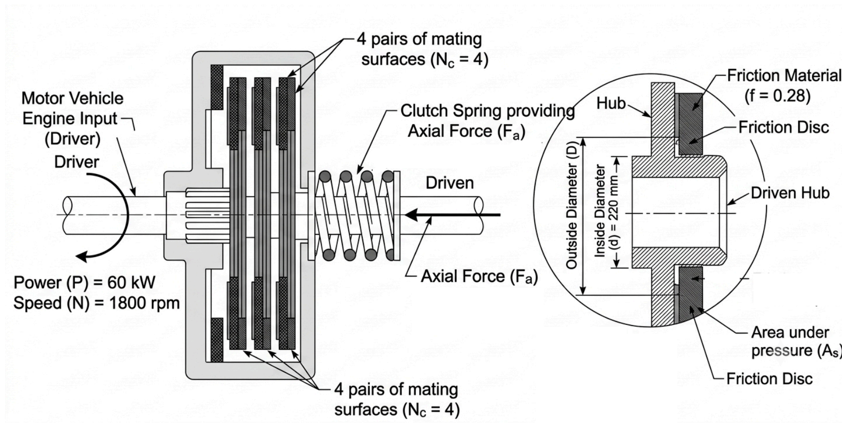

Step 1: Calculate the Transmitted Torque (T)

The engine power and rotational speed determine the total torque that the clutch must safely transmit without slipping. Using the standard power-torque relation:

$$P = \frac{2\pi TN}{60}$$

Rearranging to solve for the torque T in kilonewton-meters (kN-m):

$$60\ kW = \frac{2\pi T\ (1800\ rpm)}{60}$$

$$T = 0.31831\ kN - m$$

Step 2: Determine the Mean Friction Radius (R_m)

According to the Uniform Pressure Theory, the equivalent or mean radius at which the total friction force is assumed to act is the integrated average across the entire surface area:

$$R_m = \frac{2}{3}\left[\frac{R^3 - r^3}{R^2 - r^2}\right] = \frac{1}{3}\left[\frac{D^3 - d^3}{D^2 - d^2}\right]$$

Substituting the diameters in meters:

$$R_m = \frac{1}{3}\left[\frac{(0.250\ m)^3 - (0.220\ m)^3}{(0.250\ m)^2 - (0.220\ m)^2}\right] = 0.11766\ m$$

Step 3: Calculate the Required Axial Force (F_a)

The total torque capacity for a multi-plate clutch is given by the product of the friction coefficient, the clamping axial force, the mean radius of friction, and the number of active contact surfaces:

$$T = fF_a R_m N_c$$

Rearranging the formula to isolate the axial actuating force (F_a):

$$F_a = \frac{T}{fR_m N_C} = \frac{0.31831\ kN-m}{(0.28)(0.11766\ m)(4)} = 2.4155\ kN$$

Since the provided multiple-choice options strictly match the calculation derived from the **Uniform Pressure Theory**, we will proceed with UPT to satisfy the board problem requirements while noting this distinction. However, take note of the following:

- **Uniform Pressure Theory (UPT)** assumes the clutch surfaces are perfectly flat and rigid, which is only true for **brand-new, un-worn clutches**.
- **Uniform Wear Theory (UWT)** assumes that wear is proportional to the product of pressure and velocity, which represents a **worn-in/used clutch**. UWT is always the safer, more conservative choice because it yields a lower torque capacity for the same axial force (meaning a higher axial force is required to transmit the same torque).