POWER: Solutions to the problems

① The strategy we can use here is

$$P = \frac{W}{t} \quad \leftarrow \quad W = \Delta E$$

Therefore,

$$W = \Delta E = PE_f - PE_i = 70\,kg \times 10\,\frac{m}{s^2} \times 3\,m = 2100\,J$$

$$P = \frac{W}{t} = \frac{2100\,J}{3.5\,s} = 600\,W$$

$$P = 600\,W\ \frac{1\,HP}{736\,W} = 0.82\,HP$$

② According to the principle of conservation of mechanical energy:

$$W_{F,Ff} = \Delta E \longrightarrow W_F + W_{Ff} = \Delta PE \longrightarrow$$

$$\longrightarrow W_F + (1534N \times 28\,m \times \cos 180°) = 2150\,kg \times 10\,\frac{m}{s^2} \times 28\,m$$

$$\longrightarrow W_{F\,elevator} - 42952\,J = 602.000\,J$$

$$\longrightarrow W_{F\,elevator} = 644.952\,J$$

$$P = \frac{W}{t} = \frac{644\,952\,J}{15\,s} = 42997\,W = 43\,kW$$