**PHY101 GDB No.1 Spring 2021**

**BC200403287**

v

**Question**:

“Is it true or wrong to say that an automobile at rest can be accelerating very fast? Either yes or no explain it with mathematical background.”

**Acceleration*:***

***“The time rate of change of velocity of an object is called acceleration.”***

*If* ***∆v*** *be the change in velocity in time interval* ***∆t*** *then,*

***a = ∆v / ∆t*** *where,* ***∆****v =vf – vi*

*The velocity can be changed either by changing its magnitude or direction or both. When an object moves in a circular path at constant speed and then stopped, it is still accelerating due to constant acceleration.*

**Denoted by***:* a.

**Unit**: *The S.I unit of acceleration is* ***m/sec2.***

***GDB Solution:***

*The given statement is true, because while at rest there is no change in speed and direction of an automobile but constant acceleration can occur upon automobile.*

***Mathematically:***

*As we know that the geometric significance of derivative is:*

**x = xo + vo t+ 1/2 at^2**

*Applying derivative formulae to above equation, we get:*

**x = xo + vo t+ 1/2 at^2**

**dx/dt = 0 + vo + 1/2 a(2t)**

**⟹ v = dx/dt = vo + at**

**⟹ dv/dt =0 +a = a**

*where,* ***a*** *is constant acceleration.*

*So, applying the same method to an automobile while at rest, the automobile can accelerate due to constant acceleration.*

***v = at***

*but****, dv / dt = a*** *which is not equal to 0.*

**Conclusion**:

*Yes, it is* ***true*** *that while at rest an automobile can be accelerating very fast.*