Name _____ Class _____ Date _____

Circular Motion and Gravitation

Section Quiz: Newton's Law of Universal Gravitation

Write the letter of the correct answer in the space provided.

_____ 1. What is the centripetal force that holds planets in orbit?
  a. inertia
  b. gravitational force
  c. planetary force
  d. Kepler's force

_____ 2. The force that Earth exerts on the moon
  a. is greater than the force the moon exerts on Earth.
  b. is less than the force the moon exerts on Earth.
  c. is equal in magnitude to the force the moon exerts on Earth.
  d. causes tides.

_____ 3. How does the gravitational force between two objects change if the distance between the objects doubles?
  a. The force decreases by a factor of 4.
  b. The force decreases by a factor of 2.
  c. The force increases by a factor of 2.
  d. The force increases by a factor of 4.

_____ 4. What does G stand for?
  a. free-fall acceleration
  b. gravitational field strength
  c. the constant of universal gravitation
  d. gravitational force

_____ 5. Which of the following is an expression of gravitational field strength?
  a. $G\dfrac{m_1 m_2}{r}$ **c.** $G\dfrac{m_E}{r}$
  b. $G\dfrac{m_1 m_2}{r^2}$ **d.** $G\dfrac{m_E}{r^2}$

_____ 6. Tides are caused by
  a. differences in the gravitational force of the moon at different points on Earth.
  b. differences in Earth's gravitational field strength at different points on Earth's surface.
  c. differences in the gravitational force of the sun at different points on Earth.
  d. fluctuations in the gravitational attraction between Earth and the sun.

_____ **7.** When a person holds a ball above Earth's surface, the system contains
gravitational potential energy. Where is this potential energy stored?
   a. in the ball
   b. inside Earth
   c. in the person holding the ball
   d. in the gravitational field between Earth and the ball

_____ **8.** Evidence confirms that gravitational mass
   a. depends on gravitational field strength.
   b. varies with location.
   c. depends on free-fall acceleration.
   d. equals inertial mass.

9. Explain why an astronaut weighs less on the moon than on Earth.

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10. The moon has a mass of 7.35×10^{22} kg and a radius of 1.74×10^{6} m.
What is the gravitational force between the moon and an 85 kg astronaut?
($G = 6.673 \times 10^{-11}$ N•m^2/kg^2)