Revision List for 5th Year Physics Summer Exam 2024

Reflection in a plain and curved mirrors

- The 2 laws of reflection
- Finding the image distance by no parallax method
- Real and virtual image definitions
- Concave and convex mirror calculations of *u, v* and *f,* ray diagrams showing how real and virtual images are formed
- *Mandatory Experiment: To find the focal length of a concave mirror*

Refraction

- The laws of refraction
- Refractive index and Snell's Law
- Speed of light and apparent depth in materials
- Total internal reflection (TIR) – demonstration and calculations
- Snell's window – how its formed and calculations
- Fibre optics – uses, diagram of how it uses TIR, purpose of cladding

Lenses
- Concave and convex lens calculations of *u, v* and *f,* ray diagrams showing how real and virtual images are formed
- Power of a lens and combinations of lenses
- The eye, defects of vision and how lens fix these
- *Mandatory Experiment: To find the focal length of a convex lens*

Velocity and Acceleration

- Definitions and simple calculation of velocity and displacement
- Drawing Displacement vs Time graphs and calculating acceleration from these
- Drawing Velocity vs Time graphs and calculating displacement from these
- Acceleration – calculations involving the 3 equations of motion
- Deriving the 3 equations of motion
- Vector components – combining 2 vectors components into one using the Parallelogram Law or Triangle Law
- Resolving a vector into perpendicular components using sin and cos

Force Mass and Momentum

- Know the units and definitions for Work, mass and weight
- Newton's 3 Laws of Motion – know them off and be able to give an example of where we see them in everyday life
- Derive F = ma as a special case of Newton's 2nd Law
- Know the Conservation of Momentum and be able to perform calculations using the formula
- Momentum conservation during collisions at 90 degrees
- Vertical acceleration, friction and Terminal Velocity

Pressure and Density

- Density mass volume calculations – converting mm^3 and cm^3 to m^3
- Pressure – know the unit and definition
- Pressure in liquids and gases
- Upthrust, Archimedes Principle and the Law of Floatation
- Boyles Law – know the definition and be able to perform calculations
- *Mandatory Experiment: Boyles Law*

Gravity and Moments

- Force of Gravity, definition and calculations
- Acceleration due to gravity and how it changes with distance from a planet
- Moments – clockwise and anticlockwise calculations
- Torque and couples
- *Mandatory Experiment: To investigate the laws of Equilibrium*

Work

- Definition and unit.
- Calculations involving force and displacement in the same direction only.
- Lifts, escalators and work done

Energy

- Energy as the ability to do work. Definition and Unit.
- Different forms of energy.
- Kinetic and Potential energy calculations ($E_P = mgh$ $E_k = 1/2mv^2$)
- Principle of conservation of energy
- energy conversion between E_P and E_k for a pendulum and falling/rising objects
- Sources of energy: renewable and non-renewable.

Power

- Power as the rate of doing work or rate of energy conversion. Definition and Unit.
- Percentage efficiency = Power output x 100 / Power input

Heat and Temperature

- Heat and Temperature, Definitions and Unit
- Heat Capacity and Specific Heat Capacity – definitions and units and calculations
- Specific Latent Heat of Fusion and Vaporisation – definitions and calculations
- Heat Pumps and Methods of heat transfer – convection, conduction and radiations
- U-Value and Solar constant – definitions and calculations
- *Mandatory Experiment:*
  - *To calibrate a mercury thermometer using a standard thermometer*
  - *Measurement of the Specific Heat Capacity of Water*
  - *Measurement of the Specific Latent Heat of fusion of ice*
  - *Measurement of the Specific Latent Heat of Vaporisation of water*

Waves and Wave Motion

- Types of waves and examples of each
- Definitions and explanations of each of the following
  - Wavelength, amplitude and frequency
  - Amplitude of a wave
  - Reflection of waves
  - Refraction of waves
  - Diffraction of waves
  - Interference of waves
  - Polarised waves
  - Coherent sources
- Be able to use the formula $c = f\lambda$ to calculate speed, wavelength or frequency of a wave
- Define the Doppler Effect and explain how it occurs with the aid of a diagram
- Complete calculations using the formula for the Doppler Effect
- Give some examples of the application of the Doppler Effect