

USEFUL RESOURCES

The updates, homework assignments, and useful links for APC can be found on SchoolNova's web page:
https://schoolnova.org/nova/classinfo?class_id=adv_phy_club&sem_id=ay2021

The practical information about the club and contacts can be found on the same web page.

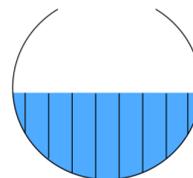
TODAY'S MEETING

Today we discussed two problems from the previous assignment. The unfinished problems are reassigned as a homework and one more additional problem is suggested.

IMPORTANT: Homework is crucial for the success of the program. Club members have a dedicated Discord server where they can discuss problems and solve them together.

CLASSWORK

1. A spherical tank of radius R is half-filled with water (see picture). It is known that in a unit time a volume q of water is evaporated per unit area of the water's surface. In what time will all of the water from the tank evaporate?

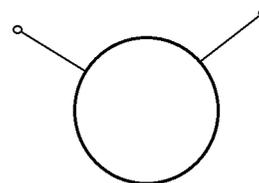


2. a) Find the mass of the Earth knowing the free fall acceleration on its' surface $g = 9.8 \text{ m/s}^2$ and its' radius $R = 6370 \text{ km}$. b) Find the escape velocity for the Earth.

HOMEWORK

In some problems you might need to use some physical constants or material properties which were not given in order not to hint on the solution. You could use Google search (try to choose a credible source).

1. A pan filled with cold ($t = 10^\circ\text{C}$) water is placed on a burner. After 10 minutes the water starts boiling. How long would it take to evaporate the water completely on this burner?
2. What would be the charge of a piece of iron with volume 1 cm^3 if someone managed to take away 1% of electrons contained in it? What would be the force of interaction between two such pieces of iron placed 1 km apart from each other?
3. There is a wire with total resistance 10Ω . A ring is made out of this wire. Where should one attach two other wires (of negligible resistance) to it so that the resistance between the free ends becomes 1Ω ?



4. a) In the class we estimated mass of the Earth to be around $6 \cdot 10^{24} \text{ kg}$. Knowing that the Earth's radius is about 6400 km, find average density of the Earth. Does it meet your expectations?
 b)* (You would need to use some creativity for this problem) Estimate the total mass of the oceans on the Earth. Estimate the total mass of Earth's atmosphere. What fractions are these masses from the total Earth's mass?

FOR THE NEXT MEETING

IMPORTANT: The next club's meeting is at 4:00pm, via Zoom, on Sunday, **October 17**.