Topic: Poiseuille's law

Question: Use Poiseuille's law to find the flow of blood in the human artery in which $n = 0.029$, $R = 0.009$ cm, $L = 4$ cm, $P = 3{,}800$ dynes/cm^2.

Answer choices:

A 8.44×10^{-5} cm^2/sec

B 8.44×10^{-5} cm^3/sec

C 8.44×10^{-4} cm^3/sec

D 8.44×10^{-4} cm^2/sec

Solution: B

To find blood flow using Poiseuille's law, you use the formula

$$F = \frac{\pi P R^4}{8nL}$$

where F is blood flow, P is the pressure difference in the artery between the beginning of the artery to the end of the artery, R is the radius of the artery, n is the viscosity of the blood, and L is the length of the artery.

Plugging everything we've been given into the Poiseuille's law formula gives

$$F = \frac{\pi(3{,}800)(0.009)^4}{8(0.029)(4)}$$

$$F = 8.44 \times 10^{-5}$$

Topic: Poiseuille's law

Question: Use Poiseuille's law to find the flow of blood in the human artery in which $n = 0.031$, $R = 0.011$ cm, $L = 3.5$ cm, $P = 3{,}900$ dynes/cm^2.

Answer choices:

A 2.067×10^{-4} cm^3/sec

B 2.067×10^{-4} cm^2/sec

C 2.067×10^{-5} cm^3/sec

D 2.067×10^{-5} cm^2/sec

Solution: A

To find blood flow using Poiseuille's law, you use the formula

$$F = \frac{\pi P R^4}{8nL}$$

where F is blood flow, P is the pressure difference in the artery between the beginning of the artery to the end of the artery, R is the radius of the artery, n is the viscosity of the blood, and L is the length of the artery.

Plugging everything we've been given into the Poiseuille's law formula gives

$$F = \frac{\pi(3{,}900)(0.0011)^4}{8(0.031)(3.5)}$$

$$F = 2.067 \times 10^{-4}$$

Topic: Poiseuille's law

Question: Use Poiseuille's law to find the flow of blood in the human artery in which $n = 0.0285$, $R = 0.013$ cm, $L = 4.5$ cm, $P = 3{,}700$ dynes/cm^2.

Answer choices:

A 3.236×10^{-5} cm^3/sec

B 3.236×10^{-4} cm^2/sec

C 3.236×10^{-5} cm^2/sec

D 3.236×10^{-4} cm^3/sec

Solution: D

To find blood flow using Poiseuille's law, you use the formula

$$F = \frac{\pi P R^4}{8nL}$$

where F is blood flow, P is the pressure difference in the artery between the beginning of the artery to the end of the artery, R is the radius of the artery, n is the viscosity of the blood, and L is the length of the artery.

Plugging everything we've been given into the Poiseuille's law formula gives

$$F = \frac{\pi(3{,}700)(0.013)^4}{8(0.0285)(4.5)}$$

$$F = 3.236 \times 10^{-4}$$