Problems levels + cables

1. The primary parameters of a cable at a frequency of 1591.549Hz (ω=10000rad/s) are 68Ω/km and 68nF/km. What load impedance has to be connected to the output of the cable in order to have at the input of the cable an input impedance equal with the load impedance? It depend this impedance on the length of the cable?

2. On a 600Ω resistance it is measured a -6dBm absolute level. Which is the amplitude of the sine signal generating this level?

3. At the input of a 3km long cable having the attenuation constant 0.4Np/km it is applied a sine signal with a level of -5dBm. Which is the level obtained at the output of the cable expressed in mW?

4. The A parameters of a cable segment are the following: $A_{11}=A_{22}=2$, $A_{12}=3$, $A_{21}=2$. If the load impedance connected to the cable has the value 2-j3, calculate the input impedance of the cable.

5. The primary parameters of a cable at a 1591.549Hz frequency (ω=10000rad/s) are the following: 100Ω/km and 40nF/km. If at the input of the cable it is applied a sine signal having the amplitude 1V and phase 0 rad, calculate the amplitude and the phase of the signal obtained at the output of the cable.

6. Give the relation used to compute the absolute power level of a tone respectively of a signal having the frequency band f_1-f_2.

7. At the input of a 3km long cable having the attenuation constant 0.4Np/km it is applied a -5dBm level sine signal. Which is the level of the signal obtained at the output of the cable and which is the amplitude of this signal if the load impedance is 500Ω?

8. Calculate the absolute power level of a probabilistic signal having the dynamic range [-2;2] and the probability density function 1/x.

9. Calculate the absolute voltage level of a 2V amplitude sine signal. The load impedance is 500Ω.

10. Calculate the absolute power level of a rectangular signal with amplitude 1V 25% duty factor. The modulus of the complex impedance is 300Ω. Which is the reference power used in this case?