Question 1

$R_{\text{opt}} = 45\Omega$

**Question 2**

$R \geq 260.5\Omega$ or $R \leq 3.45\Omega$

Question 3

In this case, the combined effective resistance for these four resistor is still 45Ω, so the engine will still get 120mA current supply. However, since these four resistor now in parallel, each of them will only receive $120/4 = 30\text{mA}$ current now. The current is reduced to $1/4$ of the original, while each resistors' resistance is increased by 4, this resulted in the power on each resistor reduced to $1/4$ of the original ($648\text{mW}/4 = 162\text{mW}$), which is in the limit of 250mW.

Question 4 & 5
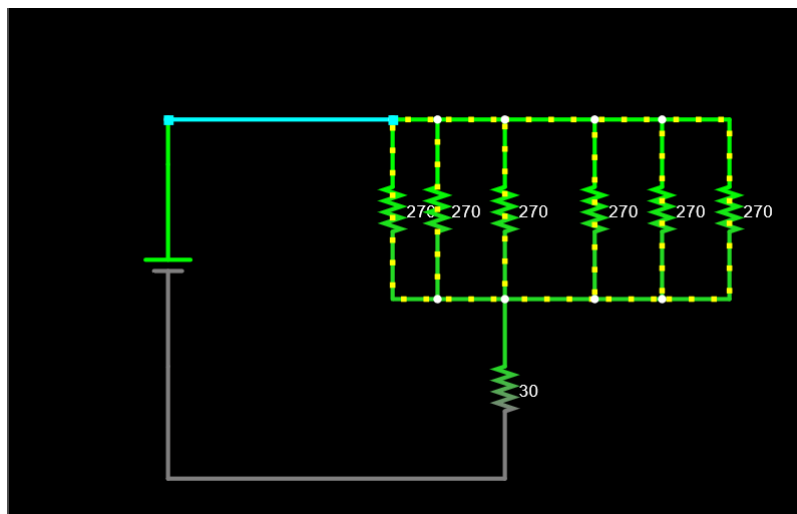
6 resistor of $45 \cdot 6 = 270\Omega$ each in parallel also works.