

Practice Problem Set

Not to be turned in for grades!

Question 1

What are Kepler's Three Laws of Planetary Motion?

Question 2

A bowling ball with a mass of 5.5 kg is placed 75 cm away from a mysterious alien artifact. The artifact exerts a gravitational force of attraction on the bowling ball which has a magnitude of 0.4 N. What is the mass of the mysterious alien artifact?

Question 3

What are the accelerations due to gravity for objects in free fall on the surfaces of the following planets: (a) Mars, (b) Venus, (c) Mercury? Planetary data can be found on page 382 of your textbook (or on Wikipedia).

Question 4

The escape velocity from the surface of Planet X is 12.5 km/s. A spacecraft with mass 2500 kg is sitting at rest on the surface of Planet X. What is the minimum amount of energy required to lift the spacecraft out of the gravitational field of Planet X?

Question 5

A metal disc with a density which is twice the density of water has a radius of 2.5 cm and a thickness of 12 mm. It is suspended from its center by a thin vertical wire. The disc is then twisted to form a torsional pendulum with a period of 0.35 s. What is the torsion constant of the wire?