = 10 \text{ m/s}^2$) **[Yes-he will land.]**

5. An object, moving with a speed of 6.25 m/s, is decelerated at a rate given by $\frac{dv}{dt} = -2.5\sqrt{v}$, where v is the instantaneous speed. Calculate the time taken by the object, to come to rest?
[Ans. 2 sec]
6. The relation between time t and distance x is $t = ax^2 + bx$, where a and b are constants. Find the acceleration.
[Ans. $-2av^3$]
7. A vector \mathbf{Q} which has a magnitude of 8 is added to vector \mathbf{P} which lies along x-axis. The resultant of two vectors lies along y-axis and has magnitude twice that of \mathbf{P} . Find the magnitude of \mathbf{P} .
[Ans. $8/\sqrt{5}$]
8. A particle is moving eastwards with a velocity of 5 m s^{-1} . In 10s, the velocity changes to 5 m s^{-1} northwards. Find the average acceleration in this time.
[Ans. $1/\sqrt{2} \text{ m/s}^2$ towards north west.]
9. A parachutist after bailing out falls 50 m without friction. When parachute opens, It decelerates at 2 m s^{-2} . He reaches the ground with a speed of 3 m/s. At what height, did he bail out?
[Ans. 293 m]
10. From a tower of height H , a particle is thrown vertically upwards with a speed u . The time taken by the article, to hit the ground, is n times that taken by it to reach the highest point of its path. Find the relation between H, u and n ?
[$2Hg = nu^2(n-2)$]