PHYSICAL QUANTITIES AND UNITS

1.1 Physical quantities	a) understand that all physical quantities consist of a numerical magnitude and a unit b) make reasonable estimates of physical quantities included within the syllabus
1.2 SI units	a) recall the following SI base quantities and their units: mass (kg), length (m), time (s), current (A), temperature (K), **amount of substance (mol)** b) express derived units as products or quotients of the SI base units and use the named units listed in this syllabus as appropriate c) use SI base units to check the homogeneity of physical equations d) use the following prefixes and their symbols to indicate decimal submultiples or multiples of both base and derived units: pico (p), nano (n), micro (μ), milli (m), centi (c), deci (d), kilo (k), mega (M), giga (G), tera (T) e) understand and use the conventions for labelling graph axes and table columns as set out in the ASE publication *Signs, Symbols and Systematics* (*The ASE Companion to 16–19 Science*, 2000)
1.3 The Avogadro constant	**a) understand that the Avogadro constant N_A is the number of atoms in 0.012 kg of carbon-12** **b) use molar quantities where one mole of any substance is the amount containing a number of particles equal to the Avogadro constant N_A**
1.4 Scalars and vectors	a) distinguish between scalar and vector quantities and give examples of each b) add and subtract coplanar vectors c) represent a vector as two perpendicular components

A2

PHYSICAL QUANTITIES AND UNITS

PHYSICS

The branch of natural science which deals with the study of matter, energy and their interactions.

Matter

Anything which occupy some space and have some mass.

Energy

The ability to do work.

eg:-kinetic energy, potential energy, mechanical energy, sound, termed, light, chemical etc.

Physical quantity

Those quantities which can be measured.

eg:-length, mass, time etc

Kinds of Physical Quantities

According to nature

Scalars

(Quantities which have magnitude only)

eg:-mass, volume, time etc

Vectors

(Quantities which have magnitude as well as direction)

eg:-Force, Velocity acceleration etc

According to priority

Base Quantities

(These quantities are not composed of the products and quotients of base Quantities)

Derived quantities

(These quantities are composed of the products and quotients of base physical Quantities)

BASE PHYSICAL QUANTITIES

- **SI Units** – International System of Units

Base Quantities	Name of Unit	Symbol of Unit
length	metre	m
mass	kilogram	kg
time	second	s
electric current	ampere	A
temperature	kelvin	K
amount of substance	mole	mol
luminous intensity	candela	cd

unit

A specific amount Or a standard value of a quantity whose multiples represent the whole magnitude of the quantity.

eg:-, 5m means 5 multiples of a standard length of 1m (meter).

SYSTEM INTERNATIONAL UNITS (SI units)

Those units which are standized and well accepted internationally for global unification and understanding of the quantities like there are many units of distance (feet, cubit, yard, cm etc) but meter (m) is SI unit.

Note:-There is no unique symbol of a quantity but abbreviations of units are all unique.

Quantity	Usual symbol	Formula	SI Derived unit	SI Base unit	Other unit
Area	A	A=lxb	-	m^2	-
Volume	V	v=lxbxh	-	m^3	-
Density	ρ (rho)	ρ =m/v	-	kgm^{-3}	-
Speed/velocity	v	v=s/t	-	ms^{-1}	-
Acceleration	a	a=(v-u)/t	-	ms^{-2}	-
Force	F	F=ma	N(newton)	$kgms^{-2}$	-
Pressure	P	P= F/A	Pa(pascal)	$kgms^{-1}{}^{-2}$	-
Work	W	w= Fxs	J(joule)	kgm^2s^{-2}	-
Power	P	P= W/t	w	kgm^2s^{-3}	-
Efficiency	E	$E=\frac{\text{Output}}{\text{Input}}$	-	no unit	-