

Examen elektrodynamica

24 juni 2013 - (voormiddag & namiddag)

Om ambiguteit in terminologie te vermijden zijn de vragen in het Engels opgesteld. Als je bepaalde woorden of vragen in het Nederlands wilt vertaald krijgen, kan je dit om het even wanneer komen vragen. Het examen is mondeling met schriftelijke voorbereiding.

1. Give a brief answer to the following questions and explain clearly and precisely why your answer is correct. Estimates have to be correct in the order of two.
 - (a) A ring is given a kick, so it starts to twirl. A current now runs through it. Explain and give an estimate.
 - (b) ...
 - (c) Suppose we put a bunny on a conducting platform and charge it to 1 μC . Estimate the total amount of energy required. (Model the bunny as a sphere with a 10 cm radius.)
 - (d) Because of the shock, the bunny starts hopping around. Estimate the amount of radiated energy per jump. (You can model the bunny as an oscillator with a 1 m amplitude.)
 - (e) I take a glass of water and fill it with a couple of milk drops. What happens to the transmitted light?
 - (f) The ionosphere is a dilute layer of ionized gas surrounding the earth. Explain why low-frequency radio waves reflect off the ionosphere, but visible light doesn't.
 - (g) I'm staring at a pond on a sunny day. The sun reflects off on the water's surface. I put on my polarized sunglasses so I can see the bottom of the pond.
 - (h) What does the universe look like to light?
2. Rederive the whole theory behind the frequency dependence of permittivity (Griffiths 9.4.3) for the case, where a constant magnetic field \mathbf{B} is applied along the z-axis.