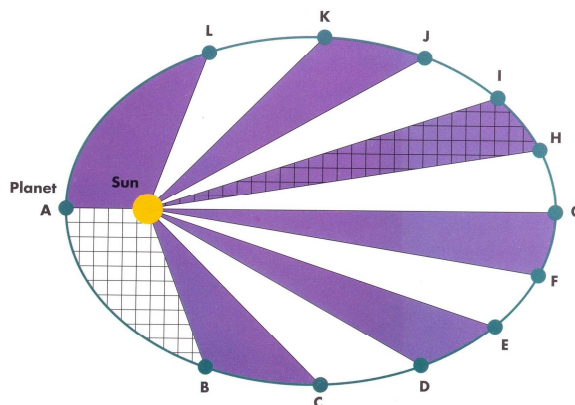


EXAMEN : Baccalauréat général - Série S-SVT ou S-SI	Session 2013
ÉPREUVE : Evaluation spécifique de Langue en section européenne	
PHYSIQUE-CHIMIE en langue ANGLAISE	
Thème : « Mécanique : lois de Newton et de Kepler »	Sujet n°16

Johannes Kepler published his first two laws in 1609, having found them by analyzing the astronomical observations of Tycho Brahe. Kepler discovered his third law many years later, and it was published in 1619. At the time, Kepler's laws were radical claims; the prevailing belief (particularly in epicycle-based theories) was that orbits were perfect circles. Most of the planetary orbits can be rather closely approximated as circles, so it is not immediately evident that the orbits are ellipses. Detailed calculations for the orbit of the planet Mars first indicated to Kepler its elliptical shape, and he inferred that other heavenly bodies, including those farther away from the Sun, have elliptical orbits too. Kepler's laws and his analysis of the observations on which they were based challenged the long-accepted geocentric models of Aristotle and Ptolemy, and generally supported the heliocentric theory of Nicolaus Copernicus (although Kepler's ellipses likewise did away with Copernicus's circular orbits and epicycles), by asserting that the Earth orbited the Sun, proving that the planets' speeds varied, and using elliptical orbits rather than circular orbits with epicycles.



Some eight decades later, Isaac Newton proved that relationships like Kepler's would apply exactly under certain ideal conditions that are to a good approximation fulfilled in the solar system, as consequences of Newton's own laws of motion and law of universal gravitation.

http://en.wikipedia.org/wiki/Kepler_laws

Questions

1a : Present and comment on the document focusing on Kepler's law.

1b : What can you tell about gravitation law and Newton's laws ?

2 : What are the applications using Kepler's laws?