Definitions and Concepts for OCR (B) Physics A-level

Modules 1 and 2: Practical Skills & Fundamental Data Analysis

Absolute Uncertainty: The interval that a value is said to lie within, with a given level of confidence.

Accuracy: A measure of how close a measurement is to the true value.

Analogue Apparatus: Measuring apparatus such as rulers, beakers and thermometers that rely on the experimenter reading off a scale to determine the measurement.

Anomalies: Data points that don't fit the pattern of the data. You should determine why an anomalous result has occurred before removing it. Repeat readings help remove anomalies.

Control Variables: Variables that must remain the same throughout an experiment so as to not affect the results.

Digital Apparatus: Measuring apparatus such as ammeters, voltmeters and digital calipers that digitally measure and display a measurement.

Fiducial Marker: A thin marker, such as a splint, that is used to ensure readings are taken from the same place each time. They are used to improve the accuracy of measurements.

Gradient: The change in the y-axis value over the change in the x-axis value between two points. If the graph is curved, a tangent can be drawn to calculate the gradient at a specific point.

Line of Best Fit: A line drawn on a graph to demonstrate the pattern in the plotted data points.

Logarithmic Scale: A scale that is based on the change of exponents (e.g. 10^1, 10^2, 10^3,...). An exponential curve plotted with a logarithmic scale will appear as a straight line.

Mean: A way of expressing the average of a set of measurements by adding all the values and then dividing by the number of values (note that zero would also count as a value).

Median: A way of expressing the average of a set of measurements by arranging the values in order of size and taking the centre value (or the middle of two centre values).

Oscilloscope: A device which displays a graph of how a signal changes over time, used to view oscillations of waves. The horizontal axis of the graph is referred to as the time-base (representing time), and the vertical axis represents voltage.

Percentage Uncertainties: The uncertainty of a measurement, expressed as a percentage of the recorded value.

Plumb Line: A line attached to a weight (plumb) used to determine the vertical on an upright surface, this can improve the accuracy of measurements

Precision: A measure of how close a measurement is to the mean value. It only gives an indication of the magnitude of random errors, not how close data is to the true value...

Prefixes: Added to the front of units to represent a power of ten change.

Radians: Another unit in which you measure angles. Π radians is equal to 180 degrees.

Random Errors: Unpredictable variation between measurements that leads to a spread of values about the true value. Random error can be reduced by taking repeat measurements.

Range: Of a set of data, this is the highest value minus the lowest value.

Resolution: The smallest change in quantity that an instrument can display.

Resonance Tube: A long cylindrical tube partially filled with water. Used to determine the speed of sound in air by formation of stationary waves.

Response Time: The time taken for a person or system to react to a given stimulus.

Scalar Quantities: A quantity with only magnitude and no direction (e.g. mass, energy, length).

Sensitivity: The smallest change of input that can be detected by an instrument.

SI Units: The standard units used in equations. They are: metres, kilograms, seconds, amps, Kelvin and moles.

Significant Figures: A measure of a measurement's resolution. All numbers except zero are counted as a significant figure. When zeros are found immediately after a decimal place, they too are counted.

Spread: The spread of a set of results is equal to ± (half the range).

Standard form: The format of writing values where you state it as a number, x, (where $1 \leq x < 10$) times ten to the power of some integer
e.g. 43600 would be 4.36×10^4.

Systematic Errors: Causes all readings to differ from the true value by a fixed amount. Systematic error cannot be corrected by repeat readings, instead a different technique or apparatus should be used.

Uncertainty bars (or Error bars): They visually represent the uncertainty of a measurement on

a graph.

Vector Quantities: A quantity that has both a magnitude and an associated direction. Examples include velocity, displacement and acceleration.

Vernier Scales: The type of scale used on calipers and micrometers, that involve reading from a fixed scale and a moving scale to produce accurate measurements.

Zero Errors: A form of systematic error, caused when a measuring instrument doesn't read zero at a value of zero. This results in all measurements being offset by a fixed amount.