**Centripetal acceleration & Force problems 2**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_\_\_\_\_\_\_\_Period: \_\_\_\_\_\_\_\_\_

$a\_{c}=\frac{v^{2}}{r}=\frac{4π^{2}r}{T^{2}}$ $F\_{C}=ma\_{c}$ $v=\frac{d}{t}=\frac{2πr}{T}$

UNITS

 m, kg, s

1. An airplane is moving on a circular path of radius 2.5 km. If it completes 3 complete cycles in 3.20min, calculate:

a. centripetal acceleration in m/s2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. centripetal force [airplane’s mass=12,500lbs] [1kg=2.2lb] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. Calculate the centripetal force acting on a 925 kg car as it takes a curve with a radius of 7500 cm at a speed of 79.2km/h. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. A small plane makes a complete circle with a radius of 3.28 km in 2.0min.

a. What is the centripetal acceleration of the plane? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b. If the plane’s mass is 12,500lb, what is the centripetal force applied to the airplane? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. A car with a mass of 833 kg rounds an unbanked curve in the road at a speed of 100.8km/h. If the radius of the curve is .105 km, what is the average centripetal force exerted on the car? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. An amusement park ride has a radius of 2.8 m. If the time of one revolution of a rider is 0.98 s, what is the speed of the rider? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. An electron (m=9.11x10-31 kg) moves in a circle whose radius is 2.00 x10-20 m. If the force acting on the electron is 4.60x10-14 N, what is its speed? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

II. Answer the following multiple choice questions.

1. The diagram shows a student “twirling” a car key in a circular path on the end of a string.

 If the string snaps at P, which path will the keys follow?

 a. W

 b. X

 c. Y

 d. Z

2. An athlete runs at a constant speed, around a circle of radius 5.0m in 12s. What are the athlete’s speed and acceleration?



3. Which vector diagram best represents the acceleration, a, and force F for an abject traveling along a circular path?



