Groundwater Flow Between Wells

A. Flow is from Well B to Well A
(High head to low head)

B. Use Darcy's law

$$Q = -K \frac{h_2 - h_1}{s} A$$

$h_A = 275\,m$

$h_B = 300\,m$

$s = 300\,m$

$A = 150\,m \times 250\,m = 37{,}500\,m^2$

$K = 10\,cm/sec = 0.1\,m/s$

└ Note you need to change the units

$$Q = -0.1\,m/s \frac{275\,m - 300\,m}{300\,m} \times 37{,}500\,m^2$$

$$\boxed{Q = 312.5\ m^3/sec}$$

$1\ m^3/sec = 327\ gal/day$

so $\boxed{Q = 1 \times 10^5\ gal/day}$

C. Average linear Velocity

$$v = \frac{q}{n_e} \quad \text{where } q = -K \frac{h_2 - h_1}{s}$$

$q = 0.01\ m/s$

Effective porosity from model → n_e

$$v = \frac{0.01\ m/s}{0.30}$$

$v = 0.03\ m/s$

$v = \frac{d}{t} \Rightarrow t = \frac{d}{v}$

$$t = \frac{300\,m}{0.03} = 10{,}000\ sec$$

$\boxed{t = 0.12\ days}$