- ***Candidates should be able to*** *:*
  - *Explain that some physical quantities consist of a* ***numerical magnitude*** *and a* ***unit****.*
  - *Use correctly the named units listed in this specification as appropriate.*
  - *Use correctly the following* ***prefixes*** *and their* ***symbols*** *to indicate decimal sub-multiples or multiples of units :*

    pico (p), nano (n), micro (μ), milli (m), centi (c), kilo (k), mega (M), giga (g), tera (T).

  - *Make suitable* ***estimates of physical quantities*** *included within this specification.*

- ***PHYSICAL QUANTITIES***

- *A* ***PHYSICAL QUANTITY*** *(e.g. mass, density..) is a measurable property whose meaning is precisely defined so that everyone can have the same understanding of the term.*

  The meaning of a physical quantity can be represented by :

  - *A* ***DEFINING EQUATION*** *-* $\text{Density} = \frac{\text{mass}}{\text{volume}}$
  - *A* ***WORD DEFINITION*** *-* ***The Density of a substance is the mass per unit volume of***

- *When quoting the measurement of a physical quantity it is essential state the* ***unit*** *as well as the* ***numerical value****.*

- *The scientific system of units is called the* ***Systeme Internationale D'Unites (S.I.System)****. The seven* ***base quantities*** *and their* ***units*** *are listed in the table below :*

BASE QUANTITY	SYMBOL	BASE UNIT	SYMBOL
mass	m	kilogram	kg
length	l	metre	m
time	t	second	s
electric current	I	ampere	A
temperature	T,θ	kelvin	K
amount of substance	n	mole	mol
luminous intensity		candela	cd

- *All other quantities and units can be* ***derived*** *from the seven* ***base*** *quantities and units.*

- ***Examples***
  Volume *=* ***l x w x b*** *is measured in* $\mathbf{m^3}$.
  Density *=* ***mass/volume*** *is measured in* $\mathbf{kg\ m^{-3}}$.
  Acceleration *=* ***velocity change/time*** *is measured in* $\mathbf{m\ s^{-2}}$.
  Momentum *=* ***mass x velocity*** *is measured in* $\mathbf{kg\ m\ s^{-1}}$.
  Charge *=* ***current x time*** *is measured in* $\mathbf{A\ s^{-1}}$ *(called* ***coulomb, C****).*

- ***STANDARD PREFIXES FOR S.I. UNITS***

- *In Physics we are often faced with very large and very small numbers. To cope with this, numbers are written using **powers of 10**. This is called **scientific notation**. **Standard prefixes** ,such as those shown in the table below, are used as an abbreviation for some of the powers of 10.*

PREFIX	SYMBOL	VALUE
pico	p	10^{-12}
nano	n	10^{-9}
micro	μ	10^{-6}
milli	m	10^{-3}
centi	c	10^{-2}
kilo	k	10^{3}
mega	M	10^{6}
giga	G	10^{9}
tera	T	10^{12}

- ***ESTIMATION***

- *In problem solving or calculations carried out in experiments you should always look at your answer to see if it seems reasonable. The only way you can know if an answer is absurd is if you have some awareness of some benchmarks. So let's try to make some estimates :*

Mass of a person	
Height of a person	
Walking speed	
Speed limit on motorways	
Volume of a can of coke	
Density of water	
Weight of an apple	
Weight of a saloon car	
Diameter of the Earth	
Mass of the Earth	
Current in a domestic appliance	
e.m.f. of a car battery	
Voltage of the mains supply	
Diameter of a sewing needle	
Maximum speed of a modern fighter plane	