Name: _____ Practice Ph12 3-3

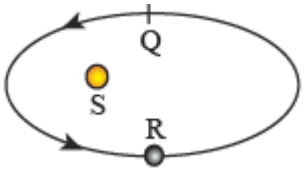
1. A satellite is placed in circular orbit at an altitude of 4.8×10^5 m above the Earth's surface. What is the satellite's orbital period?

2. A satellite is put into a circular orbit with a radius of 1.2×10^4 m. If the satellite takes 1.75 h to orbit once, what is the mass of the planet about which it is orbiting?

3. What is the acceleration due to gravity at the surface of a planet whose mass is 1.88×10^{21} kg and whose radius is 4.34×10^5 m?

   A. 2.89×10^5 m/s^2
   B. 9.80 m/s^2
   C. 0.666 m/s^2
   D. 3.08×10^{-3} m/s^2

4. A planet moves in an elliptical orbit around a sun as shown below.



   The direction of the planet's acceleration vector at R is:

   A.  B.  C.  D. E. 

5. Which of the following explains why the moon remains in orbit around Earth?
   A. The gravitational force between Earth and the Moon is equal to the centripetal force necessary to keep the Moon in its orbit.
   B. The acceleration of the Moon is zero relative to Earth.
   C. The force of gravity exerted by Earth on the Moon balances the force of gravity exerted by the Moon on Earth.
   D. The centrifugal and centripetal forces on the Moon balance.

6. What is the gravitational force exerted by the Sun on a person of mass 72 kg standing on the surface of the earth?

   A. 1.3×10^{-6} N
   B. 2.3×10^8 N
   C. 710 N
   D. 0.42 N

7. A boy and a girl are sitting on a sofa. They move so that the distance between them is now one-quarter as great as it was before. How does the gravitational force of attraction between them change?
   A. sixteen times as great
   B. four times as great
   C. one-quarter as great
   D. one-sixteenth as great

8. Two identical planets, X and Y, are fixed in position as shown. A space probe P is released from rest from the position shown. X, Y and P are all equidistant from point C. After it is released the space probe will move with:

   A. increasing acceleration
   B. constant acceleration
   C. constant velocity
   D. constant speed

9. A certain spherical planet which is not rotating has a radius of 6.36×10^5 m and a mass of 1.89×10^{21} kg. At what minimum speed would a vehicle travelling along its surface just begin to leave the ground?
   A. 445 m/s
   B. 19 800 m/s
   C. 630 m/s
   D. It depends on the mass of the vehicle.

10. Two sacks contain 10 oranges each. Which of the following changes alone could double the gravitational force between the sacks?
   A. Add 20 oranges to one of the sacks only
   B. Add 10 oranges to each sack
   C. Add 20 oranges to each sack
   D. Add 10 oranges to one of the sacks only

11. To what value would the earth's radius (in meters) have to be reduced (without changing its mass) so that the escape velocity from its surface would be 1/100 of the speed of light?

12. An unpowered projectile is being launched from the surface of the moon. What minimum velocity must it have at the surface to escape from the moon completely?

13. What is the change in gravitational potential energy when a 5.2×10^3 kg satellite is put into an orbit with a radius of orbit of 2.5×10^7 m around Earth.

    A. 1.1×10^{11} J
    B. 3.2×10^{11} J
    C. 2.4×10^{11} J
    D. 8.3×10^{10} J

14. For an object on the Earth, what is the escape velocity from the Earth's gravitational field?

    A. 7.91×10^3 m/s
    B. 4.64×10^2 m/s
    C. 6.25×10^7 m/s
    D. 1.12×10^4 m/s

15. Two protons are seperated by a distance of 2.0×10^{-10} m between their centres. Relative to zero at infinite separation, what is the gravitational potential energy of each proton because of the presence of the other.

    A. 1.2×10^{-18} J
    B. -1.2×10^{-18} J
    C. 9.3×10^{-55} J
    D. -9.3×10^{-55} J

16. Relative to zero at infinity, what is the gravitational potential energy of the moon due to the attraction of the Earth?

    A. -1.99×10^{20} J
    B. -7.63×10^{28} J
    C. 1.99×10^{20} J
    D. 7.63×10^{28} J

17. Which of the following could represent the kinetic energy, the gravitational potential energy and the total energy for an orbiting satellite in a stable circular orbit?

	Kinetic Energy	Gravitational Potential Energy	Total Energy
A.	80 000 J	- 40 000 J	40 000 J
B.	40 000 J	-80 000 J	- 40 000 J
C.	40 000 J	40 000 J	80 000 J
D.	80 000 J	40 000 J	120 000 J

18. How much work is required to raise a 4.0×10^3 kg object to an altitude of 5.0×10^6 m above the earth's surface?

    A. 1.4×10^{11} J
    B. 1.1×10^{11} J
    C. 2.5×10^{11} J
    D. 2.0×10^{11} J