# Answer on Question #44569, Physics, Mechanics | Kinematics | Dynamics

## Question:

An engine rotating at 2000 rev/min has a flywheel of 15 kg and radius of gyration of 300mm attached to it to smooth out the engine cycle. What energy is available from the flywheel at this speed in Joules?

## Answer:

Kinetic energy of rotation equals:

$$E = \frac{I\omega^2}{2}$$

where $I$ is moment of inertia, $\omega$ is angular speed.

Moment of inertia equals:

$$I = mr_g^2$$

where $m$ is mass of the body, $r_g$ is radius of gyration.

Therefore:

$$E = \frac{mr_g^2\omega^2}{2} = \frac{15\ kg \cdot 0.3^2 m^2 \cdot \left(\frac{2\pi \cdot 2000}{60}\frac{rad}{s}\right)^2}{2} = 29609\ J \cong 3 \cdot 10^4\ J$$

Answer: $3 \cdot 10^4\ J$