

Preliminary Physics Course – Year 11



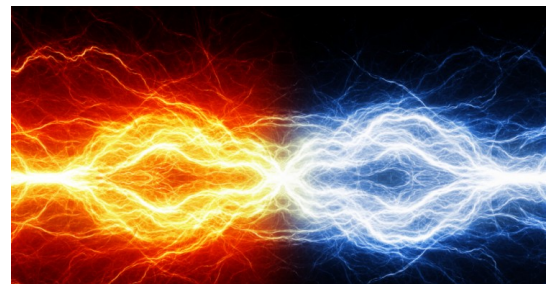
Module 1: Kinematics

- Vectors and scalars
- Relative motion
- Equations of motion
- Displacement-time graphs
- Vector addition and subtraction
- Applications of vectors in real life

1. $v = v_0 + at$
2. $\Delta x = \left(\frac{v + v_0}{2}\right)t$
3. $\Delta x = v_0t + \frac{1}{2}at^2$
4. $v^2 = v_0^2 + 2a\Delta x$

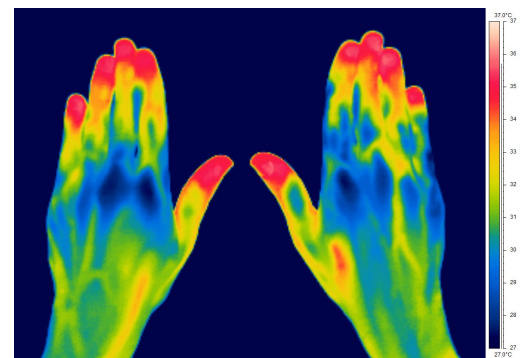
Module 2: Dynamics

- Newton's Laws of Motion
- Contact and field forces
- Force vector decomposition
- Motion on inclined planes
- Friction and its applications
- Work, energy and power
- Conservation of energy and momentum
- Impulse and car accidents
- Elastic and inelastic collisions



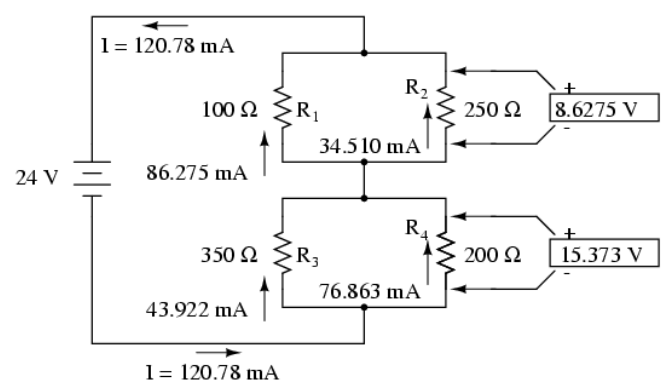
Module 3: Waves and Thermodynamics

- Wave properties and behaviour
- Sound waves, Doppler effect and beats
- Behaviour of light and Snell's Law
- The Laws of Thermodynamics



Module 4: Electricity and Magnetism

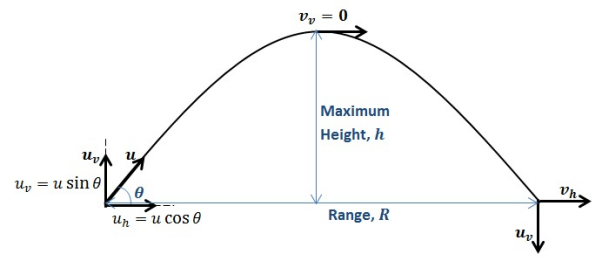
- Electric fields and forces
- Voltage and electrical current
- Ohm's Law and Kirchoff's Laws
- The effects of magnetism
- The relationship between electricity and magnetism



HSC Physics Course – Year 12

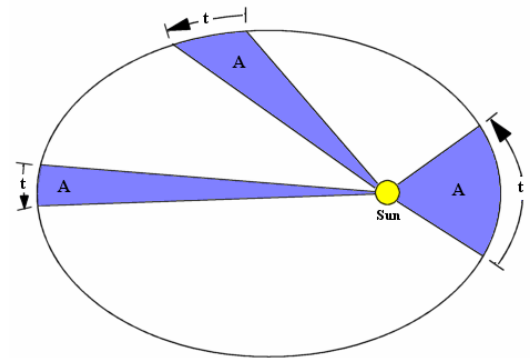
Module 5: Advanced Mechanics

- Projectile motion
- Circular motion
- Motion in gravitational fields
- Escape velocity
- Kepler's Laws



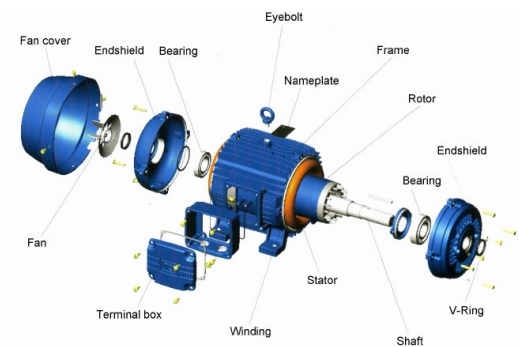
Module 6: Electromagnetism

- Effects of fields on electrical charges
- Work done in electric fields
- The operation of AC and DC motors
- The force between two parallel current carrying conductors
- Electromagnetic induction and transformers



Module 7: The Nature of Light

- Maxwell's contributions to light
- Measuring the speed of light
- Emission and absorption spectroscopy
- Models of light throughout history
- Diffraction and polarisation of light
- The quantum model of light
- Einstein and special relativity



Continuous Spectrum



Emission Lines



Absorption Lines



Module 8: From the Universe to the Atom

- Big Bang Theory
- The lifecycle of stars
- Different models of the atom
- Wave-particle duality
- Nuclear reactions and radioactive decay
- The Standard Model of matter
- Particle accelerators

