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Q NO: 1

Charge is usually transferred by electron because electrons are not affected by the strong force, and so they only get trapped by the electrical attraction of nucleus which is much weaker in ionized atoms. Therefore, it is easier for electrons to transfer the charge.

Q NO: 5

A gravitational field vector points towards the earth, and an electric field vector points towards electrons because when it moves to proton a positive charge placed in the vacinity of

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of a proton is pushed away from proton, so the electric field also moves away from proton.

Q NO : 7

Lightning rods are normally taller then the building because the lightning rod is capable of ionizing the surrounding air and making it more conductive so due to its ionizing power it is taller then the building.

Q NO : 6

$Q = 0.0001$

$W = 0.3125 \times 10^{19} eV = 0.500680194 j$

$V = ?$

$W = VQ$

$V = \frac{W}{Q} = \frac{0.500680194}{0.0001}$

$V = 5006.8 V$

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Q NO : 3

$Q = -3\mu C$

$\vec{F} = 13\hat{i} + 9\hat{j}$

$E = ?$

$E = \frac{\vec{F}}{Q} = \frac{13\hat{i} + 9\hat{j}}{-3 \times 10^{-6}}$

=

Long Question:

Symmetry.

It is an allangement of charges that can be rotated about an axis and/or reflected in a mirror and still look the same

Plane symmetry

A plane symmetry is a symmetry of a pattern in the Euclidean plane: that is transformed of the plane that caries line to lines and preserve

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many different distance.

Spherical symmetry:

An analogous 3-dimensional equivalent term is called as spherical symmetry.

Cylindrical symmetry:

In cylindrical symmetry, there is only one axis of rotation, and it is always vertical. It is usually found in towers, columns and domes.

Electric field.

Since the charge is uniformally distributed on the surface the electric field E must point perpendically away from plane, $\vec{E} = E\hat{k}^n$

We consider a gaussian surface of uniform plane of charge.

The total flux is

$$\Phi_E = \iint_S \hat{E}\cdot\hat{dA} = \iint_{S_1} \hat{E_1}\cdot dA_1 + \iint_{S_2} \hat{E_2}\cdot\hat{dA_2} + \iint_{S_3} \hat{E_3}\cdot dA_3$$

$$= E_1A_1 + E_2A_2 + 0$$

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$= (E_1 + E_2)A$

$\Phi_E = 2EA$

$2EA = \frac{Q_{enc}}{\varepsilon_0} = \frac{\sigma A}{\varepsilon_0}$

$E = \frac{\sigma}{2\varepsilon_0}$

In unit vector notation

$$\vec{E} = \begin{cases} \frac{\sigma}{2\varepsilon_0}\hat{k}, & z > 0 \\ -\frac{\sigma}{2\varepsilon_0}\hat{k}, & z < 0 \end{cases}$$