

StellarXplorers IV National Finals Quiz Study Guide

For National Finals Quiz will be an individual 10-question Quiz taken by all team members. This quiz will be a **closed-book quiz**, administered using the ClassMarker Web-based testing. Each student will have 10 minutes to complete the Quiz. The team score will be the average score of all team members.

Section 1.1: Know the mission(s) of the following spacecraft: Pioneer, Mariner, Viking, and Magellan.

Section 2.1: Know the key contributions of the Renaissance astronomers Nicholas Copernicus, Tycho Brahe, and Johannes Kepler.

Section 4.3: Know how the Total Mechanical Energy, Kinetic Energy, and Potential Energy of a person changes when a person is riding on a playground swing.

Section 5.1

Know how each of the following six Classical Orbital Elements (COE) describe an orbit and a spacecraft's location within the orbit: Semi-major Axis (a), Eccentricity (e), Inclination (i), Right Ascension of the Ascending Node (RAAN) (Ω), Argument of Perigee (ϵ), True Anomaly (v)

Know the relationship between an orbit's shape and the orbit's eccentricity.

Section 5.2: Know the characteristics of the following types of orbits: Geostationary, Geosynchronous, Semi-synchronous, Sun-synchronous, and Molniya

Section 5.3: Know the relationship between the inclination of an orbit and its ground track.

Section 9.2: Understand how the orbit inclination determines the number of launch windows per day from a specified launch site, using the textbook definition of Launch Window.

Section 14.1: Know the definitions of the following terms: effective exhaust velocity, impulse, total impulse, specific impulse.

Section 14.2: Know how the Hall Effect Thruster and Pulsed Plasma Thruster work.