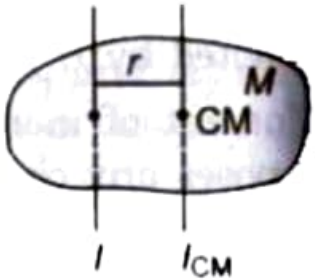
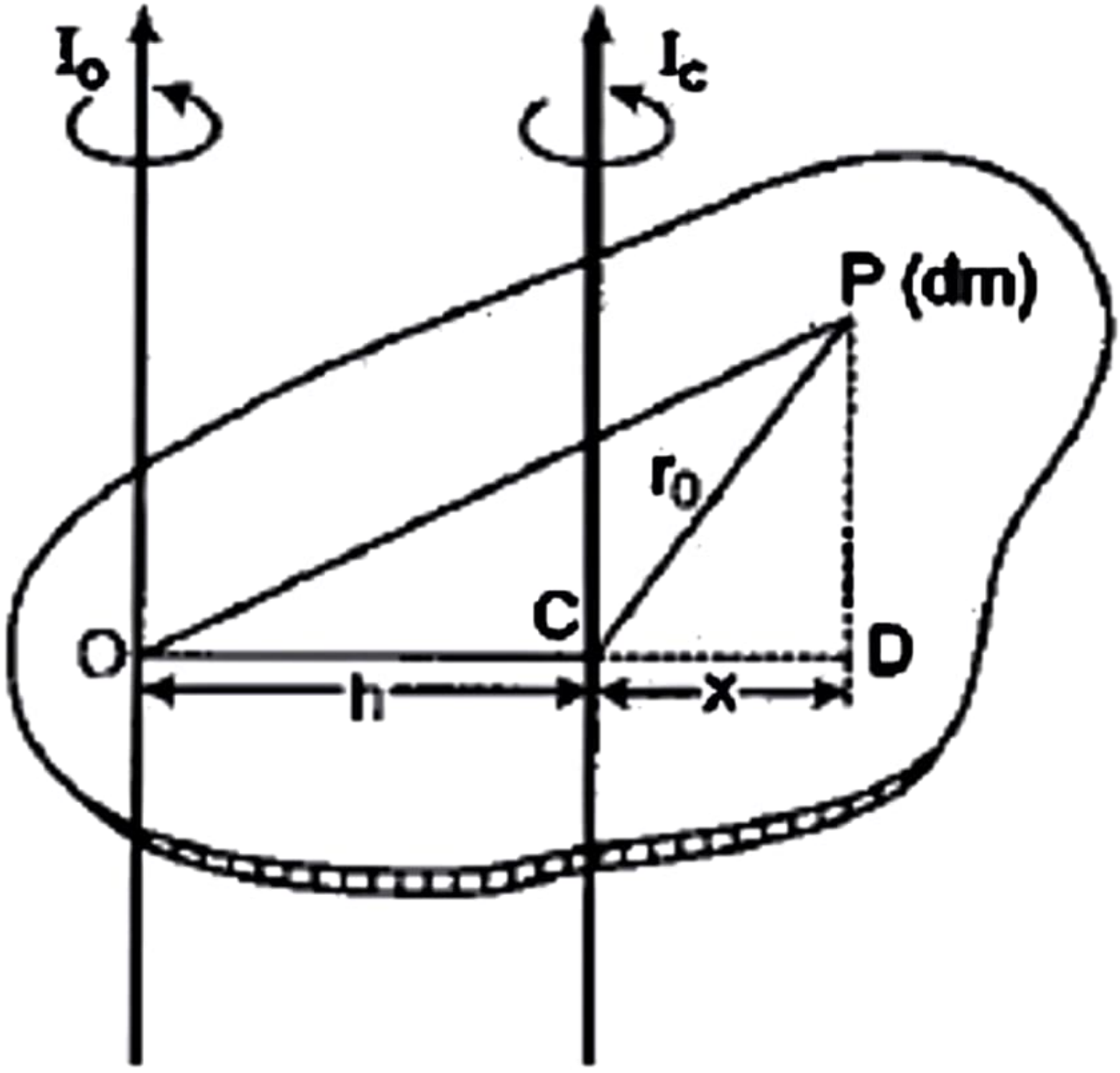
Parallel Axes Theorem



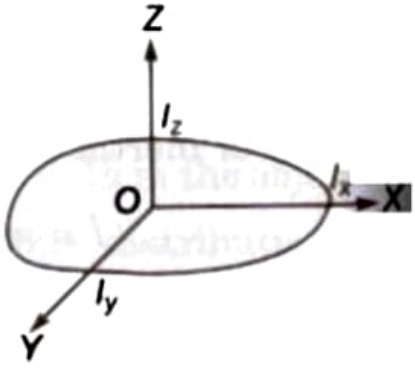
The moment of inertia of any object about any arbitrary axes is equal to the sum of moment of inertia about a parallel axis passing through the centre of mass and the product of mass of the body and the square of the perpendicular distance between
the two axes.

Mathematically $I = I_{CM} + Mr^2$

where I is the moment of inertia about the arbitrary axis, I_{cM} is moment of inertia about the parallel axis through the centre of mass, M is the total mass of the object and r is the perpendicular distance between the axis.


I_o
I_c
P (dm)
r_0
C
O
D
h
x

Perpendicular Axes Theorem

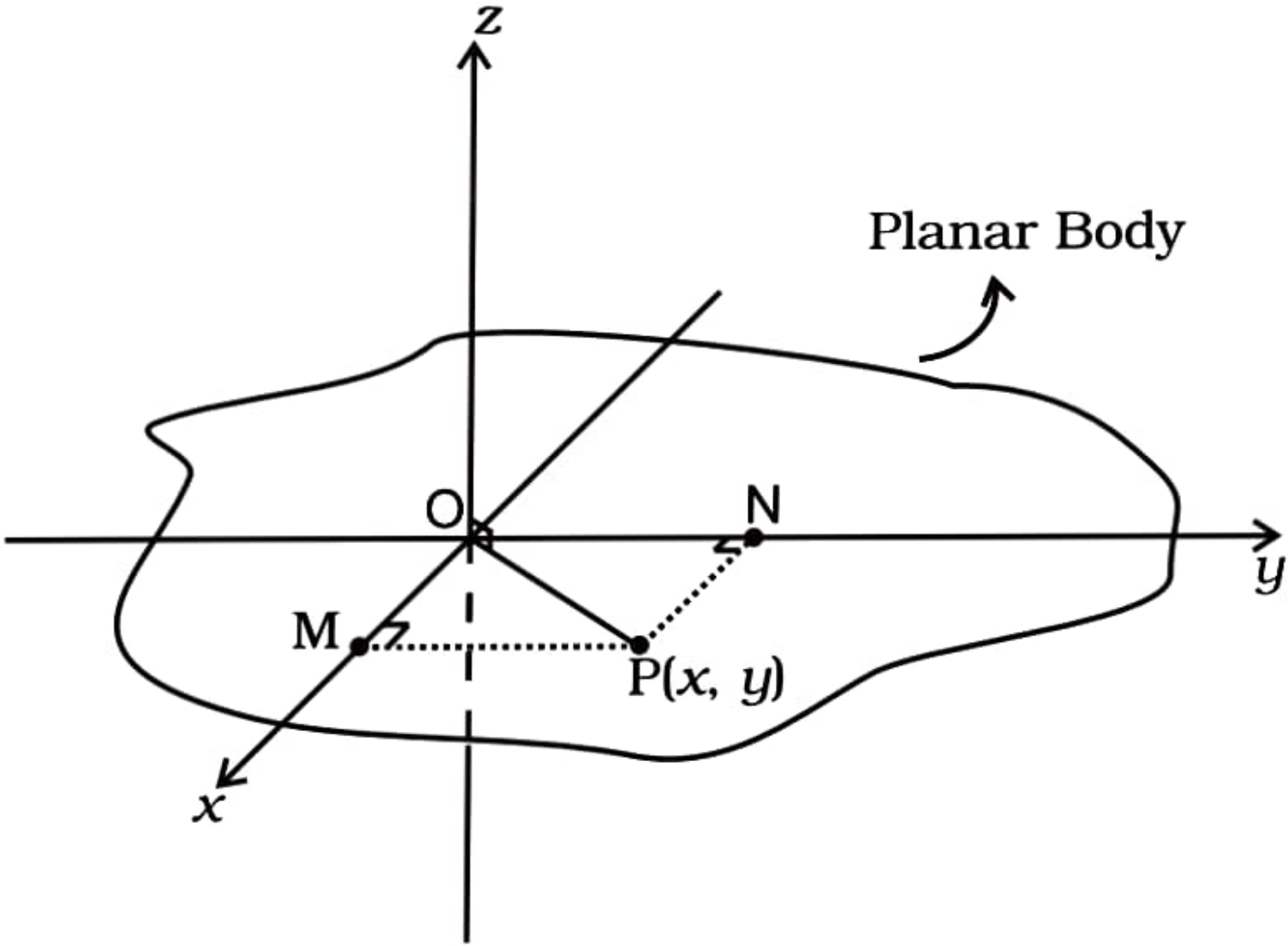


The moment of inertia of any two dimensional body about an axis perpendicular to its plane (I_z) is equal to the sum of moments of inertia of the body about two mutually perpendicular axes lying in its own plane and intersecting
each other at a point, where the perpendicular axis passes through it.

Mathematically $I_z = I_x + I_y$

where I_x and I_y are the moments of inertia of plane lamina about perpendicular axes X and Y respectively which lie in the plane lamina an intersect each other.

Theorem of parallel axes is applicable for any type of rigid body whether it is a two dimensional or three dimensional, while the theorem of perpendicular is applicable for laminar type or two I dimensional bodies only.


z
Planar Body
O
N
y
M
P(x, y)
x