## Butler, Brown, Stephenson & Speakman, *Animal Physiology* Solutions to numerical exercises

## **Chapter 17**

## **Question 17.1**

The amplification factor in this instance refers to the ratio between the energy associated with the one action potential (5 × 10<sup>-11</sup> J) that was triggered and the energy of the photon that has triggered it (hc/ $\lambda$  = 6.626 × 10<sup>-34</sup> J s × 2.998 × 10<sup>8</sup> m s<sup>-1</sup>/420 nm = 1.99 × 10<sup>-25</sup> J m /(4.20 × 10<sup>-7</sup> m) = 4.7 × 10<sup>-19</sup> J). Consequently, the amplification factor in this case is 5 × 10<sup>-11</sup> J/4.7 × 10<sup>-19</sup> J = 1.06 × 10<sup>8</sup> = **106,000,000**.