Academic Year: 2017/2018 – Term 3
Physics - Grade 11
Revision sheet

Chapter 7: section 1,2,3 / Chapter 11: section 1 ,2
pages: (224-243),(364-377)

$$F_{centripetal} = m\frac{v^2}{r}$$

$\frac{v^2}{r}$ is the centripetal acceleration

1. Centripetal forces are always directed toward the (center) of a circle.

2. If the velocity of a car is halved, the Fc required to keep it in a path of constant radius is (multiplied, divided) by _____

3. If the same satellite orbited at the same velocity around a planet with three times the force of gravity, the orbit radius would be (multiplied, divided) by

_____

4. If the velocity, radius, and mass are simultaneously doubled, the required centripetal force will be (multiplied, divided) by _____

5. If the centripetal force exerted on an object is multiplied by four, and the . velocity of the object is doubled, the radius of the circle

_____

6 what happens to centripetal force if the mass doubles ? _____

7. What happens to centripetal force if the velocity doubles? _____

8. what happens to centripetal force if the radius doubles ? _____

9. What happens to centripetal force if the mass and radius double? _____

$$F \; = \; G \, \frac{m_1 \; m_2}{r^2}$$
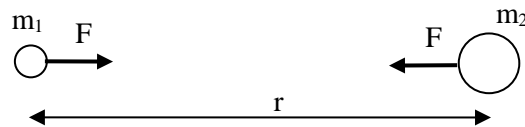
Newton's Law of Universal Gravitation: Every particle in the universe attracts every other particle with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between them. This force acts along the line joining the two particles

Hooke's Law can be simply written as: $F = -k \cdot x$
Period T $=1/f$, $f = 1/T$

Simple Harmonic Oscillators/Waves/

Pendulum Period=

$$T = 2\pi \sqrt{\frac{L}{g}}$$

Spring: Period=

$$T = 2\pi \sqrt{\frac{m}{k}}$$

_____ 1. What term describes a change in the speed of an object in circular motion?
    a. tangential speed   c. centripetal acceleration
    b. tangential acceleration   d. centripetal force

_____ 2. When a car makes a sharp left turn, what causes the passengers to move toward the right side of the car?
a. centripetal acceleration
c. centrifugal force
b. centripetal force
d. inertia

_____ 3. Two small masses that are 10.0 cm apart attract each other with a force of 10.0 N. When they are 5.0 cm apart, these masses will attract each other with what force? ($G = 6.673 \times 10^{-11}$ N•m^2/kg^2)
a. 5.0 N
c. 20.0 N
b. 2.5 N
d. 40.0 N

_____ 4. Which of the following is *not* an example of approximate simple harmonic motion?
a. a ball bouncing on the floor
b. a child swinging on a swing
c. a piano wire that has been struck
d. a car's radio antenna waving back and forth

_____ 5. A simple pendulum, swings in simple harmonic motion. At maximum displacement,
a. the acceleration reaches a maximum.
b. the velocity reaches a maximum.
c. the acceleration reaches zero.
d. the restoring force reaches zero.

_____ 6. The angle between the string of a pendulum at its equilibrium position and at its maximum displacement is the pendulum's
a. period.
c. vibration.
b. frequency.
d. amplitude.

_____ 7. For a system in simple harmonic motion, which of the following is the time required to complete a cycle of motion?
a. amplitude
c. frequency
b. period
d. revolution

_____ 8. For a system in simple harmonic motion, which of the following is the number of cycles or vibrations per unit of time?
a. amplitude
c. frequency
b. period
d. revolution

_____ 9. In an oscillating mass-spring system, the velocity of the mass is greatest when the mass is
    a. at the point of maximum displacement.
    b. halfway between the equilibrium point and maximum displacement.
    c. at the point where acceleration is greatest.
    d. at the equilibrium point.

_____ 10. How would the speed of Earth's orbit around the sun change if Earth's distance from the sun increased by 4 times?
    a. It would increase by a factor of 2.
    b. It would increase by a factor of 4.
    c. It would decrease by a factor of 2.
    d. The speed would not change.

Q1. Two trucks with equal mass are attracted to each other with a gravitational force of 6.7×10^{-4} N. The trucks are separated by a distance of 3.0 m. What is the mass of one of the trucks? ($G = 6.673 \times 10^{-11}$ N•m^2/kg^2)

Q2.   A new moon is discovered orbiting Neptune with an orbital speed of 9.3×10^3 m/s. Neptune's mass is 1.0×10^{26} kg. What is the radius of the new moon's orbit? What is the orbital period? Assume that the orbit is circular.
($G = 6.673 \times 10^{-11}$ N•m^2/kg^2)

Q3. Calculate the centripetal force acting on a 925 kg car as it rounds an unbanked curve with a radius of 75 m at a speed of 22 m/s.

$(6.0 \times 10^3 \text{ N})$

Q4. A small plane makes a complete circle with a radius of 3282 m in 2.0 min. What is the centripetal acceleration of the plane?

(9.0 m/s^2)

Q5. A car racing on a flat track goes 32 m/s around the curved track which has a   radius of 56 m. What is the car's centripetal acceleration? What is the car's centripetal force if it has a mass of 2150 kg

Q6. A planet is in orbit as shown below. Where are the two possible locations for a Sun?

Q7. Kepler's First Law states that a planet moves on an ellipse around the sun. Where is the sun with respect to that ellipse? _____

Q8. What is the force of attraction between a 60.0 kg student in the senior parking lot and the school? The distance between the two is 100.000 m and the mass of the school 65,000,000 kg

Q9. A pendulum is observed to complete 32 full cycles in 56 seconds.

a. Calculate the period.

b. Calculate the frequency.

c. Calculate the length.

Q10. Find the length of a pendulum that has a period of 2.0 s.

-Find the length of a pendulum that has a frequency of 0.80 Hz

Q11. The bob of a pendulum has a mass of 0.25 kg. If this pendulum is 1.0 m long, what is its frequency?

Q12. When a mass of 25g is attached to a certain spring , it makes 20 complete vibrations in 4.0 sec , what is the spring constant of the spring ?