Beverly Hills High School -- Physics -- Exam #4 -- 100 points

Write TRUE if the statement is true OR write the word(s) that substitute for the underlined word(s) that would make it true. Writing false only earns partial credit. Three points each.

_____ 1) There are 2π <u>degrees</u> in one revolution.

_____ 2) <u>Galileo</u> is famous for contributing his Laws of Planetary Motion.

_____ 3) The law of universal gravitation is a(n) <u>direct cube</u> law.

_____ 4) The planet Neptune <u>revolves</u> around the sun.

_____ 5) We use the Greek letter <u>theta</u> for angular or rotational velocity.

<u>Short Answer/Fill-In</u>. Be clear, neat and complete. Three points each.

6) The word centripetal means _____.

7) An object's _____ is what is constant in uniform circular motion.

8) Copernicus' great contribution was the _____ Theory. (Give its name.)

9) A bicyclist is rolling down a hill but he is not accelerating. What can you say about the <u>forces</u> involved?

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10) Dividing tangential velocity by rotational velocity gives you _____.

<u>Multiple Choice</u>. Write the letter that best answers each example. Three points each.

_____ 11) Two large objects have a gravitational force between them of 800 N. If the distance between them is cut in half their new gravitational attractive force will be

         a) 400 N   b) 800 N   c) 1600 N   d) 3200 N   e) none of these

_____ 12) The best formula for centripetal acceleration is

         a) $F = ma$ b) $a = \Delta v/\Delta t$ c) $a = Fm$ d) $F = mv^2/r$ e) $a = v^2/r$

_____ 13) If we convert 36° to radians properly, we get

         a) $\pi/180$ b) $\pi/36$ c) $\pi/10$ d) $\pi/5$ e) none of these

_____ 14) The radius of a wheel is 0.40 m. One-fourth the way around the wheel is a distance of

         a) 0.10π m   b) 0.20π m   c) 0.40π m   d) 0.10 m   e) none of these

_____ 15) If you divided $2\pi r$ by the velocity, you would get

        a) time   b) radius   c) mass   d) acceleration   e) force

Calculation Section. Always give units for full credit. Five points apiece. Use $G = 6.67 \times 10^{-11}$ N•m^2/kg^2 and $g = 9.80$ m/s^2 where necessary.

16) Find the radius of a circle whose circumference is 853 m.

17) An oil rig uses a drill bit that rotates at a speed of 4200 rpm. What is that in radians per second?

18) A 0.30 kg mass has a centripetal force of 750 N applied on it. If it travels in a circle of radius 1.50 m, how fast is it spinning?

19) A huge Ferris wheel turns only once in 45 seconds. How many radians does it turn in 20 minutes?

20) The mass of the Moon is 7.36×10^{22} kg. The mass of Earth is 5.98×10^{24} kg. If the gravitational force between them is 1.96×10^{26} N, what is the distance between Earth and the Moon?

21) Show, using a diagram, how we arrive at a definition for the radian. Describe it below as well.

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