

StellarXplorers IV Qualifying Round 1 (QR1) Quiz

ANSWER KEY

1. How fast must an object in space be traveling (assuming there is no air resistance on the object) so that its path would exactly match the Earth's curvature? [Section 4.1]
 - a. 7.9 km/s
 - b. 9.8 km/s
 - c. 16.1 km/s
 - d. 32.2 m/s
2. _____ is the tendency of an object to stay at rest, or remain in motion, unless acted upon by an outside force. [Section 4.2]
 - a. Mass
 - b. Gravity
 - c. Inertia
 - d. Momentum
3. "The time rate of change of an object's momentum equals the applied force" is _____. [Section 4.2]
 - a. Newton's First Law of Motion
 - b. Newton's Second Law of Motion
 - c. Newton's Third Law of Motion
 - d. Newton's Principle of Inertia
4. Object A has a mass of 2 kg. and is traveling in a straight line at 75 km/s. Object B has a mass of 0.3 kg. and is traveling at 500 km/s. Which object has more linear momentum? [Section 4.2]
 - a. Object A
 - b. Object B
 - c. They have the same momentum
 - d. Need more information to determine which has more momentum
5. An object's resistance to spin is called _____. [Section 4.2]
 - a. Moment Arm
 - b. Angular Momentum
 - c. Moment of Inertia
 - d. Angular Velocity

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6. Newton's Law of Universal Gravitation says the force of gravity is proportional to the distance between two masses. How are they related? [Section 4.2]
- Force is directly proportional to the distance
 - Force is inversely proportional to the square root of the distance
 - Force is inversely proportional to the square of the distance between them
 - Force is directly proportional to the square of the distance between them
7. Two ice skaters are stopped and facing each other. Both skaters have the same mass. Skater A pushes Skater B and both begin moving in opposite directions. What happens? [Section 4.3]
- Skater A stays in the same spot while Skater B moves away from Skater B.
 - Skater B stays in the same spot while Skater A moves away from Skater B.
 - Skaters A and B both move away from each other at the same speed
 - Cannot determine without more information
8. A person is riding on a swing. At what point will the Total Mechanical Energy be the greatest? [Section 4.3]
- At the swing's highest point
 - At the swing's lowest point
 - At a point somewhere between the highest and lowest point
 - The Total Mechanical Energy is a constant
9. The specific mechanical energy of a spacecraft in orbit depends on _____ . [Section 5.1]
- Spacecraft mass
 - Spacecraft velocity
 - Size of the orbit
 - All three values
10. For a satellite flying an elliptical orbit around Earth, what is the closest point to Earth? [Section 5.1]
- Apogee
 - Perigee
 - Ascending Node
 - Descending Node

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11. Which of the six Classical Orbital Elements (COE) describes the shape of an orbit?

[Section 5.1]

- a. Eccentricity (e)
- b. Semi-Major Axis (a)
- c. True Anomaly (v)
- d. Right Ascension of the Ascending Node (Ω)

12. Which of the six Classical Orbital Elements (COE) determines the spacecraft's location within the orbit? [Section 5.1]

- a. Eccentricity (e)
- b. Semi-Major Axis (a)
- c. True Anomaly (v)
- d. Right Ascension of the Ascending Node (Ω)

13. What type of orbit has an Eccentricity of 0.01 ($e = 0.01$)? [Section 5.1]

- a. Circular
- b. Elliptical
- c. Parabolic
- d. Hyperbolic

14. A satellite has an Inclination of 120° ($i = 120^\circ$). What type of orbit is this? [Section 5.1]

- a. Retrograde
- b. Polar
- c. Direct
- d. Equatorial

15. A satellite has an Inclination of 90° ($i = 90^\circ$). What type of orbit is this? [Section 5.1]

- a. Retrograde
- b. Polar
- c. Direct
- d. Equatorial

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16. A satellite is in a retrograde, low-Earth orbit (LEO) and an inclination of 100° . In what type of orbit is the satellite? [Section 5.1]
- Sun Synchronous
 - Semi-Synchronous
 - Molniya
 - Geostationary
17. A satellite is in a highly elliptical orbit with a Period of 12 hours. In what type of orbit is the satellite? [Section 5.1]
- Sun Synchronous
 - Semi-Synchronous
 - Molniya
 - Geostationary
18. Which of the following type of satellites would be in a Semi-Synchronous orbit? [Section 5.1]
- ISS
 - Communications
 - GPS
 - Remote Sensing
19. A satellite is in a low Earth, direct orbit. Due to the Earth's rotation, the ground track of each subsequent orbit moves further _____. [Section 5.3]
- North
 - South
 - East
 - West
20. The southernmost point of a satellite's ground track is at 35° S latitude. What do we know about this orbit? [Section 5.3]
- It is a direct orbit
 - The inclination of the orbit is 35°
 - The orbit is circular
 - All of the above