

Q1) The momentum theory is a theory describing a mathematical model of an ideal actuator disk, such as a propeller or helicopter rotor.

It is used to calculate the local forces on a propeller or wind-turbine blade. Blade element theory is combined with momentum theory to alleviate some of the difficulties in calculating the induced velocities at the rotor. Whereas the streamtube area is reduced in by the propeller, it is expanded by a wind turbine.

the power given thrust is

$$P = \sqrt{\frac{T^3}{2\rho A}}$$

$T =$ the Thrust

$\rho =$ density of air

$A =$ area of the rotor