8-10)

I'm going to skip part (b).

a) $J = F\,\Delta t = 1000(0.15) = 150\ \text{N}$
b) Skipped
c) So here were told to assume a head floating in space on its own, initially at rest.

$$J = \Delta p = m_{Head}v_f - m_{Head}v_i = m_{Head}v_f.$$

$$v_f = \frac{J}{m_{Head}} = \frac{150}{10} = 15\ \text{m/s}.$$

d) So, let's discuss. The average brain is maybe 1.4 kg. Let's examine what approximately happens to a brain during such a blow. The head, and presumably brain, achieve a speed of 15 m/s in 0.15 second. That's an acceleration of

$$a = \frac{\Delta v}{\Delta t} = \frac{15 - 0}{0.15} = 100\frac{m}{s^2} = 10\ a_g!$$

How does the brain accomplish such a high acceleration? A force of

$$F = m_{Brain}a = 1.4 \times 100 = 140\ \text{N}$$

was applied by the inside of the skull. A similar force will be applied to the rear of the brain as the head eventually comes to rest. This is why persons with external head trauma often experience indirect damage to the brain.