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PHY102 - ELECTRICITY, MAGNETISM AND MODERN PHYSICS

_____ and thunder are two common phenomena in our hot and humid atmosphere in Nigeria.
Lightning

Lightning and _____ are two common phenomena in our hot and humid atmosphere in Nigeria.
Thunder

The two common phenomena in our hot and humid atmosphere in Nigeria are _____and thunder
Lightning

The two common phenomena in our hot and humid atmosphere in Nigeria are Lightning and _____
thunder

Lightning and thunder are two common phenomena in our hot and humid atmosphere in_____.
Nigeria

A _____ Benjamin Franklin demonstrated as long ago as 1752 that thunder clouds are charged with electricity.
Physicist

_____ demonstrated as long ago as 1752 that thunder clouds are charged with electricity.
Benjamin Franklin

A physicist Benjamin Franklin demonstrated as long ago as 1752 that _____are charged with electricity.
Thunder clouds

A physicist Benjamin Franklin demonstrated as long ago as 1752 that thunder clouds are charged with_____.
Electricity

Benjamin Franklin demonstrated in _____ that thunder clouds are charged with electricity.
1752

The charged clouds when discharged in the atmosphere give rise to a great spark referred to as _____
Lightening

The amount of electric current during the discharge of charged clouds is_____
20KA

The _____which gives rise to lightning produces a great amount of heat.
Electric discharge

The electric discharge which gives rise to _____ produces a great amount of heat.
Lightning

The electric discharge which gives rise to lightning produces a great amount of_____.
Heat

In a fraction of a_____, temperature rises to about 150000C.
Second

In a fraction of a second, _____ rises to about 150000C.
Temperature

In a fraction of a second, temperature rises to about_____.
150000C

The lightening develops in a small area which is about _____ in width.
20cm

When the sound is reflected by clouds, hill or any other obstacle we hear the _____of clouds.
Roaring

When the sound is reflected by clouds, hill or any other obstacle, we hear the roaring of_____.
Clouds

The roaring of clouds is heard when_____
The sound is reflected by clouds, hill or any other obstacle

The forces between electric charges are very large.
True

The force responsible for holding electrons to nuclei to form atoms and for holding the groups of the atoms together to form molecules, solids and liquids is called_____
Electrostatic force

Electrostatic force is also called_____
Electric force

The study of static charges is known as_____.
Electrostatic

The are _____ types of electric charge
Two

The ancient _____ discovered that amber when rubbed with silk acquired the property of attracting light objects such as pieces of chaff.
Greeks

The ancient Greeks discovered that _____ when rubbed with silk acquired the property of attracting light objects such as pieces of chaff.
Amber

Who discovered that other substances exhibit the same effect and that the magnitude of the effect is roughly proportional to the area of the surface rubbed?
William Gilbert

_____ discovered that there are two kinds of electricity.
Du Fay (1745)

Du Fay (1745) discovered that there are _____kinds of electricity.
Two

_____ebonite rods when rubbed with fur exert a force of repulsion on each other.
Two

Two _____rods when rubbed with fur exert a force of repulsion on each other.
Ebonite

Two ebonite rods when rubbed with fur exert a _____on each other.
Force of repulsion

Two ebonite rods when rubbed with fur exert a force of _____on each other.
Repulsion

The two kinds of electricity can neutralize each other's effect
True

The two kinds of electricity called _____and negative
Positive

The two kinds of electricity called positive and _____
Negative

The two kinds of electricity called _____ and _____
Positive and negative

_____ rubbed with silk is said to have a positive charge
Glass

Ebonite rubbed with fur has_____ charge.
Negative

Glass rubbed with silk is said to have a positive charge and ebonite rubbed with fur a negative charge.
True

The law of force between charges states that like charges repel, unlike charges attract

The nucleus is made up of _____and electron.
Proton

The nucleus is made up of proton and _____.
Electron

The neutron is neutral (no charge) which the proton and electron have equal but opposite charges (positive and negative).

The proton and neutron in the nucleus are held together very tightly by_____.
Nuclear force

The force holding electron to the atomic nucleus is much weaker than the nuclear force.
True

This process of charging the bodies by means of rubbing them together is called_____.
Charging by friction

SI stands for_____
System International

Electric charge is measured in _____
Coulombs

The SI symbol for coulombs is_____
C

Coulombs is defined in terms of_____.
Ampere

A _____ is the quantity of charge flowing per second through a conductor in which there is a steady current of 1A.
Coulomb

A coulomb is the quantity of charge flowing per second through a conductor in which there is a steady current of_____.
1A

A coulomb is the quantity of charge flowing per second through a _____in which there is a steady current of 1A.
Conductor

A _____is the amount of charge that flow through a cross-section of a wire in one second if there is a steady current of one ampere (IA) in the wire.
Coulomb

The algebraic sum of the equal and opposite charges on two bodies is_____.
Zero

_____ is a conserved quantity.
Electric charge

Electric charge is a _____quantity.
Conserved

Electric charge is a conserved quantity.
True

Electric charge is a conserved_____.
Quantity

The charge conservation law states that the total electric charge in an isolated system, that is, the algebraic sum of the positive and negative charge present at any time does not change.

The smallest charge that is possible to obtain is that of an_____.
electron or proton

The magnitude of the forces between charged spheres was first investigated quantitatively in _____
1785

The magnitude of the forces between charged spheres was first investigated quantitatively in 1785 by_____
Charles Coulomb

Charles Coulomb is a _____scientist.
French

Who observed that the electrostatic force between the two sphere is proportional to the product of the charges and is inversely proportional to the square of their distance apart?
Charles Coulomb

Coulomb's law may be stated in mathematical terms as

$$F \alpha \frac{Q_1 Q_2}{r_2}$$

Where F is the electric force between the two charges Q1 Q2, distance r apart. We can turn the above expression of proportionality to as equation by writing

$$F = \frac{Q_1 Q_2}{r^2} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.3$$

Where K is a constant.

$$K = \frac{1}{4\pi\varepsilon} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 3.4$$

Where the constant ε depends on the material surrounding the charges, and is called permittivity.

The permittivity of a vacuum is denoted by εo (pronounced as epsilon nought) and is called the permittivity of free space

The permittivity of a vacuum is denoted by εo called_____
Permittivity of free space

The permittivity of air at standard temperature and pressure (s.t.p) is _____.
1.0005εo

Coulomb's law gives force on negative charge due to _____
The positive charge

Coulomb's law gives force on negative charge due to the positive charge as follows:

$$F = \frac{1}{4\pi\varepsilon o}\frac{q_1 q_2}{r^2}$$

$$F = \frac{(9 \times 10^9 \text{ N m}^2\text{C}^{-2})\ (5 \times 10^{-6}\text{C})\ (-12 \times 10^{-6}\text{C})}{(0.30\text{m})^2}$$

$$= -6 \text{ N}$$

The minus sign shows that the force is in the negative x-direction that is towards west. Therefore, it is a force of attraction.

The total force on q1 will be the vector sum of forces on q1 due to q2 and q3 independently. This is the_____.
Principle of Superposition

An _____is a region where an electric charge experiences a force
Electric field

Electric field is measured in _____
Newtons Coulomb

An electric field can be represented by _____or lines of force.
Electric field lines

An electric field can be represented by electric field lines or_____.
Lines of force

A _____ is defined as a path along which a free positive point charge would travel in an electric field
Field lines

The direction of an electric field is taken to be that of the direction of the forces on a positive charge, the field surrounding a point positive charge is radially outward

Figure 3.6: The nature of field lines
(a) Two unlike charges
(b) Two like charges



Figure 3.6 (a)

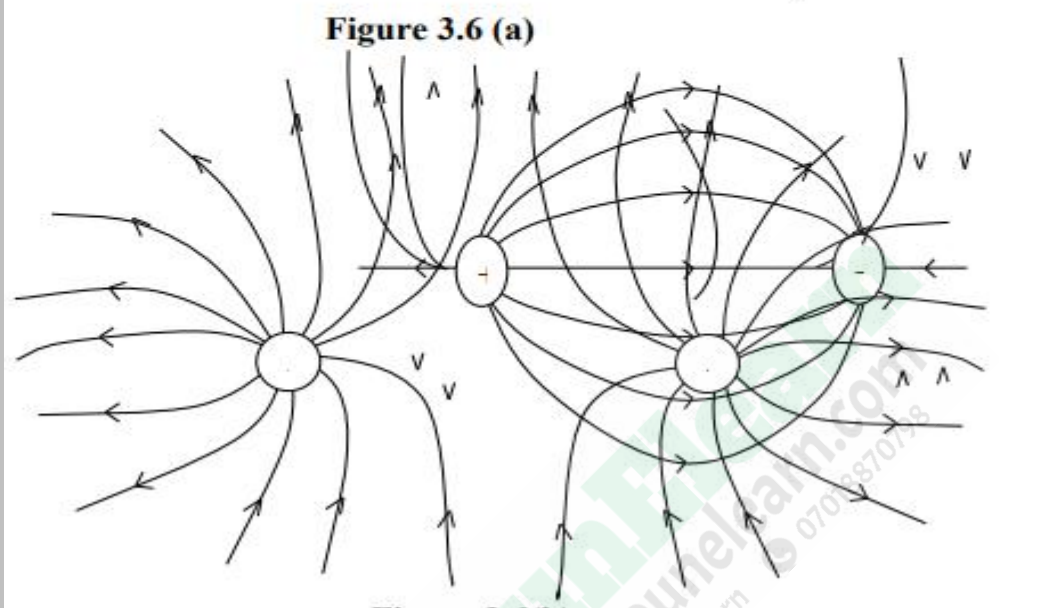


Figure 3.6(b)

There are only _____types of electric charge
Two

The unit of charge is the _____
Coulomb (C)

Charge is always conserved.
True

The algebraic sum of the charges in a closed system does not change
True

The force between two charges is proportional to the product of their charges and inversely proportional to the square of the distance between them.

Electric lines of force are visual ways of representing an_____.
Electric field

_____ law expresses the relation between an electric charge and the electric field that it sets up.

Gauss's law

Gauss's law is a consequence of _____ law.
Coulomb's

The number of the lines of force crossing any surface depends on _____factors
Three

The number of the lines of force crossing any surface depends on the following factors

- the field strength, E
- the surface area, S
- the orientation of the surface relative to the electric field

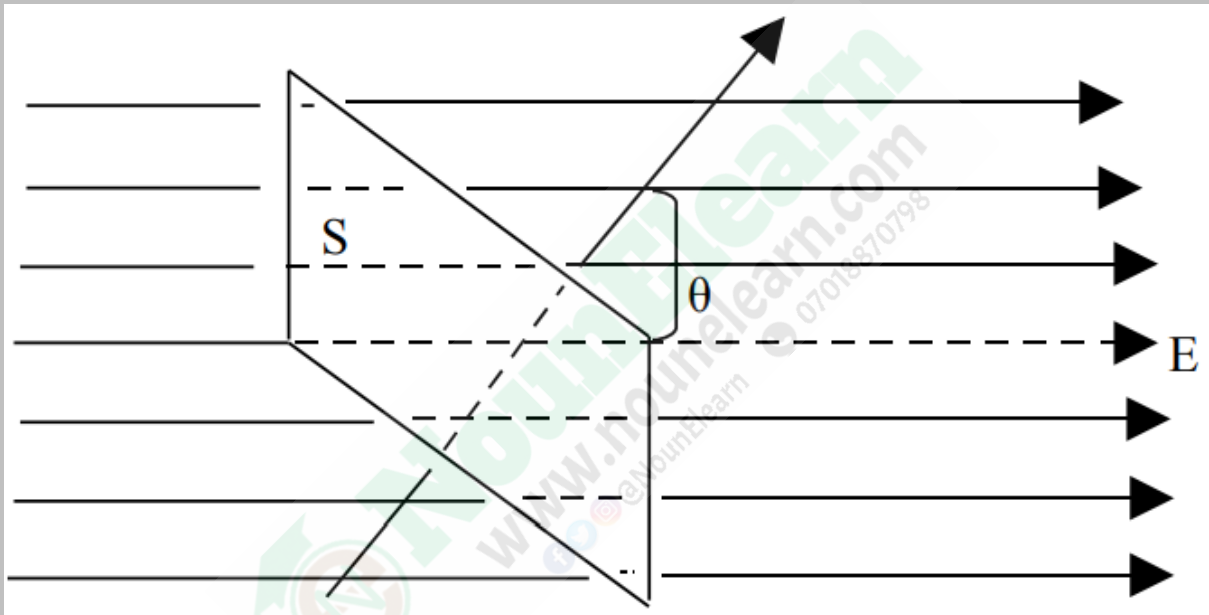


Figure 3.1

_____ states that the electric flax through the sphere is proportional to the charge and is independent of the radius of the surface.
Gauss's law

Gauss's law applies to any hypothetical closed surface called a_____.
Gaussian surface

_____ applies to any hypothetical closed surface and enclosing a charge distribution.
Gauss's law

A charge distribution is spherically symmetric if the charge density (that is, the charge per unit volume) at any point depends only on the distance of the

point from a central point (called centre of symmetry) and not on the direction.

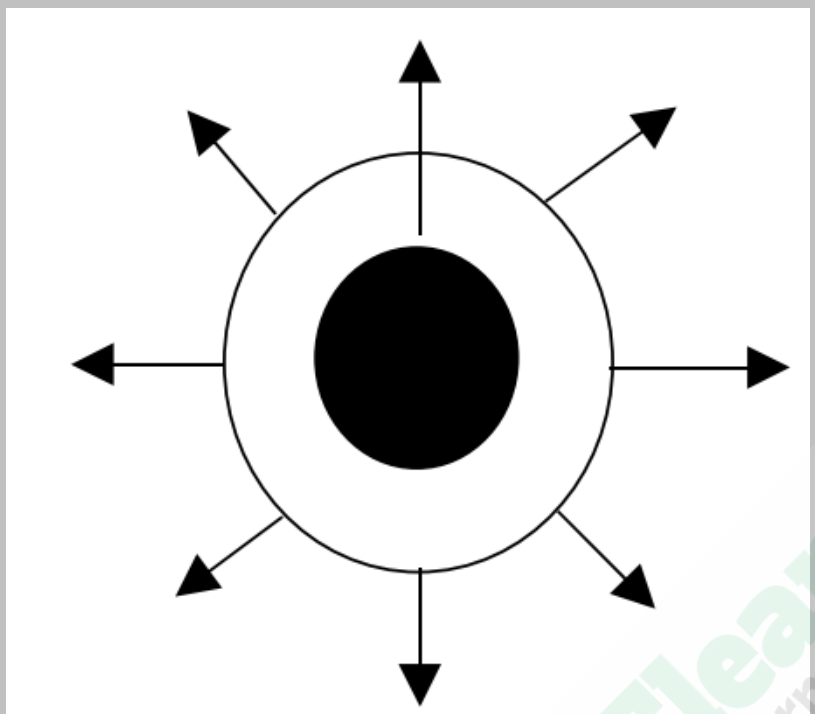


Figure 3.4

Figure 3.4 represents a spherically symmetric distribution of charge such that the charge density is high at the centre and zero beyond r.

Example of spherically symmetric charge distributions are:

- a point charge
- a uniformly charged sphere
- a uniformly charged thin spherical shell

How do we now take advantage of the spherical symmetry?
Because of the spherical symmetry, the electric field is the same at all points on the Gaussian surface

A charge distribution has cylindrical symmetry when it is infinity long and has a charge density that depends only on the perpendicular distance from a _____axis
Line called symmetry

If a body A exerts a force on another body B and work is done a transfer of energy occurs which is measured by the_____.
Work done

_____ at a point in a field can be defined as the work done per unit charge moving from infinity to the point.

Electric potential

Electric potential is a property of a point in a field and is a scalar since it deals with a quantity of work done or potential energy per unit charge.

The symbol for potential is V

The unit of Electric potential is joule per coulomb (JC-1) or volts (V).

A pair of equal and opposite charge, ±q, separated by a vector distance a is called a dipole.

A molecule consisting of a positive and negative ion is an example of an electric dipole in nature. An atom consists of equal amount of positive and negative charges whose centre coincide, hence an atom is neutral for all points outside it.

A positive potential energy means that work has to be done to assemble the like charges together.

If the product q1 q2 is negative (unlike charges) the potential energy is negative.

A negative potential energy means that work has to be done to pull the charges away from each other.

The total potential energy of the system is the algebraic sum of the potential energies of all pairs of charges.

The electrostatic potential energy is the energy stored in a system of charges.

_____ is equal to the amount of work done in assembling the system together by bringing the charges from infinity.

The unit of C is coulomb per volt (CV-1) also known as a Farad (F)

Relative permittivity has no units

True

For air at atmospheric pressure Er = 1.0005 which is close enough to unity and so for most purposes Eair = Eo.

Dielectric	Relative Permittivity Er
Vacuum	1.0000
Air at s.t.p	1.0005
Polythene	2.3
Perspex	2.6
Paper (waxed)	2.7
Mica	7
Water (pure)	80
Barium titanate	1200

When a dielectric material is subjected to a sufficiently strong electric field it becomes a_____
Conductor

When a dielectric material is subjected to a sufficiently strong electric field it becomes a conductor. This phenomenon is known as _____
Dielectric breakdown

Capacitors may be classified into _____broad groups
Two

Capacitors may be classified into two broad groups: fixed and variable

An electrolytic capacitor consists of two electrodes of aluminum called the positive and the negative plates.

The positive plate is electrolytically coated with a thin layer of_____.
Aluminium oxide

There are _____types of electrolytic capacitors
Two

There are two types of electrolytic capacitors- the wet type and the dry type.

The _____of a capacitor is a measure of its ability to store electric charge.
Capacitance

A _____ is a device which can store electric charge
Capacitor

The _____is defined as that direction in which a positive charge moves.
Direction of current

_____ is defined as the current per unit area perpendicular to the velocity of the charge carriers
Current density

The unit of resistance is _____
volt per ampere

A resistance of 1 VA-1 is called _____
1 Ohm (IΩ)

A perfect conductor has _____resistivity
Zero

A perfect insulator an _____ resistivity.
Infinite

The resistivity of all metallic conductors increases with increasing temperature
True

_____ is a measure of energy transfer
Work

The _____ of a source converted into electrical energy, when unit charge passes through it.
Electromotive force

EMF stands for _____
Electromotive Force

A battery or dynamo is said to produce an electromotive force.

A _____ in a network is a point where three or more conductors are joined.
Branch point

A _____is any closed conducting path.
Loop

_____ is the algebraic sum of the currents toward any branch point is zero.

Point rule

_____ algebraic sum of the e.m.f.s in any loop equals the algebraic sum of the IR products in the same loop.
Loop rule

The _____states formally that no charge accumulates at a branch point.
Point rule

An _____is normally connected in series so that the current passes through the meter.
Ammeter

The most used method of measuring resistance is the_____.
Wheatstone bridge

A practical form of the Wheatstone bridge is the _____
Meter bridge

The _____consists of a resistance wire of uniform cross-section through which a steady current is passed.
Potentiometer

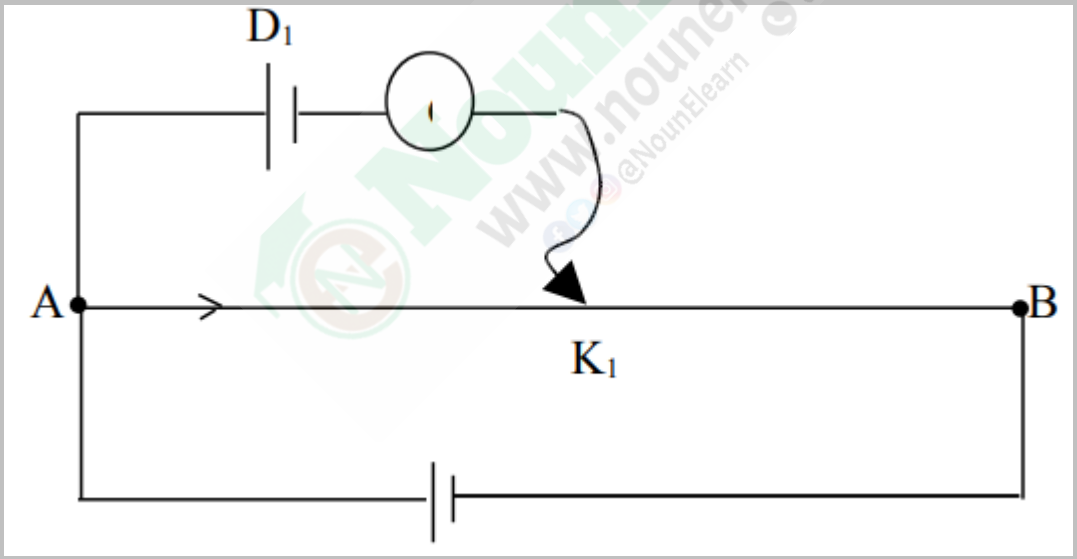


Fig: The Potentiometer

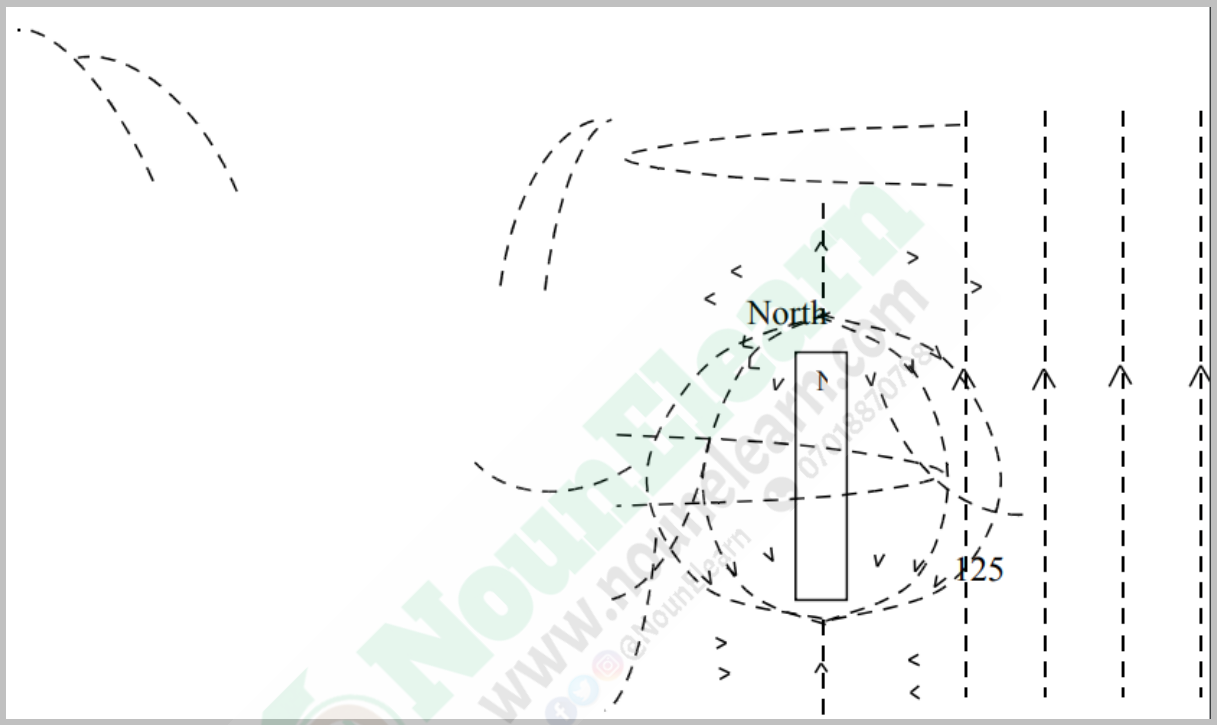
The first magnetic phenomena to be observed were those associated with _____magnets.
Natural

The magnetic properties of a magnet appear to originate at certain regions in the magnet which are referred to as the_____.
Poles

The space surrounding a magnet where a magnetic force is experienced is called a_____.
Magnetic field

A magnetic field can be represented by magnetic field lines drawn so that:

- The line (or the tangent to it if is curved) gives the direction of the field at that point
- The number of lines per unit cross-section area is an indication of the "strength" of the field.



A _____ is a place where two magnetic fields are equal and opposite and the resultant force is zero.
Neutral point

A _____carrying an electric current is surrounded by a magnetic field.
Conductor

A conductor carrying an _____is surrounded by a magnetic field.
Electric current

A conductor carrying an electric current is surrounded by a_____.
Magnetic field

The _____ is a useful aid for predicting the direction of the field, knowing the direction of the current.

Right-hand screw rule

The right-hand screw rule states that if a right-handed screw moves forward in the direction of the current (conventional), then the direction of rotation of the screw gives the direction of the lines.

The field pattern due to a current in a long cylindrical coil called the _____
Solenoid

A _____ produces field similar to that of a bar magnet.
Solenoid

_____is defined as the force per unit charge and the gravitaional field strength
Electric field strength

_____ is defined as the force acting per unit current length
B-field

The force acing per unit on a conductor which carried unit current and is at right angles to the direction of the magnetic field is called_____
Flux density

A ' Vs' is called a_____
Weber

The _____ is the basic electrical unit of the SI system.
Ampere

The frequency f is called the_____.
Cyclotron frequency

CRO stands_____
Cathode Ray Oscilloscope

_____ of an electron beam is used in the cathode-ray tubes of modern oscilloscopes.
Electrostatic deflection

Electrostatic deflection of an _____is used in the cathode-ray tubes of modern oscilloscopes.
Electron beam

Electrostatic deflection of an electron beam is used in the cathode-ray tubes of modern_____.
Oscilloscopes

There are _____sets of deflecting plates
Two

The _____ is the most familiar of all machines for accelerating charged particles and ions to a high velocity.
Cyclotrons

A charged particle moving in a uniform electric field follows a parabolic path because_____
It is subjected to a constant acceleration

Solid conductors of ions as in the sodium-sulphur cell are also known as_____.
Electrolytes

_____are molten ionic compounds or solutions containing ions
Electrolytes

The electrode by which the flow of electrons enters the electrolyte is called the _____
Cathode

_____is used for the refining of impure copper.
Electrolysis

The anode is made from impure copper and the cathode from a thin sheet of pure copper.

The _____ becomes coated with a thick layer of pure copper.
Cathode

The _____of a substance is the mass liberated in electrolysis by 1 coulomb.
Electrochemical equivalent

Ionic Theory of Electrolysis was put forward by _____in 1887.
Arrhenius

Ionic Theory of Electrolysis was put forward by Arrhenius in_____.
1887

A _____ is a system in which two electrodes are in contact with an electrolyte.
Cell

In an _____ a current from an outside source is passed through the electrolyte to produce chemical change.
Electrolytic cell

In an electrolytic cell a current from an outside source is passed through the _____to produce chemical change.
Electrolyte

In an electrolytic cell a current from an outside source is passed through the electrolyte to produce _____change.
Chemical

The commonest 'dry' cell is the _____
Dry Leclarche

The two important 'rechargeable' cells in common use are the lead-acid type, and the nickel-cadmium alkaline type.

Secondary cells are also referred to as _____
Accumulators

Solutions that conduct electricity are called_____.
Electrolytes

In an electrolyte the metallic and hydrogen ions are _____.
Positive

In general, primary cells have to be discarded after use and are popularly called 'dry' batteries

_____ cells can be charged and discharges repeatedly.
Secondary

Secondary cells can be charged and discharges repeatedly (but not indefinitely) and are generally called_____.
Accumulator

Secondary cells can be charged and discharges repeatedly
True

_____ theory of dissociation assumes that when an electrolyte enters solution part of it is dissociated into ions the extent of dissociation increasing with dilution.
Arrhenius

In an _____ protons emerge with neglegible kinetic energy from an ion source maintianed at a potential of 2.0x106V.
Electrostatic accelerator

In an electrostatic accelerator, _____emerge with neglegible kinetic energy from an ion source maintianed at a potential of 2.0x106V.
Protons

The proton beam emerging from the accelerator contains _____
10^{13} protons per second

NEPA stands for_____
National Electric Power Authority

Electric lamp filaments have to operate at even higher temperatures if they are to emit _____
Light

A _____ is a short length of wire often tinned copper selected to melt when the current through it exceeds a certain value.
Fuse

The calorie is not an SI unit of heat.
True

_____ is the rate of conversion of electrical energy
Electric power

A _____ is a device for protecting an apparatus or wiring from damage by overload.
Fuse

A device for protecting an apparatus or wiring from damage by overload is called_____
Fuse

The points of the Earth at which the magnetic field intensity is directed vertically are called_____.
Magnetic poles

The striaght line passing through the magnetic poles is called the_____.
Earth's magnetic axis

The circumference of the great circle in the plane perpendicular to the magentic axis is called the _____
Magnetic equator

The magnetic field of the earth is often called the _____
Total intensity

Two magntic fields can be compared by means of a _____

Deflection magnetometer

_____ are lines joining places on the map of the earth where the declination is the same.
Isogonic lines

_____ are lines which pass through places having zero declination
Agonic lines

_____ are lines joining places on the map of the earth where the magnetic dip is the same.
Isoclinic lines

A line passing through places having no dip is called_____
Aclinic line

_____ lines join up places on the map of the earth where the value of horizontal intensity is the same.
Isodynamic Lines

A _____ is a device which changes an alternating p.d from one value to another of greater or smaller value using the principle of mutual induction.
Transformer

One complete alternation is called a _____
Cycle

The unit of frequency is the _____
hertz (Hz)

The frequency of electricity supply in Nigeria is _____
50Hz

The effective value is also called the _____
root mean square

A _____ is a device with a low resistance to current flow in one direction and a high resistance for the reverse direction.
Rectifier

The conversion of a.c. to d.c is called_____
Rectification

Long cables are also called_____
Transmission lines

The arrangement of transmission lines is referred to as a_____.
Grid system

_____ is the conversion of a.c to d.c by a rectifier.
Rectification

Rectification is the conversion of a.c to d.c by a_____.
Rectifier

Rectifiers have a low resistance to current flow in one direction known as the _____
Forward direction

A _____ can be used if half-wave rectifiers prove to be unsatisfactory because there are times when there is no current.
full-wave rectifier

_____ is the process of obtaining a direct current from an alternating electrical supply.
Rectification

A _____ is an electrical device that allows more current to flow in one direction than the other
Rectifier

An electronic component such as a capacitor or resistor, that is incapable of amplification is referred to as a_____.
Passive element

An electronic component such as a transistor that is capable of amplification is said to be an_____.
Active element

An electron emitted from a sustance by irradiation as a result of the photoelectric effect is called a_____.
Photoelectron

In the _____effect, the energy of photons is converted into electrical energy.
Photoelectric

In the photoelectric effect, the energy of _____ is converted into electrical energy.
Photons

In the photoelectric effect, the energy of photons is converted into_____.
Electrical energy

The e.m.f of a thermocouple may be measured by means of a_____.

Potentiometer

_____ is the emission of electrons from metal surfaces when electromagnetic radiation of high enough frequency falls on them.
Photoelectric effect

Photoelectric effect was first noticed by the German Physicist called_____
Heinrich Hertz

Photoelectric effect was first noticed by the German Physicist Heinrich Hertz in _____
1887

_____ are ava cuated tubes in which the negative electrode is coated with potassium and cesium
Photocells

_____ are used as control devices.
Photocells

Photocells are used as _____ devices.
Control

_____ are used for the automatic control of traffic signals, automatic switching on and off the street lighting system, automatic opening and closing of doors, controlling the temperature of furnaces
Photocells

_____ is defined as the amount of energy equal to the change in energy of one electronic charge when it moves through a potential difference of one volt.
Electron volt

The surface cannot be penetrated by an electron unless an external source does work against the attractive force and thereby increases the kinetic energy of the electron. If this is done by heating the metal, the process is called_____.
Thermionic emission

The _____ is the generation of an e.m.f in a circuit containing two different metals or semiconductors, when the junctions between the two are maintained at different temperatures.
Seebeck effect

_____is the liberation of electrons from a substance exposed to electromagnetic radiation.

Photoelectric effect

The number of electrons emitted depends on the _____of the radiation.
Intensity

The kinetic energy of the electrons emitted depends on the _____of the radaition.
Frequency

_____ refers to the emission of electrons from a heated metal
Thermionic effect

_____ is used to produce the electron supply in cathode-ray tubes and x-ray tubes.
Thermionic emission

An ideal system that absorbs all incoming radiation is called a _____
Blackbody

In thermionic emission, the electron current per unit area is given by I = AT2 exp (- φ/KT)

A major surprise to physicists at the end of the nineteenth century concerned the distribution of wavelength's emitted by a_____.
Blackbody

An ideal system that absorbs all the incoming radiation is called a _____
Blackbody

Physicists study blackbody radiation by observing a hollow object with a _____
Small opening

The light emitted by the small opening is in equilibrium with the walls of the object because_____
It has been absorbed and re-emitted many times

In_____ , Max Planck developed a formula for blackbody radiation that was in complete agreement with experiment data at all wavelenghts.
1900

Who developed a formula for blackbody radiation that was in complete agreement with experiment data at all wavelengths?
Max Planck

_____ that blackbody radiation was produced by submicroscopic electric oscillators which he called resonators.
Planck proposed

Planck proposed that blackbody radiation was produced by submicroscopic electric oscillators called_____.
Resonators

According to planck's theory, the resonators absorb or emit energy in discrete units of light energy called quanta (now called photons) by "jumping" from one quantum state to another adjacent state.

According to _____ theory, the resonators absorb or emit energy in discrete units of light energy called quanta (now called photons) by "jumping" from one quantum state to another adjacent state.
Planck's

A _____ will radiate or absorb energy only when it changes quantum states.
Resonator

A resonator will radiate or absorb energy_____
Only when it changes quantum states

If a resonator remains in one quantum state no energy is absorbed or emitted.
True

Electromagnetic radiation can be classified according to the energy of its photons, wavelength or frequency

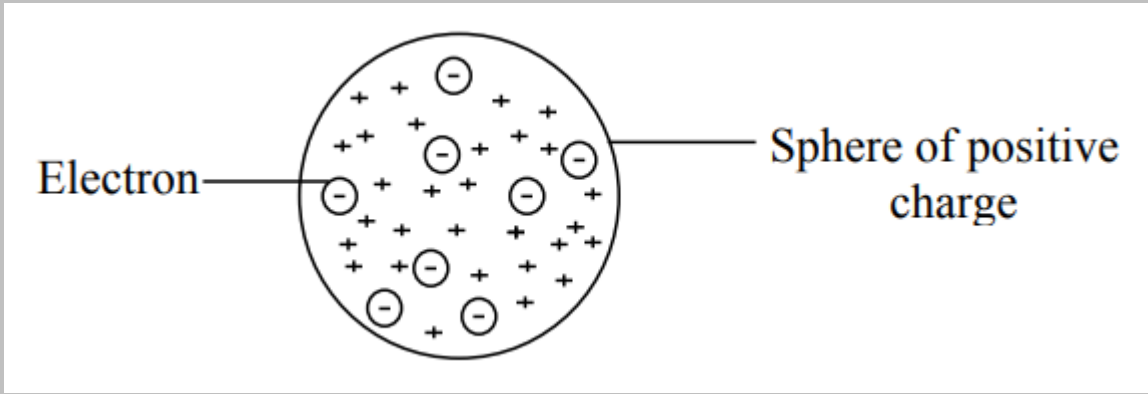
Photon energies are usually specified in electrovolts and wavelengths in angstrom unit.

The discovery of the electron in 1897 prompted J.J. Thomson (1856 – 1940) to suggest a new model of the atom.

The electron was discovered in_____
1897

The electron was discovered in 1897 by _____
J.J. Thomson

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In _____ Niels Bohr applied the quantum theory to the nuclear atom.
1913

In 1913 _____ applied the quantum theory to the nuclear atom.
Niels Bohr

In 1884 Balmer, a swiss schoolmaster, had discovered a formula representin the series of visible spectral lines of hydrogen.

The lowest of these energy levels is called the_____
Ground state

The higher levels are called_____.
Excited states

_____ are a form of electromagnetic radiation having short wavelengths and high frequencies about 1018 – 1019 Hz.
X-rays

The essentials of the x-rays tube were invented by _____in 1913.
Coolidge

The essentials of the x-rays tube were invented by Coolidge in_____.
1913

A _____ is a hypothetical body that absorbs all the radiations falling on it.
Blackbody

Black-body radiation is the electromagnetic radiation emitted by a black body.

_____ are electromagnetic radiation of shorter wavelenght than ultraviolet radiation produced by bombardment of atoms by high quantum – energy particles.
X-ray

The nucleus of the hydrogen atom consists of a single particle called_____
Proton

The mass of a proton is about _____ times that of an electron
1836

The energy of any bound system is restricted to certain discrete values which are called the _____.
Energy levels of the system

The spontaneous of a nucleus is called _____
Radioactivity

The protons and neutron both being constituents of the nucleus are called_____
Nucleons

The total number of protons and neutron is called the _____
Mass number

Nuclei with identical number of protons or identical number of neutrons belong to the same species and a nuclear species is called a_____
Nuclide

Nuclides with the same atomic number are called _____
Isotopes

IUPAP stands for_____
International Union of Pure and Applied Physics

_____ is a photon of electromagnetic radiation sometimes ejected by nuclei following beta or a alpha emission when the nucleus adjusts its energy levels.
Gamma Radaition

Radium 226 has a half-life of _____years
1622

_____ is the spontaneous distegration of certain atomic nuclei accompanied by the emission of alpha-particle (helium nuclei), beta – particles (electrons and positrons), or gamma radiation which are shortwavelength electromagnetic waves.
Radioactivity

The nucleus contains protons and neutrons collectively called_____
Nucleons

The total number of neutrons and protons is known as the _____
Mass number

A _____ is a collection of such atoms whose nuclei have the property of randomly but spontaneouly emitting radiation.
Radioactive source

The radioactive decay law states that a radioactive substance decays exponentially with time.

_____ are atoms or ions of the same element but with different numbers of nuleous,
Isotopes

_____ is produced when fast moving electrons are stopped as they heat a metal target
X-ray

_____ effect is the emission of electrons from metal surfaces when electromagnetic radiation of high enough frequency falls on them.
Photoelectric

If two different metals such as copper and iron are joined in a circuit and their juctions are kept at different temperatures, a small e.m.f is produced and current flows. This called_____
Thermoelectric effect

_____ is transmitted at high voltages to avoid loss of power but are distributed at low voltages for domestic use using step down transformers
Electricity

Electricity is transmitted at high voltages to avoid loss of power but are distributed at low voltages for domestic use using _____transformers
Step down

Electricity is transmitted at high voltages to avoid loss of power but are distributed at low voltages for domestic use using step down t_____
Transformers

Lenz's law is an expression of the principle of conservation of_____
Energy

The induced e.m.f is directly proportional to the rate of change of flux linkage. This is the statement of _____'s law
Faraday

Kirchhoff's loop rule is the statement of the conservation of_____

Energy

Kirchhoff's juntion (point) rule is the statement of the conservation of_____
Charge

The energy per unit charge converted form other forms to electrical energy is called_____
Electromotive force

Electric current is a_____ quantity.
Scalar

The maximum electric field a material can withstand without the occurrence of breakdown is called_____
Dielectric strength

An electrical insulator is also known as a _____
Dielectric

A negative charge_____ negative charge
repels

Electric charge between two bodies can be produced by_____
rubbing

The principle that electric forces add vectorially is known as the principle of_____
superposition

The force that is responsible for holding electrons to nuclei to form atoms is called the_____ force
Electrostatic

The magnitude of the forces between charged spheres was first investigated by Charles_____
Coulomb

A region where an electric charge experiences a force is_____ field
electric

The work done in taking a unit positive charge from one point to another in electric field is _____ of the path chosen between the two points.
Independent

The potential difference between two points B and A is equal to the_____ in taking a unit positive charge from A to B.
Work done

Whose law is employed in electrostatics ?
Coulomb

The energy stored in a system of charges is known as electrostatic potential_____
energy

Find the force on a charge 2C in a field 1Vm_____
2N

Electric field is measured in Newton per_____
Coulomb

The charges on capacitors connected in parallel are in the ratio of their_____
Capacitance

For capacitors in parallel, the potential difference across each capacitor is_____
the sam

For capacitors connected in series each has the same _____
Charge

The magnitude and direction of the earth's field varies with position over the_____ surface.
Earth

Field lines are drawn such that the lines per unit cross-section area is proportional to_____ field.
Electric

The_____ is the SI Unit of electric charge
Coulomb

When a charge density depends only on the perpendicular distance from a plane, the charge distribution is said to have_____ symmetry.
plane

Electric flux density is a function of _____
charge

1eV is the energy acquired by an electron in falling freely through_____ 1volt.
Potential difference

As charge increases, electric flux density _____
increases

The minimum energy required to liberate an electron from a metal surface is called_____
Excitation

A body that absorbs all radiations falling on it is known as_____
Blackbody

The _____ number is the total number of neutrons and protons.
Mass

The direction of the electric field is opposite to that of the force if the charge is_____
Negative

The force between electric charges is known as_____
Electric Force

The electric flux is a_____ quantity.
Scalar

Gauss's law applies to any hypothetical closed surface called_____ surface.
Gaussian

The force applied to a conductor is 10N if the charge in the conductor is 5C, what is the electric field intensity?
2V/m

When an atom is in the ground state it is said to be _____
Stable

When beta decay occurs_____ changes into a proton and electron.
Neutron

An alpha particle is a _____ nucleus consisting of 2 protons and 2 neutrons.
Helium

When a dielectric material is inserted between the plates of a capacitor it increases its_____
Capacitance

Potential difference is the work done in moving a unit charge _____ from one point to another in an electric field.
Positive

The surface integral of the electric field E over a surface is defined to be electric_____
flux

Gaussian surface is an imaginary closed_____
surface

The magnetic North is found by suspending a bar magnet freely on the_____ axis.
Vertical

At the _____ a dipping compass needle is horizontal and at the magnetic poles it is vertical.
magnetic equator

The variation of the compass from the north-south direction is called the_____
Declination

Six equal point charges Q = 10nC are located at 2,3, 4,5,6,7m. Find the potential at origin.
143.35

According to Faraday's law, the magnitude of the induced e.m.f is proportional to the rate of change of _____ linking the circuit.
magnetic flux

Property of magnetic material in which_____ attracts or repels.
charge

In the cathode ray oscilloscope, when fast moving electrons strike the glass screen coated with zinc and sulphide they cause_____
Fluorescence

In the method of charging by friction, The algebraic sum of the individual charges that is the net charge is_____
Constant

The resistivity of a semiconductor decreases rapidly with increasing_____
Temperature

According to ohm's law the potential difference is proportional to the_____
Current

The study of static charges is called_____
Electrostatics

A charge distribution in which the charge density at any point depends only on the distance of the point from a central point and not on the direction is said to be spherically _____
symmetric

Neutral objects constitute of equal_____
charge

What is the potential difference in an open circuit called?
Zero

The potential taken between two points across a resistor will be_____
Positive

The Gaussian surface for a line charge will be _____
Sphere

The Gaussian surface for a point charge is _____
Cube

Gauss law cannot be used to find which of the following quantity?
Electric field intensity

The quantity of charge flowing per second through a conductor of 1A is known as _____
Total Amperes

The _____ meridian is the vertical plane in a direction of geographic north and south.
geographic

The _____ meridian is the vertical plane in which a magnet set itself at a particular place.
Magnetic

The angle of _____ is the angle between the magnetic and geographic meridians.
Vertical

The _____of a substance is the number of times the average mass of one of the molecules is greater than the atomic mass unit.
Atomic weight

Which of these pairs are the clearing fluids required for the determination of surface tension of water by rise in a capillary tube?
sodium oxide and nitric acid

Electric charge enclosed by Gaussian surface is_____
0

The variation of the compass from the north-south direction is called the _____.
Declination

The _____ variation is a low unpredictable change in the local values of the magnetic elements.
Lower magnetic

According to Faraday's law, the magnitude of the induced e.m.f is proportional to the rate of change of _____ linking the circuit.
magnetic flux

A transformer is a device which changes an alternating _____ From one value to another using the principle of mutual induction.
potential difference

The ratio of the e.m.f induced in the secondary and primary coils is equal to the transformer _____.
Current ratio

The lines of force are said to be _____
real

Electric field originates at _____
Positive charge

Charging a body by rubbing is achieved through ___.
Friction

Which one among the following is the field where electric charge experiences a force?
Electric field

The properties of a charge include which of the following?
Potential

Coulomb's law applies to _____
Long charges

The _____ is the amount of energy equal to the change in energy of one electronic change when it moves through a potential difference of one volt.
electron-volt

A voltameter is a cell designed for the study of _____.
Electrolysis

The _____ is the use of electrolysis to coat one metal with another.
Electroplating

A _____ is a system in which two electrodes are in contact with an electrolytic.

Focus

One of the main disadvantages of the Leclanche cell is that _____.
the zinc case takes part in the reaction

The force between two particles is inversely proportional to the square of distance between them and proportional to the product between the two is the statement of _____.
Einstein

Total electric flux through any closed surface is equal to the charge enclosed by that surface" This is the statement for?
Gauss law

As area increases, what happens to electric flux density?
increases

Strength of the electric field is _____
Directly proportional to the force applied

Gauss law cannot be used to find which of the following quantity?
Electric field intensity

Gauss law can be evaluated in which coordinate system?
Cartesian

Charging by _____ is the process of charging two bodies by means of rubbing them together.
Electric

The _____ is the SI Unit of electric charge.
coulomb

The unit of permittivity is _____.
farad per metre

Coulomb's law applies to _____
point masses

Electric field lines are represented by _____.
lines of force

Choose the correct option.
F=E/q

The relation between an electric charge and electric field is express by _____
Ohm's law

The _____ is most essential for the production of electrons by thermionic emission.
Cool anode

The process by which an electron is emitted from a hot filament is called _____
Cathodic emission

The number of the lines of force crossing any surface depends on the orientations of the surface relative to the electric field, the field strength and _____
Permittivity

With Gauss law as reference which of the following law can be derived?
Ampere law

Which, among the following, will be unity in free space
volume

Choose the incorrect option. The unit of ____.
E=N/C

Which is correct?
Lines of force shows the direction in which negative charge would accelerate

The arrow in a line of force indicates ____.
scalar

A particle with charge 5.0μC is placed at the corner of a cube. The total electric flux in N.m2/C through all sides of the cube is
9.4 x 104

A point charge is placed at the center of a spherical Gaussian surface. The electric flux ϕE is changed if: A
a second point charge is placed just outside the sphere

Choose the INCORRECT statement_____
According to Gauss' law, if a closed surface encloses no charge, then the electric field must vanish **everywhere on the surface**

A neutral electroscope is touched with a positively carged rod. After the rod is removed the electroscope is charged positively because of_____
induction

A positively charged sphere with a charge of +8Q is separated from a negatively charged sphere -2Q by a distance r. The spheres briefly touch

each other and move to the original distance r. What is the new charge on each sphere after they move to the distance r?
3Q

Two positive charges Q1 and Q2 are separated by a distance r. The charges repel each other with a force F. If the magnitude of each charge is doubled and the distance stays unchanged what is the new force between the charges?
4F

Sphere A is charged positively and sphere B is neutral. The spheres are brought near each other. Which of the following statements is true?
There is an attractive electrostatic force between the spheres

Two positive charges with magnitudes 4Q and Q are separated by a distance r. Which of the following statements is true?
The forces on each charge are the same in magnitude and opposite in direction

A neutral electroscope is touched with a negatively charged rod. What is the charge on the electroscope after the rod is removed?
negative

A positively charged rod is brought close to one end of a neutral metallic plate. What type of charge is induced on the farthest side of the plate?
Positive

The _____ is the use of electrolysis to coat one metal with another
electroplating

A Cell designed for the study of electrolysis is called a_____
Voltameter

The chemical equivalent of a substance is its_____ divided by its valency
molecular weight

The number of grammes of a substance equal to its molecular weight is called_____
Atom

The_____ of a substance is the number of times the average mass of one of the molecules is greater than the atomic mass unit
molecular weight

According to Faraday's law, the mass of a substance liberated in electrolysis is proportional to the_____
quantity of electricity passed

The process of conducting electricity by an electric solution is known as_____
Electrolysis

The electrode by which the flow of the electrons leaves the electrolyte is called_____
Anode

The electrode by which the flow of the electrons enters the electrolyte is called_____
cathode

The motion of a charged particle moving through a combination of the electric and magnetic fields, is described by the_____
Lorenz force

In the cathode ray oscilloscope, the electron beam can be deflected either by an electric field or by_____
magnetic field

When the direction of motion of the charged particle is neither parallel nor perpendicular to the direction of the magnetic field, it describes a_____
helical trajectory

A charge particle velocity in a plane perpendicular to a magnetic field describes a____
circular trajectory

A Charged particle moving in a uniform electric field follows a parabolic path because it is subjected to a_____
constant acceleration

The cyclotron is a mahine for accelerating charged particles and ions to a high____
Velocity

Which of the following is not an element of a cathode ray tube?
Bryer

In the cathode ray oscilloscope, when fast moving electrons strike the glass screen coated with zinc and sulphide they cause_____
Fluorescence

The direction of magnetic force is perpendicular to____
total velocity and magnetic field

Which of the following is not magnetic?
Copper

When current flows in one direction only it is called_____
D.C

Which law stated that an induced e.m.f flows in such a direction as to oppose the motion producing it?
Lenz's

A neutral point is defined as a point at which the resultant magnetic flux density is____
Zero

The process of magnetising an object made of magnetic material simply by bringing a magnet near is called_____
induced magnetism

A magnetic material is one which is capable of being_____
magnetized

The unit of permeabilty of a medium is ____
H/m

The unit of magnetic flux density is____
N/Am

The force acting per unit current length is called_____
magnetic flux density

Force per unit charge is called____
electric field strength

The force on a current-carrying conductor is greatest when the conductor is at_____ to the field
right angles

According to ohm's law the potential difference is proportional to the_____
Current

The SI Unit of electromotive force is_____
Volt

The_____ of a battery is the chemical energy converted into electrical energy when unit charge is passed through it
E.M.F

The resistivity of a semi conductor decreases rapidly with increasing_____
Temperature

Capacitance is measured in_____
C/V

A Capacitor whose capacitance vary continuously can be use for_____
tuning radio receivers

Electrolytic capacitors have capacitances of up to_____
100000μF

There are ____types of electrolytic capacitors
two

The two types of electrolytic capacitors are____ and_____
wet and dry

An electrolytic capacitor consist of two electrodes of_____ positive and negative plates
Aluminium

Capacitors are classified into two, namely____
fixed and variable

The maximum electric field a material can withstand without the occurence of breakdown is called_____
dielectric strength

When a dielectric material is subjected to a sufficiently strong electric field, it becomes a_____
Conductor

When a dielectric material is inserted between the plates of a capacitor it increases its____
Capacitance

For capacitors connected in series each has the same_____
charge

For capacitors in parallel, the potential difference across each capacitor is_____
the same

The charges on capacitors connected in parallel are in the ratio of their_____
Capacitance

Which of the following is a device that can store electric charge?
Capacitor

Which of the following is not an example of dielectric material?

Steel

The electrostatic force is conservative because the workdone in taking a charge round a closed path is____
Zero

The energy stored in a system of charges is known as____
electrostatic potential energy

The SI Unit of potential difference is the_____
volt

The potential difference between two points B and A is equal to the____ in taking a unit positive charge from A to B
Workdone

The work done in taking a unit positive charge from one point to another in electric field is____ of the path chosen between the two points
Independent

Electric potential is measured in____
J/C

The work done per unit charge moving from infinity to the point is called_____
Electric potential

When a positive charge is repelled by another positively charged body its potential energy becomes____
decreased

A body when raised above the earth's surface is said to acquire____
potential energy

The electric field due to an infinite sheet of charge is____ to the plane of the sheet
Perpendicular

The electric field outside a spherically symmetrical shell with radius r and total charge q is directed_____
radially

The surface integral of the electric field over a surface is called_____
electric flux

When the charge density at any point depends only on the distance of the point from a central point and not on the direction of the charge distribution is said to be_____

spherically symmetric

Gauss's law applies to any hypothetical closed surface called_____
Gaussian surface

The number of lines of force crossing any closed surface is proportional to the_____
net charge

The electric flux is a_____
Scalar

The number of lines of force crossing any surface depends on the field strength, the surface orientation of the_____
surface

The relation between an electric charge and electric field is express by_____
Gausss law

Electric charge is quantized, occurring in only in_____
discrete amounts

The direction of the electric field is opposite to that of the force if the charge is_____
negative

The electric field is measured in____
Newton per coulomb

Electric field is which type of physical quantity?
Vector

A region where an electric charge experiences a force is known as____
electric field

The fact that electric forces add vectorially is known as the____
superposition principle

Coulomb's law applies to____
point charges

The unit of permitivity is____
farad per metre

The smallest charge that is possible to obtain is that of____
proton and electron

In conservation of charge, the algebraic sum of the equal and opposite charges on the two bodies is_____
zero

The quantity of charge flowing per second through a conductor of 1A is known as____
coulomb

The SI Unit of electric charge is_____
Coulomb

What will happen to two glass rods after being rubbed with silk?
repel eachother

The process of charging two bodies by means of rubbing them together is called charging by____
Friction

Which of the following is origin of the negative charge
electron

_____is produced when fast moving electrons are stopped as they heat a metal target
x-ray

_____ effect is the emission of electrons from metal surfaces when electromagnetic radiation of high enough frequency falls on them.
Photoelectric

If two different metals such as copper and iron are joined in a circuit and their juctions are kept at different temperatures, a small e.m.f is produced and current flows. This called_____ effect
Thermoelectric

_____ of an RLC circuit occurs when the capacitive and the inductive reactances are equal in magnitude
Resonance

Electricity is transmitted at high voltages to avoid loss of power but are distributed at low voltages for domestic use using_____transformers
step down

A_____ is a device with a low resistance to current flow in one direction and a high resistance for the reverse direction
Rectifier

Lenz's law is an expression of the principle of conservation of_____
energy

Kirchhoff's loop rule is the statement of the conservation of_____
energy

Kirchhoff's juntion (point) rule is the statement of the conservation of_____
Charge

The same electric current flows through resistors in_____ connection
series

The term 'lost volts' refers to the energy per unit charge dissipated in the_____ of a cell or battery
internal resistance

The energy per unit charge converted form other forms to electrical energy is called_____
electromotive force

Electric current is a_____ quantity.
Scalar

Inserting an dielectric between the plates of a capacitor_____ its capacitance
increases

The maximum electric field a material can withstand without the occurrence of breakdown is called_____
dielectric strength

In the equation C = Q/V, where the symbols have their usual meaning, the unit of C is called_____
Farad

The gradient of a scalar potential is a_____ quantity
Vector

The law of_____ of charge states that the total electric charge in an isolated system, that is, the algebraic sum of the positive and negative charge present at any time, does not change
Conservation

A_____ is the amount of charge that flow through a cross-section of a wire in one second if there is a steady current of one ampere (I A) in the wire
Coulomb

Objects with net unlike charges_____ each other
attract

There are_____ types of electric charges
Two

The force exerted by charged particles on each other when they are at rest in a frame of reference is called_____ force
electrostatic

____ forces, hold electrons to nuclei, atoms and molecules together to give rise to bulk matter
Elecrostatic

Two ebonite rods rubbed with fur and suspended from a rigid support close to each other by threads will_____ each other
repel

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www.nounelearn.com
@NounElearn
07018870798