

B. Sc Physics; Part-I  
Paper-I, Group-B

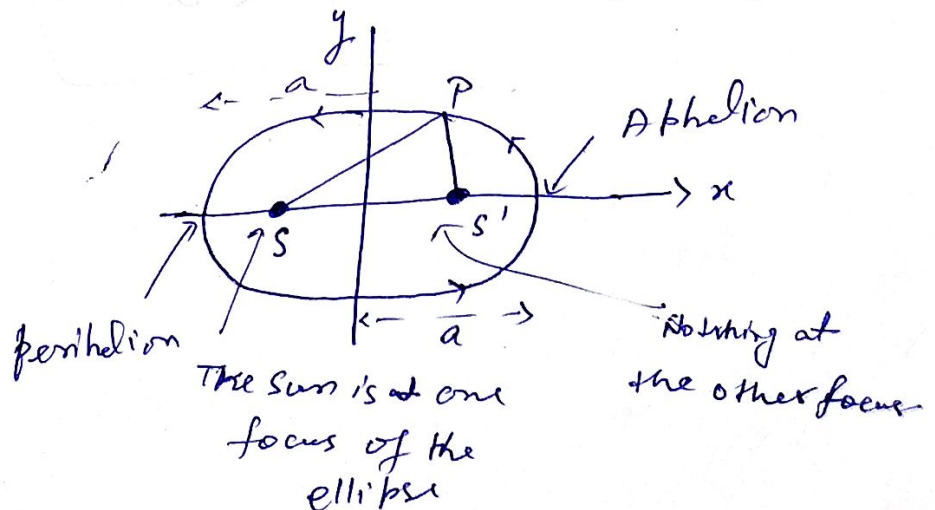
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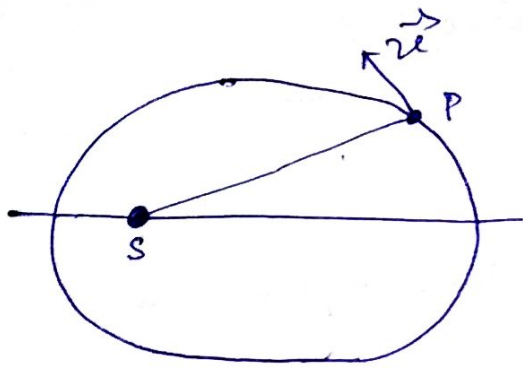
Kepler's laws: -

- Law discusses about planetary motion
- Planet - derived from a Greek word meaning 'wanderer'.
- Kepler's law - three empirical laws which accurately described the motion of the planet discovered by Johannes Kepler between 1601 and 1619.

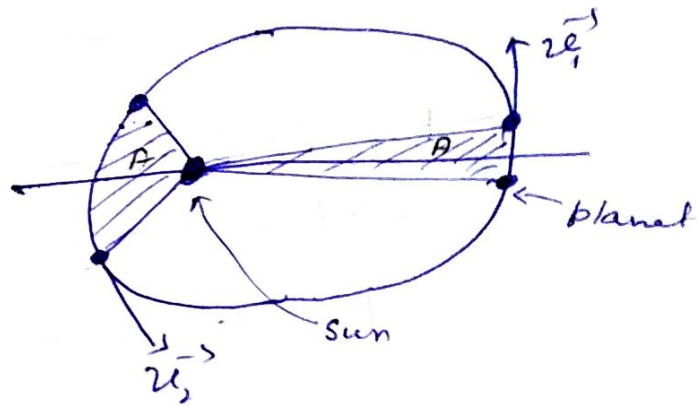
Three laws are:

- i) Each planet moves in an elliptical orbit, with the Sun at one focus of the ellipse.
- ii) A line from the Sun to a given planet sweeps out equal areas in equal times.
- iii) The periods of the planets are proportional to the  $\frac{3}{2}$  power of the major axis lengths of their orbits.





$SP \rightarrow$  line from Sun (S) to the planet



The line  $SP$  sweeps out equal area in equal times.

Mathematical form of Second law:

$$\frac{dA}{dt} = \frac{L}{2m}$$

↑  
Sector velocity

$L \rightarrow$  angular momentum

Sector velocity is constant  $\rightarrow$  angular momentum is conserved

Third Law:

$$T \propto a^{3/2}$$