1) 115(16): Lorentz Transformation in the Faraday Disk.

The Lorentz transformation produces the result:

$$\underline{E}' = \underline{E} + \underline{v} \times \underline{B} \quad -(1)$$

Consider the orbital velocity of the rim of the rotating disk:

$$\underline{v} = \frac{v^{(0)}}{\sqrt{2}} \left( \underline{i} - i\underline{j} \right) \exp(i\Omega t) \quad -(2)$$

where $\Omega$ is its angular frequency. In order to apply the Lorentz transform it has to be assumed that this is instantaneously linear. The magnetic field of the magnet is:

$$\underline{B} = B^{(0)} \underline{k} \quad -(3)$$

The real and physical part of eq. (2) is:

$$\underline{v} = \frac{v^{(0)}}{\sqrt{2}} \left( \underline{i} \cos(\Omega t) + \underline{j} \sin(\Omega t) \right) \quad -(4)$$

Therefore:

$$\underline{v} \times \underline{B} = v^{(0)} \frac{B^{(0)}}{\sqrt{2}} \left( \underline{i} \sin(\Omega t) - \underline{j} \cos(\Omega t) \right) \quad -(5)$$

which is $v^{(0)}$ multiplied by the real part of:

$$\underline{B} = -\frac{B^{(0)}}{\sqrt{2}} \left( i\underline{i} + \underline{j} \right) \exp(i\Omega t) \quad -(6)$$

which is a rotating <u>magnetic</u> field, <u>not an</u> <u>electric</u> <u>field</u>.

Lorentz transformation does not explain the Faraday paradox.