Gear Calculations – Group 6

Input Speed (ω_i): 67 RPM

Desired Output Speed (ω_o): 15 RPM $\pm$ 0.075 RPM

Achieved Output Speed (ω_{gear6}): 14.98684 RPM

Gear Ratio Calculation:

$$GR = \frac{\omega_i}{\omega_o} = \frac{67}{15} = 4.46667$$

Proposed Gearing Solution:

Gear A = 12 teeth

Gear B = 24 teeth

Gear C = 12 teeth

Gear D = 24 teeth

Gear E = 34 teeth

Gear F = 38 teeth

$$GR = \frac{z_o}{z_i} = \frac{B}{A} * \frac{C}{D} * \frac{F}{E} = \frac{24}{12} * \frac{24}{12} * \frac{38}{34} = 4.47059$$

Speed of Individual Gears:

$$\omega_{gear\ A} = 67\ RPM$$

$$\omega_{gear\ B} = \frac{\omega_{gear\ A}}{GR_{AB}} = \frac{67}{2} = 33.5\ RPM$$

$$\omega_{gear\ C} = 33.5\ rpm$$

$$\omega_{gear\ D} = \frac{\omega_{gear\ C}}{GR_{CD}} = \frac{33.5}{2} = 16.75\ RPM$$

$$\omega_{gear\ E} = 16.75\ RPM$$

$$\omega_{gear\ F} = \frac{\omega_{gear\ E}}{GR_{EF}} = \frac{16.75}{1.1176} = 14.98684\ RPM$$