# AS Physics (9702)
# Topically sorted definitions

Learner Guide
Section 2: Examination advice
Paper 2 and Paper 4 Structured Questions

"Memorise all definitions – you will need to be as precise as possible when quoting them in the examination. Quantities are defined in terms of quantities. Units are defined in terms of units. Remember to use "per" if a ratio is essential to the definition; for example, "pressure" should be defined as "force per unit area" (not "force on unit area").

# 1. PHYSICAL QUANTITES AND UNITS

- Scalar quantity [1]
  a scalar quantity has magnitude (only)
- Vector quantity [1]
  a vector quantity has magnitude and direction

# 2. MEASUREMENT TECHNIQUES

- Precision [1]
  the size of the smallest division (on the measuring instrument)
- Accuracy [1]
  how close measured value is to the true quantity value

# 3. KINEMATICS

- Distance
- Displacement
- Speed
- Velocity
- Acceleration [1]
  change in velocity divided by time (taken)

$$a = \frac{\Delta v}{\Delta t}$$

# 4. DYNAMICS

- Mass
- Linear momentum
- Newton's first law of motion
- Force / Newton's second law of motion [1]
  (resultant) force is (proportional **OR** equal to) rate of change of momentum

$$F_{net} = \frac{dp}{dt}$$

- Newton's third law of motion [2]

force on body A (by body B) is equal (in magnitude) to force on body B (by body A)
force on body A (by body B) is opposite (in direction) to force on body B (by body A)

$$\pm F_A = \mp F_B$$

- Weight
- Principle of conservation of momentum [2]
  sum/total momentum (of a system of bodies) is constant
  **or**
  sum/total momentum before is equal to sum/total momentum after
  for an isolated system **or** no (resultant) external force

$$\Sigma m_n u_n = \Sigma m_n v_n$$

**i.e.**

$$m_1 u_1 + m_2 u_2 + \cdots = m_1 v_1 + m_2 v_2 + \cdots$$

# 5. FORCES, DENSITY AND PRESSURE

- Force on mass (uniform gravitational field)
- Force on charge (uniform electric field)
- Centre of gravity of a body [1]
  the point where (all) the weight (of the body) is taken to act
- Moment of a force
- Torque of a couple
- Principle of moments [2]
  for a body in (rotational) equilibrium
  sum/total of clockwise moments about a point is equal to sum/total of anticlockwise moments about the (same) point
- Density
- Pressure

# 6. WORK, ENERGY AND POWER

- Work
- Efficiency

- Kinetic energy [1]
  the energy/ability to do work a object/body/mass has due to its speed/velocity/motion/movement
- Gravitational potential energy [1]
  the energy/ability to do work of a mass that it has or is stored due to its position/height in a gravitational field
- Elastic potential energy [1]
- Power

## 9. DEFORMATION OF SOLIDS

- Stress
- Strain
- Young modulus
- Elastic deformation
- Plastic deformation

## 14. WAVES

- Wave motion
- Displacement (*for a progressive water wave*) [1]
  distance (in a specified direction of particle/point on wave) from the equilibrium position
- Amplitude (*for a progressive water wave*) [1]
  the maximum distance (of particle/point on wave) from the equilibrium position
  **or**
  the maximum displacement (of particle/point on wave)
- Phase difference
- Period
- Frequency
- Wavelength (*of a progressive wave*) [1]
  distance moved by wavefront/energy during one cycle/oscillation/period (of source)

or
minimum distance between two wavefronts
or
distance between two adjacent wavefronts

- Speed
- Transverse wave
- Longitudinal wave (*with reference to direction of propagation of energy*)
  vibration(s)/oscillation(s) (of particles) parallel to direction of propagation of energy
- Doppler effect

## 15. SUPERPOSITION

- Principle of superposition
- Node
- Antinode [1]
- Diffraction
- Interference
- Coherence

## 17. ELECTRIC FIELDS

- Electric field strength
  force per unit charge acting on a stationary point charge
  $$E = \frac{F}{Q}$$
- Field line (line of force) in an electric field [1]
  path/direction in which a (free) positive charge will move

## 19. CURRENT OF ELECTRICITY

- Coulomb
- Potential difference
- Volt

joule divided by coulomb

$$V = \frac{J}{C}$$

- Resistance [1]
  potential difference divided by current

$$R = \frac{V}{I}$$

- Ohm [1]
  volt divided by ampere

$$\Omega = \frac{V}{A}$$

- Ohm's law

## 20. D.C. CIRCUITS

- Electromotive force (e.m.f.)
- Potential difference (p.d.)
- Kirchhoff's first law [1]
  sum of current(s) into junction is equal to sum of current(s) out of junction
  **or**
  (algebraic) sum of current(s) at a junction is zero

$$\Sigma I_{in} = \Sigma I_{out}$$

- Kirchhoff's second law [2]
  sum of electromotive force(s) is equal to sum of potential difference(s)
  around a loop/around a closed circuit

$$\Sigma E = \Sigma V$$

## 26. PARTICLE AND NUCLEAR PHYSICS

- Nucleon number
- Proton number
- Mass-energy
- $\beta$ decay