The average flow rate of blood in the aorta is 4.2×10^{-6} m^3/s and it has a radius of 1.3 cm, the viscosity of blood is (2.084×10^{-3} Pa.s). The average blood velocity (in cm/s) is

a. 0.8 **b.** 0.6 **c.** 0.7 **d.** 0.9

From the information of problem 6, what is the flow resistance per meter (in Pa.s m^{-4})

a. 2.38×10^5 **b.** 1.86×10^5 **c.** 4.56×10^5 **d.** 4.88×10^5

$Q = 4.2 \times 10^{-6}$

$r = 1.3 \times 10^{-2}$

$\eta = 2.084 \times 10^{-3}$

a-) $Q = AV$

$4.2 \times 10^{-6} = (\pi)(1.3 \times 10^{-2})^2 V$

$V = 7.9 \times 10^{-3}$

$= 0.8 \times 10^{-2}$

$= 0.8$ cm

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b-) $\frac{R}{\ell} = ??$

resistance per meter

$R = \frac{\Delta P}{Q}$

$\frac{R}{\ell} = \frac{\Delta P}{\ell Q}$ ← ضرب الطرفين في $\frac{1}{\ell}$

$Q = \frac{\pi \Delta P R^4}{8 \eta \ell}$

$Q = \frac{\Delta P}{\ell} \cdot \frac{\pi R^4}{8\eta}$

$\frac{\Delta P}{\ell} = \frac{Q 8\eta}{\pi R^4}$

$= \frac{4.2 \times 10^{-6} * 8 * 2.084 \times 10^{-3}}{\pi (1.3 \times 10^{-2})^4}$

$= 0.78$

$\frac{R}{\ell} = \frac{0.78}{4.2 \times 10^{-6}}$

$= 185808.0047$

$= 1.86 \times 10^5$