Opto-Electronics Question 8.5:

a)

$n := 50\%$ quantum efficiency

$\eta := 0.5$

$\lambda := 0.9 \cdot 10^{-6} \cdot m$

$h := 6.626 \cdot 10^{-34} \cdot J \cdot s$

$c := 2.998 \cdot 10^{8} \cdot \frac{m}{s}$

$e := 1.602 \cdot 10^{-19} \cdot C$

$$R := \frac{\eta \cdot e \cdot \lambda}{h \cdot c}$$

$$\boxed{R = 0.36 \frac{A}{W}}$$ Responsivity

b)

$I := 10^{-6} \cdot A$ photo current

$$P := \frac{I}{R}$$

$$\boxed{P = 2.76 \times 10^{-6} W}$$ Received optical power

c)

$$f := \frac{c}{\lambda}$$

$$r_p := \frac{P}{h \cdot f}$$

$$\boxed{r_p = 12.484 \times 10^{12} \frac{1}{s}}$$ number of received photons