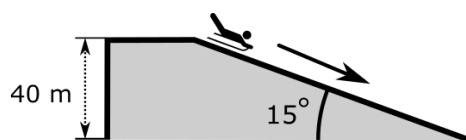
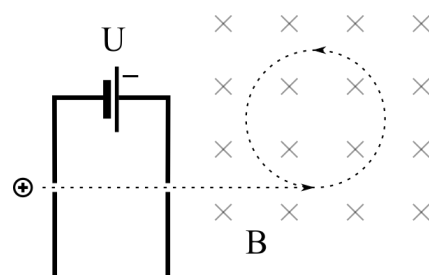


3. izpit iz fizike - 24. 8. 2017

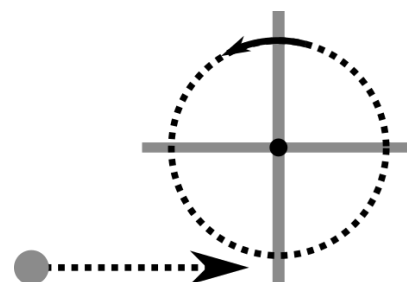
1.) Športni sanklač se spusti s sanmi z vrha 40 m visokega klanca z naklonom 15 stopinj. Koeficient trenja med sanmi in klanecem je 0,15. Koliko časa potrebuje, da doseže dno klanca? Kolikšno največjo hitrost doseže pri spustu? S kolikšno silo pa mora vleči 8 kg težke sani, da se po klanecu navzgor premikajo s konstantno hitrostjo? Sanklač vleče s silo, ki je vzporedna s klanecem.



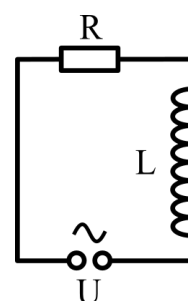
2.) Kolikšen je naboj delca z maso $1 \mu\text{g}$, če pri hitrosti 10^5 m/s zaradi magnetne sile kroži v homogenem magnetnem polju $0,5 \text{ T}$ po krožnici s polmerom 15 cm ? Kolikšna centripetalna sila deluje na krožeč delec? S kolikšno pospeševalno napetostjo smo pospešili delec do te hitrosti, če je bila pred pospeševanjem njegova hitrost zanemarljiva?



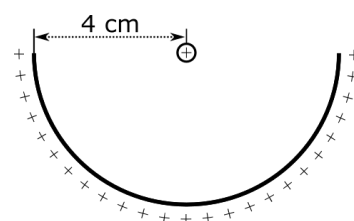
3.) $0,8 \text{ kg}$ težak križ sestavljen iz štirih palic z dolžino $0,5 \text{ m}$ leži v vodoravni ravnini in je vrtljivo vpet na središču. Iz smeri pravokotno na palico s hitrostjo 20 km/h prileti kepa plastelina z maso $0,2 \text{ kg}$ in se prilepi na konec palice. S kolikšno kotno hitrostjo se začneta okoli osi vrteti križ in plastelin po trku? Kako se rezultat spremni, če se plastelin od križa odbije tako, da takoj po trku leti nazaj v nasprotni smeri s hitrostjo 2 km/h ?



4.) Generator izmenične napetosti s frekvenco 50 Hz zaporedno zvežemo z upornikom z upornostjo 100Ω in tuljavo z neznano induktivnostjo. Po vezju teče efektivni tok $0,1 \text{ A}$. Če upornik nadomestimo z drugim, ki ima upornost 60Ω , teče po vezju efektivni tok $0,15 \text{ A}$. Izračunaj induktivnost tuljave in amplitudo napetosti na generatorju.

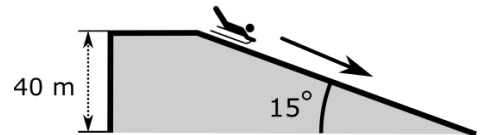


5.) Tanko plastično žico, ki je enakomerno nabita z nabojem $2 \times 10^{-8} \text{ As}$, upognemo v obliko polkroga z radijem 4 cm . V središču polkroga držimo kroglico z maso 3 g in nabojem 10^{-8} As (glej sliko). S kolikšnim pospeškom se bo začela gibati kroglica, ko jo spustimo? Kolikšno največjo hitrost doseže kroglica, če žica ves čas miruje?

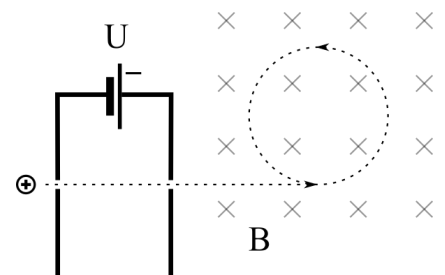


3rd written exam in physics, 24/08/2017

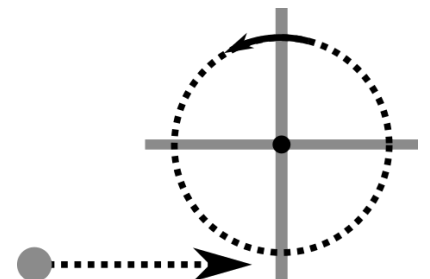
1.) A sledder slides down a 40 meter high slope with a 15 degree inclination. The coefficient of friction between the sled and the slope is equal to 0.15, the mass of the sled is equal to 8 kg. How long before he reaches the bottom of the slope? What is his maximum speed during the descent? With what force must he pull the sled up the hill if he wants to move with a constant speed? The sledder pulls with a force that is parallel to the slope.



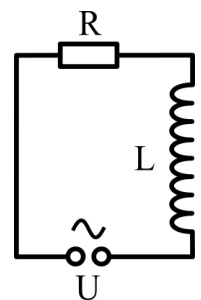
2.) A particle with mass equal to 1 mg and speed equal to 10^5 m/s is travelling inside a homogeneous magnetic field of density 0.5 T. What is its charge if the radius of its path is equal to 15 cm? What is the magnitude of the centripetal force acting on the particle? What accelerating voltage was used to accelerate the particle to its current speed, assuming the particle's speed before acceleration was negligible?



3.) A cross composed of four 0.5 m long arms and weighing 0.8 kg lies in a horizontal plane and can freely rotate around its center. A piece of clay weighing 0.2 kg perpendicularly impacts the the end of one of the arms at 20 km/h. What is the angular speed of the rod after the impact if the clay sticks to the rod? How would the result change if the clay were to bounce back from the rod in the direction opposite to its original trajectory, with a speed of 2 km/h?



4.) An AC generator set to a frequency of 50 Hz is wired in series with a resistor and a coil. At first, we use a resistor with a resistivity equal to 100Ω and the effective current flowing through the circuit is equal to 0.1 A. Then, we replace the resistor with a new resistor that has a resistivity of 60Ω - the effective current is now equal to 0.15 A. Calculate the inductance of the coil and the amplitude of the voltage on the generator.



5.) A thin plastic wire is bent into a half-circle with radius of 4 cm and evenly charged with a charge of 2×10^{-8} As. A small sphere carrying a charge of 10^{-8} As and weighing 3 g is held in the centre of the half-circle (see figure). What will the acceleration of the sphere be when we release it? What will the final velocity of the sphere be if the wire is held in place?

