**Physics 12 Circular Motion Assignment Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

 **Mark:\_\_\_\_\_\_\_\_\_\_\_\_\_/**

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|  | A small plane makes a complete circle with a radius of 3500 m in 2.0 min. What is the centripetal acceleration of the plane?Ans:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  | (**Vertical**) A 3.5 kg object is whirled in a vertical circle whose radius is 1.0 m. a) What is the minimum speed at the top to maintain circular motion? b) If the string can only support 1000 N of tension force before breaking, what is maximum speed at the bottom?a:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_b:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  | (**Banked/unbanked Car**)A 1000 kg car is traveling at 20 m/s around an **unbanked** turn with a radius of 90.0 m.1. What is the minimum coefficient of friction required so that the car doesn’t skid?
2. the same car above is now driving on the highway under very icy (no friction) condition. What is the maximum speed of the car if it traveling around a 20.0o banked corner with a radius of 90 m?
3. What is the maximum speed of the car if it traveling around a 20.0o banked corner with a radius of 90 m and μ =0.45

a:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_b:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_c:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  | Macintosh HD:Users:wcheung:Desktop:Screen Shot 2017-02-08 at 9.12.49 AM.pngThe diagram show an object of mass 3.0 kg travelling in a circular path or radius 1.2m while suspended by a piece of string of length 1.9 m. What is the centripetal force on the mass?Ans:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 4. | (**Gravitation**)A 25000 kg rock is located at a distance of 7.6 x 108 m away from a small planet of mass 7.8 x 1023 kg. What is the mutual force of attraction between these two objects?Ans:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 5. | (**Gravitation**)A 5800 kg object is lifted from the Earth’s surface to a radius of 2.3 x 107 m. 1. What is the gravitational field strength of the Earth at this location?
2. What is the orbital period (time to complete one orbit) of the object?

a:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_b:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 6. | What is the **escape velocity** of a rocket trying to escape from the surface of the Moon?Ans:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 7. | A 6500 kg satellite is in ***geostationary*** orbit around **Mars** ($m=6.39×10^{23}kg, rotation period=88643 s)$* 1. What does Geostationary mean?
	2. Calculate the orbital radius
	3. What is the **total energy** of this satellite at this distance from **Mars**?

b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_c)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 8. | A 2500 kg rocket is lifted from the surface of the earth to a vertical height of 18000 m above the earth’s surface. * 1. What is the potential energy of the rocket while it is sitting on the Earth’s surface?
	2. What is the potential energy of the rocket when it is at 18000 m above the Earth’s surface?
	3. What is the **impact speed** when the rocket falls back to the surface

a)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_c)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |