

# PHYSICS FORM 4 2009-2010

Textbooks: *Physics for You* and *Teacher's Notes*

## FIRST TERM

### 1. **General Physics**

Scalar and vector quantities.

### 2. **Linear Motion**

Velocity and acceleration. Motion graphs and their interpretation.

The analysis of uniformly accelerated motion. Motion under earth's gravitational force. Measuring  $g$  by direct method.

### 3. **Force**

Newton's first law of motion and the concept of inertia.

Forces in newtons.

Types of force: weight, contact forces, drag forces, tension. (When other forces arise some explanations will be given). Force as a vector quantity.

Linear momentum and its conservation in one dimension.

Newton's second law of motion, mass and force. The newton as the kilogram metre/second<sup>2</sup>. Rate of change in momentum.

Newton's third law of motion.

### 4. **Energy**

Energy sources. The conservation of energy. (This work permeates the whole syllabus and cannot be seen in isolation). Energy transfer and efficiency. (Where necessary, the design of a particular machine, e.g. a pulley system or a system of gears, will be given). Measuring energy transfer. Work and heat, the joule. Power, the watt.

A knowledge of kinetic energy as  $\frac{1}{2}mv^2$ , and of gravitational potential energy as  $mgh$ . Quantitative study of internal energy. Conversions of K.E.  $\rightleftharpoons$  P.E. with quantitative treatment including energy losses.

## SECOND TERM

### 5. **Turning Forces**

The turning effect of a force: the principle of moments. Centre of gravity, stability.

### 6. **Pressure**

Density. Pressure; pressure in fluids; the pascal. The transmission of pressure in liquids. Pressure difference as  $pgh$ ; manometers. (The setting up of mercury barometers will not be examined). Atmospheric pressure, devices making use of atmospheric pressure. Hydraulic press and brakes.

### 7. **Waves**

Mechanical wave pulses and continuous waves as a means of energy transfer, transverse and longitudinal waves.

Basic properties of waves, frequency, wavelength, amplitude, speed in different media. Reflection, refraction and diffraction. Water waves to demonstrate these basic properties.

## THIRD TERM

The nature of sound waves, explanation of loudness and pitch in terms of basic wave properties. The speed of sound in air. Resonance. Waves produced in stretched wires, fundamental frequency and harmonics.

### 8. The Earth and the Universe

- Solar system: Day, year and seasons
- Gravitational forces: How force depends on masses and distance between them and understand that moon orbits the earth and earth orbits the sun because of this force.
- Satellites: Use and advantages. Communication satellites and geostationary concept, monitoring satellites and their position to see the whole Earth.
- The Universe: the milky way, universe as millions of galaxies.
- Formation of Stars: Origin of the universe, the big bang and the expanding universe, the red shift.

#### Assessment scheme:

When	Criteria	Marks
November Test	Class test	50
November Assessment	Class work, homework, attitude, behaviour & participation during lessons	10
Mid-Year Exam	Exam	100
Mid-Year Assessment	Class work, homework, attitude, behaviour & participation during lessons	20
Annual Exam	Exam	100
Annual Assessment	Class work, homework, attitude, behaviour & participation during lessons	20