FORMULAE TO LEARN

Throughout A-Level Physics you will encounter many formulae.

Students must be familiar with the following:

1) the relationship between speed, distance, and time:

$$speed = \frac{distance}{time\ taken} \qquad v = \frac{\Delta s}{\Delta t}$$

2) the relationship between force, mass, and acceleration:

$$force = mass \times acceleration \qquad F = ma$$

3) the relationship between acceleration, velocity, and time:

$$acceleration = \frac{change\ in\ velocity}{time\ taken} \qquad a = \frac{\Delta v}{\Delta t}$$

4) the relationship between density, mass, and volume:

$$density = \frac{mass}{volume} \qquad \rho = \frac{m}{V}$$

5) the concept of momentum:

$$momentum = mass \times velocity \qquad p = mv$$

6) the relationships between force, distance, work, power, and time:

$$work\ done = force \times distance\ moved \qquad W = Fs$$

$$power = \frac{energy\ transferred}{time\ taken} = \frac{work\ done}{time\ taken} \qquad P = \frac{\Delta W}{\Delta t}$$

7) the relationships between mass, weight, potential energy, and kinetic energy:

$$weight = mass \times gravitational\ field\ strength \qquad W = mg$$

$$kinetic\ energy = \frac{1}{2} \times mass \times (velocity^2) \qquad KE = \frac{1}{2}mv^2$$

8) the relationship between an applied force, the area over which it acts, and the resulting pressure:

$$pressure = \frac{force}{area} \qquad P = \frac{F}{A}$$

9) the ideal gas equation:

$$pressure \times volume = number\ of\ moles \times molar\ gas\ constant \times absolute\ temperature$$

$$pV = nRT$$

10) the relationships between charge, current, potential difference, resistance, and electrical power:

$$charge = current \times time \qquad \Delta Q = I\Delta t$$

$$potential\ difference = current \times resistance \qquad V = IR$$

$$electric\ power = potential\ difference \times current \qquad P = IV$$

11) the relationship between potential difference, energy, and charge:

$$potential\ difference = \frac{energy\ transferred}{charge} \qquad V = \frac{E}{Q}$$

$$potential\ energy = mass \times gravitational\ field\ strength \times change\ in\ height \qquad PE = mg\Delta h$$

12) the relationship between resistance and resistivity:

$$resistance = \frac{resistivity \times length}{cross\text{–}sectional\ area} \qquad R = \frac{\rho l}{A}$$

13) the relationship between energy and charge flow in a circuit:

$$energy = current \times potential\ difference \times time \qquad E = IVt$$

14) the relationship between speed, frequency, and wavelength:

$$wave\ speed = frequency \times wavelength \qquad v = f\lambda$$

15) the relationship between centripetal force, mass, speed, and radius:

$$centripetal\ force = \frac{mass \times (velocity^2)}{radius} \qquad F = \frac{mv^2}{r}$$

16) the relationship between capacitance, charge, and potential difference:

$$capacitance = \frac{charge}{potential\ difference} \qquad C = \frac{Q}{V}$$

17) the relationship between the potential difference across the coils in a transformer and the number of turns of coil:

$$\frac{potential\ difference\ across\ coil\ 1}{potential\ difference\ across\ coil\ 2} = \frac{number\ of\ turns\ in\ coil\ 1}{number\ of\ turns\ in\ coil\ 2} \qquad \frac{V_1}{V_2} = \frac{N_1}{N_2}$$