

PracTest UCM Gravity

ID#

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$$G = 6.67 \times 10^{-11} \text{N} \cdot \text{m}^2 / \text{kg}^2$$

1. A particle in UCM has an orbital speed of 10m/s and an orbital radius of 5m. What is its orbital period?
A. 0.32s B. 0.5s C. 2.0s D. 3.1s
2. What is the speed of an object in UCM whose acceleration is 4m/s^2 and whose orbital radius is 9m?
A. 0.44m/s B. 0.67m/s C. 1.5m/s D. 6m/s E. 36m/s
3. The force needed to keep an Olympic bobsled in a circular path as it makes a turn on the icy track is provided by a component of
A. centripetal B. friction C. normal
D. inertia E. lift F. weight (gravitational force)
4. The force needed to keep a bird in a circular path as it makes a turn is provided by a component of
A. centripetal B. friction C. normal
D. inertia E. lift F. weight (gravitational force)

A mass m is whirled around in circular motion. The radius of the circle is r , the speed of the mass is v , and the centripetal force (tension in the string) is F .

5. If the mass were doubled, the force required to maintain UCM would be
A. $F/4$ B. $F/2$ C. F D. $F\sqrt{2}$ E. $2F$ F. $4F$
6. If the mass and radius were doubled, the force required to maintain UCM would be
A. $F/2$ B. F C. $2F$ D. $4F$ E. $8F$ F. $16F$
7. If the radius and speed were doubled, the force required to maintain UCM would be
A. $F/2$ B. F C. $2F$ D. $4F$ E. $8F$ F. $16F$
8. The heliocentric model of the solar system was proposed in the sixteenth century by
A. Tycho Brahe B. Kepler C. Newton D. Ptolemy
E. Galileo F. Copernicus G. Aristotle H. Henry Cavendish
9. The person who measured the value of the universal gravitation constant: $G=6.67 \times 10^{-11} \text{N} \cdot \text{m}^2 / \text{kg}^2$.
A. Tycho Brahe B. Kepler C. Newton D. Ptolemy
E. Galileo F. Copernicus G. Aristotle H. Henry Cavendish
10. Ptolemy
A. developed the geocentric model of epicycles and deferents to account for the retrograde motion of Mars.
B. built and maintained a state-of-the-art observatory in Denmark.
C. used mathematics and reasoning to develop the theory of universal gravitation.
D. plotted and analyzed the orbits of the planets and developed three laws of planetary motion.
E. proposed the "crystalline spheres" geocentric model of the heavens.
F. proposed the heliocentric model of the heavens in the sixteen century.
11. *Harmony of the Worlds* and *The Mystery of the Universe* were written by
A. Aristotle B. Kepler C. Newton
D. Ptolemy E. Galileo F. Copernicus
12. The critical piece of evidence that suggested the correctness of Newton's theory of universal gravitation was
A. the determination of the correct value of G
B. the finding that planets travel in ellipses, not circles
C. the observation that Jupiter has moons of its own
D. the observation that apples fall 16 ft in one second near the surface of the earth
E. the calculation that the moon "falls" one twentieth of an inch in one second

13. If the moon were only half as far from the Earth as it is now, the gravitational force it exerts on the Earth would be
- A. one-fourth its present value B. one-half its present value C. equal to its present value
D. twice its present value E. four times its present value
14. On a planet with twice the radius and twice the mass of the Earth, your weight would be equal to your weight on earth times a factor of
- A. $1/4$ B. $1/2$ C. 1 D. 2 E. 4 F. 8
15. What is the gravitational attraction between a 4000kg body and a 9000 kg body that are 5m apart?
- A. $2.3E-7$ N B. $9.6E-5$ N C. $4.8E-4$ N D. $1.4E+6$ N E. $7.2E+6$ N