January 16, 2017 Student name:

Theory	Task1	Task2	Task3	AddOns	Result

1. Coulomb's law.

2. Ohm's law – both [integral and differential] notations

3. Four [main] Maxwell equations.

4. Boundary conditions for E, D – interface between two dielectrics – tangential components
5. Boundary conditions for E, D – interface between two dielectrics – normal components
6. Boundary conditions for B, H – interface between two magnetics – tangential components

7. Biot-Savart's law

8. Wave equation for E

9. Skin depth

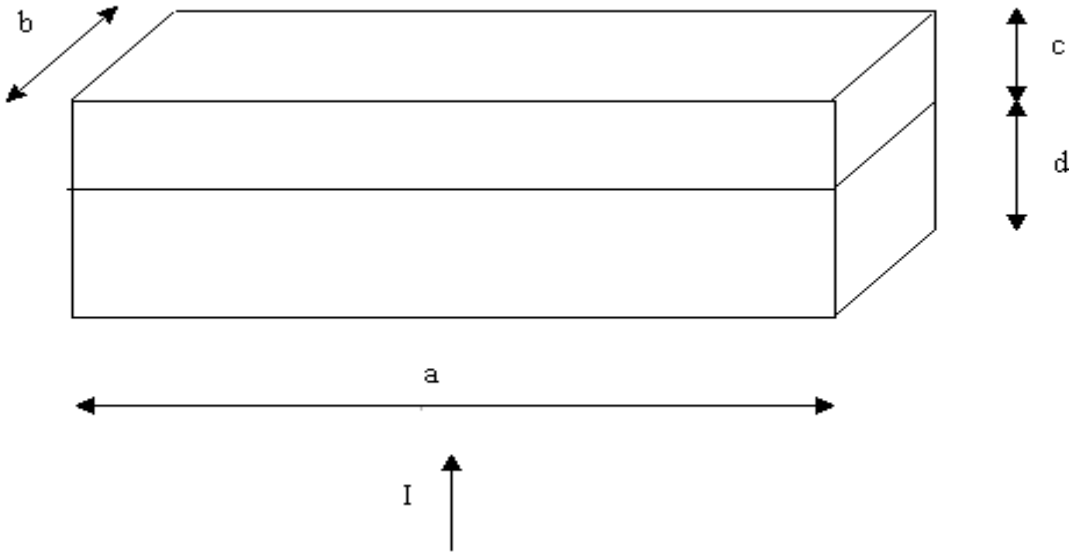
10. Poynting vector – definition

January 16, 2017 Student name:

TASK 1:

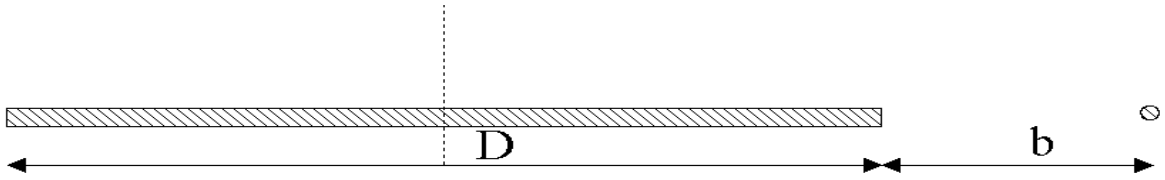
DC current I = 125 A flows up through a set of two conductors of equal crossection, but unequal conductivities. Upper one exhibits σ_1 = 5000 S/m, while the lower one σ_2 = 3000 S/m. Dimensions a = 2000 mm, b = 15 mm, c = 5 mm, d = 8 mm. Current density is homogeneous.

Specify: a) current density and b) dissipated power



TASK 2:

DC current I = 25 A flows down through a long sheet of metal and returns back through a wire of a negligible crossection. Both conductors are surrounded by vacuum. The length of the transmission line is L = 100 m, D = 50 mm, b = 25 mm.
Question: Specify the force caused by the current (consider a current density equally distributed over the sheet).



TASK 3:

An electromagnetic wave, propagating through air from a distant source, carries average power of 2kW per square meter. The wave frequency is equal to 3 GHz.

Specify:

a) Maximum Electric field intensity E and
b) Wavelength of the wave.