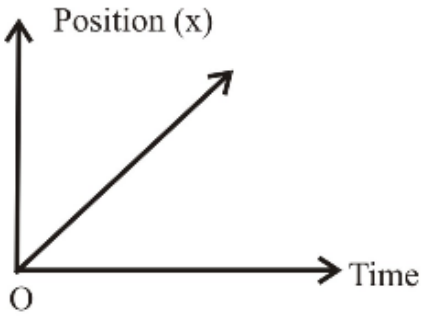
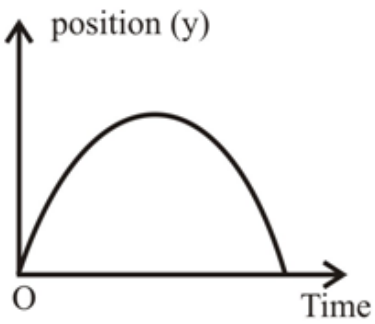
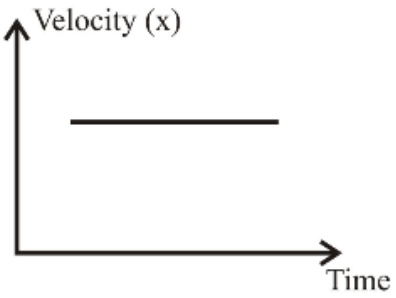
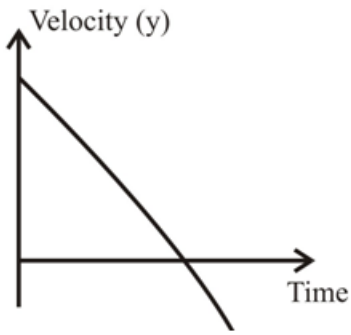
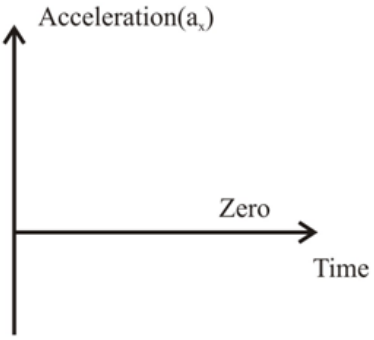
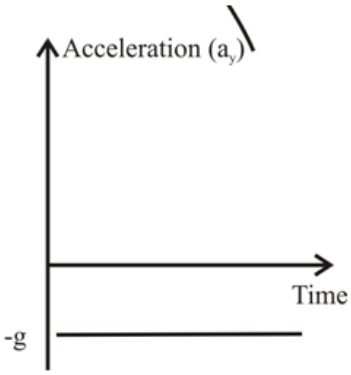












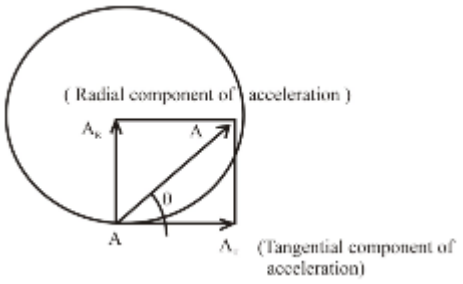
DQ 3.10:
In a uniform circular motion, what are the *average* velocity and *average* acceleration for one revolution? Explain.

Since velocity and acceleration are vector quantities the rotation of these vectors is 360 degrees in one revolution and the average is ZERO. Because it changes direction as it goes around the circle.

DQ 3.11:
In uniform circular motion, how does the acceleration change when the speed is increased by a factor of 3? When the radius is decreased by a factor of 2?

The acceleration *'a'* is proportional to the square of the speed. So if the speed is increased by a factor of 3, the acceleration increases by a factor of 9.
Since $a = \frac{v^2}{r}$ The acceleration is inversely proportional to the radius, so when the radius is decreased by a factor of 2, the acceleration increases by a factor of 2.

DQ 3.12:
In uniform circular motion, the acceleration is perpendicular to the velocity at every instant. Is this still true when the motion is not uniform – that is, when the speed is not constant?

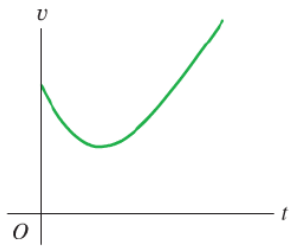


It is not true that the acceleration is perpendicular to the velocity at any instant in non-uniform circular motion.

In fact, the acceleration *'a'* will create an angle ϑ with tangential direction. When the bodies are moving at the corners, the speed varies gradually.

DQ 3.16:
A stone is thrown into the air at an angle above the horizontal and feels negligible air resistance. What graph best depicts the stone's *speed v* as a function of time *t* while it is in the air?

(d)



The speed of the stone is the magnitude of the velocity. It starts with some positive value, decreases but does not go to zero (since the y-component goes to zero at the top of the trajectory, but the x-component remains the same) and then increases (since the y-component increases in magnitude as it falls).