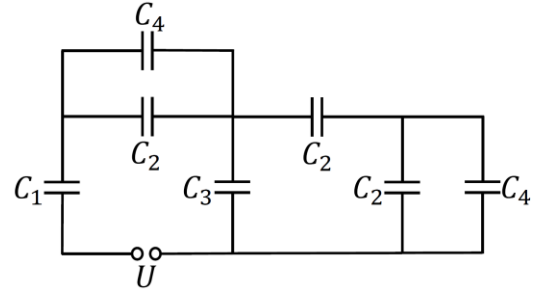
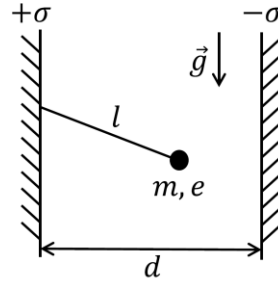


3. izpit iz fizike - 21. 8. 2020

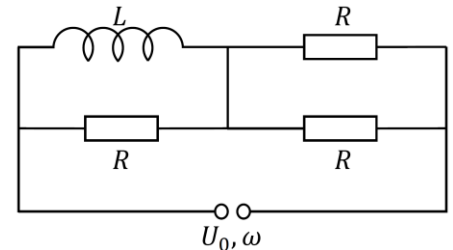
1.) Izračunaj nadomestno kapaciteto celotnega vezja in naboj ki se nabere na kondenzatorju s kapaciteto C_3 . $C_1 = 1 \mu F$, $C_2 = 2 \mu F$, $C_3 = 3 \mu F$, $C_4 = 4 \mu F$ in $U = 25 V$.



2.) Lokostrelec na sredini ravnega polja cilja glinenega goloba, ki je izstreljen iz topa na tleh s hitrostjo $v_{G0} = 10 m/s$ direktno navzgor. Lok s puščico je $H = 1 m$ nad tlemi in $D = 100 m$ oddaljen od topa, puščica pa je izstreljena pod kotom $\alpha = 45^\circ$ glede na tla v trenutku izstrelitve glinenega goloba. S kolikšno začetno hitrostjo v_{p0} mora lokostrelec izstreliti puščico za uspešen zadetek? Pod kakšnim kotom glede na tla zadane glinenega goloba?



3.) V kondenzator s površinsko gostoto naboja $\sigma = 8.85 \mu As/m^2$ ter razdaljo med ploščama $d = 1 m$ postavimo kroglico z maso $m = 1 kg$ in nabojem $e = 9.81 \mu As$. Z izolacijsko vrvico dolžine $l = 0.5 m$ povežemo kroglico in steno kot kaže slika. Kolikšen je kot med vrvico in steno? S kolikšno silo je napeta vrvica? Vrvico prerežemo. Koliko časa potrebuje kroglica da zadane steno kondenzatorja? S kolikšno hitrostjo jo zadane?

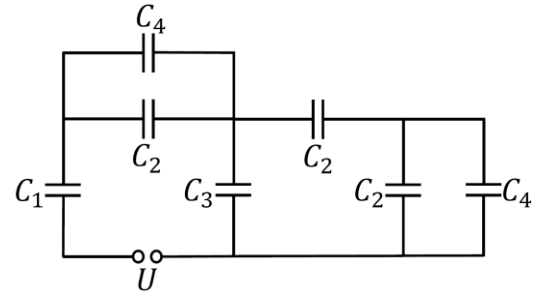


4.) Izračunaj amplitudo toka, fazni zamik med tokom in napetostjo ter moč ki se troši v izmeničnem vezju prikazanem na sliki. $U_0 = 10 V$, $\omega = 10^4 Hz$, $L = 0.1 mH$, $R = 100 \Omega$.

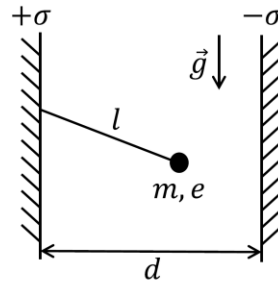
5.) Nekje v prostoru brez gravitacije se nahaja telo z maso $m = 0.5 kg$ in nabojem $e = 0.2 As$. V nekem trenutku v tem prostoru vklopimo homogeno električno polje katerega velikost se linearno spreminja s časom kot $E = kt$, kjer je $k = 2 Vm^{-1}s^{-1}$. Kolikšna je velikost hitrosti telesa in za koliko se premakne telo v $t = 10 s$?

3. exam in physics - 21. 8. 2020

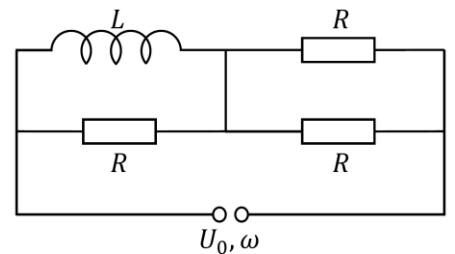
1.) Calculate the equivalent capacitance of the entire circuit as well as the charge that builds up in the capacitor with the capacitance C_3 . $C_1 = 1 \mu F$, $C_2 = 2 \mu F$, $C_3 = 3 \mu F$, $C_4 = 4 \mu F$ in $U = 25 V$.



2.) An archer in the middle of a flat field is trying to hit a clay pigeon, which is shot out of a cannon on the ground with a speed of $v_{G0} = 10 m/s$ directly upwards. The bow and arrow are held $H = 1 m$ above ground and are $D = 100 m$ away from the cannon. The arrow is shot at an angle of $\alpha = 45^\circ$ with respect to the ground at the moment the clay pigeon is shot out. What is the initial speed of the arrow v_{P0} in the case of a successful hit? At which angle does the arrow hit the clay pigeon?



3.) We place a ball with mass $m = 1 kg$ and charge $e = 9.81 \mu As$ in a capacitor with a surface charge density $\sigma = 8.85 \mu As/m^2$ and a distance between the two plates $d = 1 m$. We connect the ball and one of the walls with an isolating string of length $l = 0.5 m$ as is shown on the image. What is the angle between the string and the wall? What is the force of tension in the string? We cut the string. How much time does it take for the ball to reach the capacitor's wall? At what speed does the ball hit the wall?



4.) Calculate the current amplitude, phase shift between the current and voltage and the power expended in the alternating circuit shown on the image. $U_0 = 10 V$, $\omega = 10^4 Hz$, $L = 0.1 mH$, $R = 100 \Omega$.

5.) Somewhere in some space without gravity there is a body with mass $m = 0.5 kg$ and charge $e = 0.2 As$. In some moment we turn on a homogeneous electrical field in this space, which changes its magnitude linearly with time as $E = kt$, where $k = 2 Vm^{-1}s^{-1}$. What is the speed of the body and the distance it travels in $t = 10 s$?