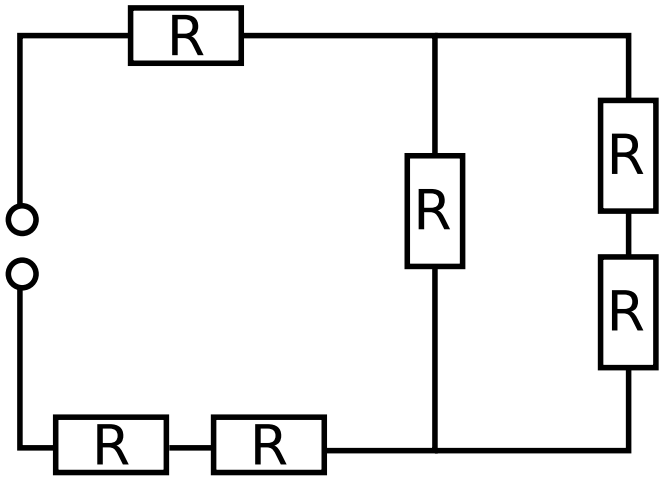
1. izpit iz Fizike 2, smeri NTF (UNI, I. st.)

Čas reševanja: 90 min

19. 6. 2023

1. We build a capacitor from two flat plates. Each has a surface area of 200 cm^2, the distance between the plates is 1 cm.
   (a) What is the capacitance of the capacitor?
   (b) What is the electric field between the plates, if we apply 10 V across the plates?
   (c) Small particle is at rest right next to the positively charged plate. Determine the speed it gains while traveling to the negatively charged plate. Neglect air drag. The mass of the particle is 1 g, its charge is 2 μAs.

2. We build an electric circuit consisting of many 5 Ω resistors, as shown on the picture.
   (a) Calculate the joint resistance of the circuit.
   (b) What electrical power is dissipated on the circuit, if it is driven by variable voltage with an amplitude of 100 V?



3. We use a lens to project an image of an object. The object is 5 m from the screen, while the screen is 30 cm away from the lens.
   (a) What focal length should we chose for the lens?
   (b) What will be the magnification of the image formed on the screen?

4. We have a gas cylinder filled with nitrogen gas at 150 bar. The temperature of the gas is the same as of the environment. We perform a two step process on the gas. First, we quickly open the gas cylinder until the pressure inside drops to 80 bar. We then close it again and wait for the temperature to return to the initial temperature of the surrounding environment. What is the final pressure of the nitrogen gas in the gas cylinder? The ration of heat capacities for nitrogen is $\kappa = 1{,}40$. Hint: on of the steps is adiabatic.