You are giiven a number of 10 ohm resistors is capable of dissipating only 1.0 W without being destroyed . what is the minimum number of such resistors that you need to combine in series or parallel combinations to a 10 ohm resistor that is capable of dissipating at least 5.0 W ? Draw the circuit diagram showing the arrangement you propose to achieve the above result?

Solution:

P=R*I^2, where P is power, R is resistance, I is current

I^2=P/R

I^2=5/10=0.5

I=0.7 amp

4 Resistors are combined in parallel.

Sum resistance is Rs=2.5 ohm

We need to combine it to 10 ohm. It's 4 "blocks".

U=I*R where U it's voltage on resistor

U=1.75

P=(U^2)/R

P=0.3 W it's power on one resistor.

Answer: