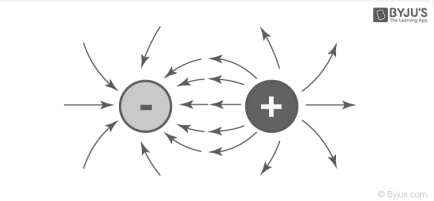
Basic notations

K of vacuum	9×10^9
E	electric field
q	charge
r	distance between 2 charges
a	radius of circle
V	electrical potential due to a point charge
U	electric potential energy

electrostatics



Electric field due to point charge

$E = Kq/r^2$

E due to a spherical shell of charge

When point is outside the shell	$E = Kq/r^2$
When point is inside the shell	$E = 0$
When point is on the surface	E max = Kq/a^2

here r is the distance between the centre of the circle and a point outside it

E due to a nonconducting charged sphere

When point is outside the shell	$E = Kq/r^2$
When point is inside the shell	$E = Kqr/a^3$
When point is on the surface	E max = Kq/a^2

here r is the distance between the centre of the circle and a point outside it

Electrical potential due to point charge

$V = Kq/r$

V due to conducting charged sphere

When point is outside the shell	$V = Kq/r$
when point is inside the shell	$V = Kq/a$
when point is on the surface	$V = Kq/a$

U of a system of charges

1. 2 point charges -
$U = Kq1q2/r12$
2. 3 point charges -
$U = K (q1q2/r12 + q2q3/r23 + q1q3/r13)$

r12, r23, r13 are all distances between the corresponding charges

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