

27 An aeroplane makes a complete quarter  
circle at 40m radius towards left while  
flying at 175 km/hr. The mass of rotary  
engine and propeller is 400kg with  
K = 30Nm, R speed lagging - 2500 rpm  
clockwise when viewed from the rear.

Find the gyroscopic couple on the  
aircraft which will be the effect by the  
aeroplane turn towards right instead of left

$$\Rightarrow \text{Soln} \quad r = 40\text{m}$$
$$V = 175 \text{ km/hr}$$
$$= 175 \times \frac{5}{18} = 48.67 \text{ m/s}$$

$$m = 400 \text{ kg}$$
$$k = 0.3 \text{ m}$$
$$N = 2500 \text{ rpm}$$

$$W = 2\pi N = \frac{2\pi \times 2500}{60} \text{ rad/s}$$

Then

Gyrosuppl up/c/b ( ) 1w up

$$= (m^2) \times (26179) \times \frac{1}{V}$$

$$= (400 \times 132) \times (26179) \times \frac{\frac{4867}{40}}{1025}$$

$$= 11471.89 \text{ N m } \underline{\text{as}}$$

When V upwards from it may fly clockwise

As Nose down, tail up

For right turn  $\frac{N\downarrow}{T\uparrow} \underline{\text{as}}$