



The 7 Problems for NZYPT 2019

Competition dates :

Regional tournaments (Auckland Wellington and Christchurch) on Saturday 9th March 2019

NZYPT National Final (top 9 teams from across the country) on Saturday 23rd March 2019

1. Invent yourself

Build a simple motor whose propulsion is based on corona discharge. Investigate how the rotor's motion depends on relevant parameters and optimize your design for maximum speed at a fixed input voltage.

2. Funnel and Ball

A light ball (e.g. ping-pong ball) can be picked up with a funnel by blowing air through it. Explain the phenomenon and investigate the relevant parameters.

3. Loud Voices

A simple cone-shaped or horn-shaped object can be used to optimise the transfer of the human voice to a remote listener. Investigate how the resulting acoustic output depends on relevant parameters such as the shape, size, and material of the cone.

4. Sci-Fi Sound

Tapping a helical spring can make a sound like a "laser shot" in a science-fiction movie. Investigate and explain this phenomenon.

5. Gyroscope Teslameter

A spinning gyroscope made from a conducting, but non-ferromagnetic material slows down when placed in a magnetic field. Investigate how the deceleration depends on relevant parameters.

6. Looping Pendulum

Connect two loads, one heavy and one light, with a string over a horizontal rod and lift up the heavy load by pulling down the light one. Release the light load and it will sweep around the rod, keeping the heavy load from falling to the ground. Investigate this phenomenon.

7. Newton's Cradle

The oscillations of a Newton's cradle will gradually decay until the spheres come to rest. Investigate how the rate of decay of a Newton's cradle depends on relevant parameters such as the number, material, and alignment of the spheres.