

### Task 2(1)

If the input power budget of your power supply is 1440W, and you use a current limiting resistor with each LED 330 ohm. Estimate how many LEDs could be put in parallel that is suitable for this power budget

Lets assume that the number of LEDs= $N$  and also the efficiency of the power source is 85% and that the LEDs voltage = 2 volts

First, let's calculate the power consumption of each LED= $X$ . The power consumption can be calculated using Ohm's Law:

$$X = V^2 / R$$

where  $V$  is the voltage across the LED and  $R$  is the resistance of the current-limiting resistor.

$$X = (2\text{volts})^2 / 330\Omega = 0.012$$

Next, we need to consider the efficiency of the power supply

$$\text{Real power} = 0.85 * 1440W = 1224W$$

Finally we determine the number of LEDs= $N$

$$N = \text{Real power} / X = 1224W / 0.012W = 100,980 \text{ LEDs}$$

The number will be the same if its parallel or series because we didn't use the total resistance

$$X = \frac{V^2}{R}$$

$$X = 0.012$$

$$P = N \times P$$

$$P = 1224W$$

$$N = P / X = 100980 \text{ LEDs}$$