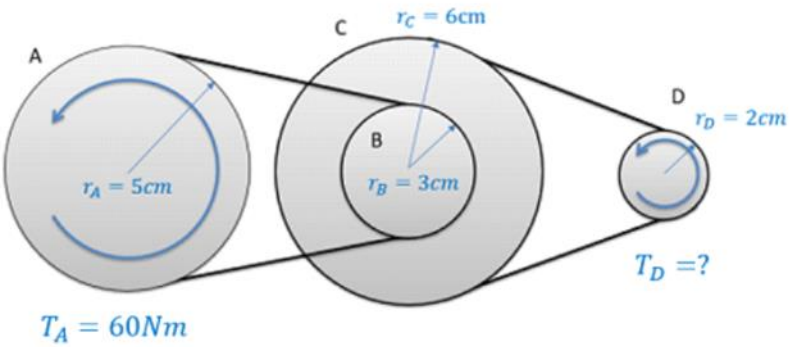
Problem 1

If a torque of 60 Nm is applied to the input pulley A, what is the expected torque at the output pulley D? Assume the mass of the pulleys is negligible.



A → B

$$\frac{T_A}{r_A} = \frac{T_B}{r_B} \rightarrow \frac{60\,Nm}{5\,cm} = \frac{T_B}{3\,cm} \rightarrow T_B = 36\,Nm$$

B → C

$$T_B = T_C = 36\,Nm$$

C → D

$$\frac{T_C}{r_C} = \frac{T_D}{r_D} \rightarrow \frac{36\,Nm}{6\,cm} = \frac{T_D}{2\,cm} \rightarrow \boxed{T_D = 12\,Nm}$$