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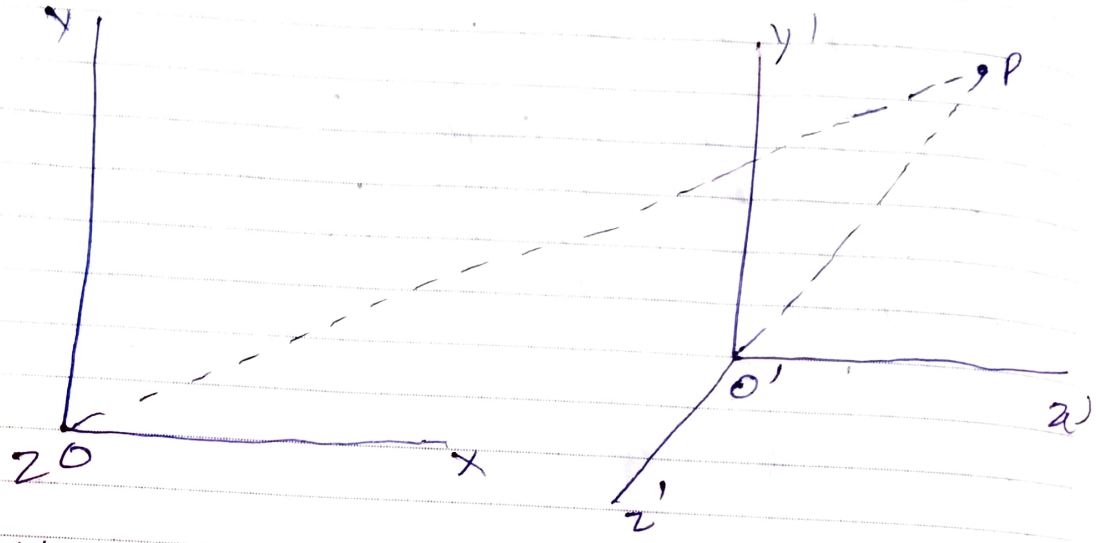
consider a body at point A having co-ordinates (x, y, z) in the frame of reference S. If the body always remain at A, it will be at rest relative to the frame of reference S. But if it moves to point B having co-ordinate (x_1, y_1, z_1) in certain time duration then it is said to be in motion relative to the frame of reference S.



Suppose motion of the particle is observed by observers O and O' as shown in fig. If O and O' are at rest with respect to each other, they will observe the same motion of P. But if O and O' are in relative motion their observation of motion of P would certainly differ.

Any object can be located or any event can be described using a co-ordinate system. This co-ordinate system is called

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Frame of reference.

There are two types of Frame of reference.

(1) Inertial Frame of reference →

An inertial frame is defined as a reference frame in which the law of inertia holds true i.e Newton's first law. such a frame is also called un-accelerated frame e.g. a distance star can be selected as standered inertial frame of reference.

(2) Non - inertial Frame →

It is defined a set of co-ordinate moving with acceleration relative to some other frame in which the law of inertia does not hold true. It is an accelerated frame. e.g, applications of brakes to a moving train makes it an accelerated frame. so it becomes a non inertial frame

Example →

Label the types of reference fram

(1) A train moving with constant velocity

(2) The rotating earth.

(3) A turning car moving with constant speed

The principle of Relativity →

States that the basic laws of physics are the same in all inertial frame of reference. That is, as you go from one reference frame to another, things like force, mass, length and time does not change. These quantities are said to be absolute.