DIFFERENCES/ SIMILARITIES B/W ELECTRIC & GRAVITATIONAL FORCES:-

Similarities :-

Gravitational Force	Electric Force
• Gravitational force is conservative force because work done is independent of path followed.	• It is also a conservative force.
• Gravitational force varies inversely with square of distance between two bodies i.e $F_g = \frac{Gm_1m_2}{r^2}$	• Electric force also varies inversely with square of distance between two charges i.e $F_e = \frac{1}{4\pi\epsilon_0}\frac{q_1q_2}{r^2}$

Differences :-

Gravitational Force	Electric Force
• Magnitude of gravitational force is very weak that's why gravitational constant G has very small value. $G = 6.673 \times 10^{-11} Nm^2kg^{-2}$.	• Electric Force is stronger than the gravitational force $\frac{1}{4\pi\epsilon_0} > G$ because constant k has very large value. $k = 9 \times 10^9 Nm^2C^{-2}$
• Gravitational force is always attractive force.	• This may be attractive or repulsive.
• This force is not affected by medium between two bodies.	• It is affected by medium between two charges.

Potential Gradient:

Definition: It is defined as:

"The quantity $\Delta V / \Delta r$ gives the maximum value of rate of change of potential with distance because the charge has been moved along a field line along which distance between two plates is minimum."

$\Rightarrow E = -$ (Potential Gradient)

Negative sign indicates that $\vec{E}$ is along decreasing potential.

SI Units:

$$E = \frac{\Delta V}{\Delta r} =$$

$$E = \frac{V}{m} = \frac{N}{C}$$

$$E = Vm^{-1} = NC^{-1}$$