Answer on Question #61869-Physics-Mechanics

1. The figure attached is water fall which is 50 m high. Water falls in a section of the fall at the rate of 1.2×106kgs−1. How much power is generated by the fall?

Solution

$$P = \frac{dE}{dt}.$$

$$E = mgh.$$

$$P = \frac{dm}{dt}gh = (1.2 \cdot 10^6)(9.8)(50) = 5.9 \cdot 10^8 W.$$

2 The bulk modulus of water is 2.1GPa. Calculate the volume contraction of 100 mL when subjected to a pressure of 1.5 MPa

a. 0.045 mL

b. -0.071 mL

c. 0.033 mL

d. -0.027 mL

Solution

$$Av_\circ = -Pv_\circ/B$$

$$B = -Pv_\circ/\Delta v_\circ$$

$$B = 2.1GPa$$

$$P = 1.5MPa = 1.5 \cdot 10^6 Pa$$

$$v_\circ = \frac{100ml}{1000}$$

$$\Delta v_\circ = -\frac{Pv_\circ}{B} = -\frac{(1.5 \cdot 10^6)(0.1)}{2.1 \cdot 10^9} = (-7.1 \cdot 10^{-5} mL)(1000) = -0.071ml$$