

$$P = \frac{(3\pi^2)^{2/3} \hbar^2}{5m} \left(\frac{Nd}{V} \right)^{5/3}$$

Noting that

$$\frac{d}{dV} V^{-5/3} = -\frac{5}{3} V^{-8/3}$$

we have

$$\frac{dP}{dV} = -\frac{5}{3} P V^{-1} \tag{1}$$

Hence

$$B = -V \frac{dP}{dV} = \frac{5}{3} P$$

From problem 5.21(d)

$$P = 3.80 \times 10^{10} \text{ N/m}^2$$

Hence

$$B = \frac{5}{3} P = 6.33 \times 10^{10} \text{ N/m}^2$$