Grade 12 Physics

SPH4U

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Contents

Chapter 2

Unit 1B

2.1 Fictitious Forces and Apparent Weight

2.1.1 Fictitious Forces

Fictitious forces are also called apparent forces or perceived forces

Explanation: When the object is viewed from a non-intertial F.O.R, we created fictitious force to explain the motion and behavior

The fictitious forces will always act in the direction opposite to the direction of acceleration of the frame of reference.

The magnitude of each fictitious force can be calculated by:

$$F_{fict} = m|a_{\vec{F.O.R}}|$$

Perceived acceleration could be represented by $a_{\vec{per}}$

Note: The object's actual acceleration would be measured relative to an inertia FOR

2.1.2 Apparent Weight

Technically, this would be the sum of the normal force and the force of friction that a surface exerts on an object.

2.1.3 Some of the formulas

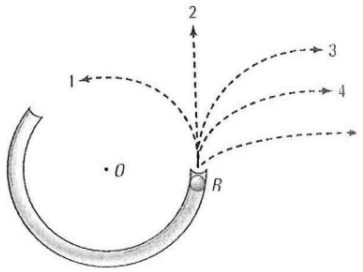
$$\sum \vec{F} = m a_{\vec{per}}$$

2.2 Lecture 2.5

2.2.1 Uniform Circular Motion

Direction: The velocity of an object at any point along a circle has a direction that is tangential to the circle

Question: If an object is attached to a string, swung in a circular motion and then the string is released, which of the five paths shown here will the object take?
ANS: Path 2



2.2.2 Centripetal acceleration

From the Newton second law, we understand that An object will accelerate in the same direction as the net force.

If the centripetal force is directed toward the centre of the circle, then what direction is the acceleration in? ANS: Toward the circle

In other words, the acceleration will always perpendicular to the velocity of the object.

2.2.3 Formulas

Formula 1:

$$\vec{a_c} = \frac{4\pi^2 R}{T^2}$$

$$\vec{a_c} = 4\pi^2 R f^2$$

$$\vec{a_c} = \frac{V^2}{R}$$

$\vec{a_c}$ is the acceleration of the object in $\frac{m}{s^2}$
R is the radius of the circular path that the object is moving around (in m)
T is the period of the object's motion
v is the speed of the object in (m/s)

For clockwise:

direction of acceleration = direction of velocity + 90 degree

else:

direction of acceleration = direction of velocity - 90 degree