

SS3 PHYSICS NOTE.

REVISION EXERCISE ON DIMENSION OF PHYSICAL QUANTITIES.

Remember, dimension is based on the these three quantities, Time(T), Length (L) and Mass (M) of the basic quantities. All other quantities are based on these three.

For example, the dimension for Area = Length x Breadth = $L \times L = L^2$

Volume : Length x Breadth x height = $L \times L \times L = L^3$.

Other examples are:

Speed/Velocity = Distance/Time = $L/T = LT^{-1}$.

Acceleration = Velocity/time = $LT^{-1}/T = LT^{-2}$.

Density = Mass/Volume = $M/L^3 = ML^{-3}$.

Question 1: What is the value of x, y and a in the dimension of pressure.

Pressure = $M^x L^y T^z$.

Solution

Pressure = Force/Area. = $MLT^{-2}/L^2 = ML^{-1}T^{-2}$.

$x=1, y=-1, z=-2$.

QUESTION 2 : Determine the dimension of momentum.

Solution

Momentum = Mass x velocity

$$= M \times LT^{-1}$$

$$= MLT^{-1}.$$

ASSIGNMENT.

1. Derive the dimension of the following physical quantities (i) work (ii) power (iii) impulse
2. If $F = GMm/R^2$. Find the dimension of G, if R is a distance.
3. The Young modulus of elasticity is defined as $E = F/A \div e/l$. Obtain the dimension of E.
4. For what values of x, y and Z will the equation $P^x V^y T^z = \text{Constant}$, become Boyles law? (P is inversely proportional to volume).

