UNITs AND DIMENSIONS

The digits expressing a numerical value of a quantity is called Significant Figure. If the unit of a measurement is changed, its significant figure will remain Unchanged.

The length is measured in metre, centimetre, etc. Some other units to measure the large distance are parsec, light year, etc. The distance covered by light in one year is called 1 Light Year.

Every unit can be expressed in terms of base units with the help of dimensional analysis. In dimensional equation, the power occurred on a base quantity is called dimension of given quantity in a particular [SSC CGL 2013]

Base Quantity

The plane angle is ratio of arc and radius with SI unit radian. Name a unit of plane angle other than radian. Degree

The study of law of nature is Physics and the quantities involved in it are known as physical quantities on the basis of magnitude and direction. The physical quantities are of Two Types

In which unit, sound level is measured, Decibel

A system of unit may be selected such that it is invariable easily available and Reproducible

If work is performed on a body, its energy can be changed. This shows that there is relation between work and energy. The SI unit used for these two quantities are Joule (J)

Quantities/Units/Symbols

Fundamental or Base Quantity SI Unit Symbol
Length Metre m
Mass Kilogram kg
Time Second s
Electric current Ampere A
Thermodynamic temperature Kelvin K
Amount of substance Mole mol
Luminous intensity Candlea cd

Complementary Quantity SI Unit Symbol
Plane angle Radian rad
Solid angle Steradian sr

MOTION

Acceleration is the rate of change of velocity. The negative of the acceleration is known as Retardation. For a retarding body, change in velocity is always [CDS 2010]

Negative

The speed or velocity at a time can be found by position line graph for a moving body. If graph is like a curve, then instantaneous speed of the body may be found as ....... on the curve.

Tangent

When a body is obliquely thrown from the Earth surface, it is called a Projectile. The velocity of projectile can be resolved into two components. The horizontal component of velocity is always Constant

The relative speed is known as the speed of a body with respect to another body. It can differ from actual speed of the body. It two bodies are moving with same speed and in same direction, their relative speed is Zero

A person jumps from an aeroplane with parachute. The graph between depth and time for the person found to be A Curve

For a body moving with constant acceleration, the velocity-time graph is straight line. In case of non uniform acceleration, the graph will not be A Straight Line

The motion along a circular track is known as Circular Motion. It is of two types, Uniform and Non-uniform. The acceleration common to both types of circular motion, is Centripetal Acceleration

Types of Motion

Type Example
One-dimensional Motion along at straight line, free fall of a body
Two-dimensional Circular motion, projectile motion
Three-dimensional Motion of a bee, motion of dust particles in atmosphere, etc.

LAWS OF MOTION

For equilibrium of a body, sum of all the forces acting on it should be zero and forces should be concurrent. In case of forces are not concurrent, the body may.

Rotate

Newton gave three laws of motion, according to one of them the property of body to continue in its state of rest or that of uniform motion in a straight line in the absence of external force is known as Inertia

Law of inertia tells that a body tries to remain in their initial physical state, until a force acting on it. Here force should be Unbalanced

A pendulum is hanging in a car deflects from vertical position when car accelerates. Here, the law of
motion comes into force, is

Second Law

While in an accelerating lift, the weight felt by a person differs from its actual value which is called apparent weight. If lift moves without no acceleration, the weight felt by the person is Actual Weight

Action-reaction pair of forces are equal in magnitude but opposite in direction. These two forces must belong to two Different Bodies

There are four types of forces in the universe. One of them is electromagnetic force. In this force, the electric and magnetic field lie .......... to each other.

Perpendicular

Due to daily rotation of the Earth, a force is exerted on each and every particle on the Earth. This force is taken to be an imaginary one and is called Centrifugal Force. Suppose the Earth suddenly loses its attracting nature, a person standing on the Earth will Fly, up

Newton’s Law of Motion

<table>
<thead>
<tr>
<th>Laws of Motion</th>
<th>Condition</th>
<th>Examples</th>
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</thead>
<tbody>
<tr>
<td>First Law</td>
<td>Acceleration in a body=0, When force on same body =0</td>
<td>An object uniformly sliding on a smooth surface. Motion under gravity, pulling or pushing of a body</td>
</tr>
<tr>
<td>Second Law</td>
<td>Force on a body equals product of its mass and acceleration (f = ma)</td>
<td>Bouncing of a ball, walking on a road. Balancing of weight by normal of body kept on a floor (or surface)</td>
</tr>
<tr>
<td>Third Law</td>
<td>Action balances reaction</td>
<td></td>
</tr>
</tbody>
</table>

GRAVITATION

The weight of a body is the product of mass and acceleration due to gravity. Weight varies from planet to planet, but mass of a body is always Constant

Aryabhata studied motion of celestial bodies in detail. He established that the Earth revolves round the Sun and Moon moves in a circular orbit around the Earth. The conclusion made by Aryabhata in a book named as Aryabhatiya

Force acting between two masses can be calculated through universal law of gravitation, which depends on product of masses and the distance between the masses. The force does not depend on the ............ between the masses.

Medium

After Aryabhatt, Kepler and Tycho Brahe studied about the planetary motion and postulated some laws known as Kepler’s Law

There is a variation in acceleration due to gravity, due to depth, altitude, rotation of the Earth, etc. At an equatorial point, acceleration due to gravity is

Lesser

The force exerted on a body by the Earth is known to be weight of the body. The term ‘weight’ includes the acceleration due to gravity and the mass. The weight of a body will be different on different Planets

Weight of a person felt by himself within a satellite is Zero

The mass of an object can be defined in two ways i.e., Gravitational and Inertial. Both the mass are found to be same. The mass measured by spring balance is actually Gravitational Mass

A satellite moving on equitorial plane of the Earth and having same time period and rotation as that of the Earth is known as Geostationary Satellite. It is used for telecommunication, weather forecasting, etc. The time period of this satellite would be 24 hours

WORK, ENERGY AND FRICTION

Gun-bullet system follow conservation momentum principle due to which after firing gun Recoils Total energy of a system is always conserved. Thus, energy is neither created nor destroyed. In case of a body having two types of energies, if one is increased then another one will must be Decreased

Force is responsible for performing a work. The rate of doing a work is power. The unit of power HP (Horse Power) converted into SI unit 746 Watt

Einstein mass-energy equivalence is $E = mc^2$ where $m = Mass$, $E = Energy$ and $c =$ Speed of light. The SI unit of $c^2$ is Joule/kilogram

Energy of a moving body, due to its motion is Kinetic, which depend upon mass and momentum of the body. If speed of body is increased then what will be the effect on its kinetic energy?

Kinetic Energy Also Increases

The mechanised energy is the sum of kinetic and potential energies. The potential energy is always due to shape, size, configuration or position of a body. During a collision, a body gets deformed. Which type of energy is stored in the body?

Potential Energy

Energy has its direct relation with stability—greater will be stability, lower will be energy. In comparison to a standing person, a slipped person has

For more visit, www.studyiq.com
**Less Energy**

A body in uniform acceleration has its momentum being changed. The rate of change of momentum gives the force on the body. If the momentum change is less, then the velocity change will be less.

Power is rate of doing work, while the energy is capacity to do work. Work also depends on energy. This implies power and energy are related.

**Also Related**

<table>
<thead>
<tr>
<th>Friction</th>
<th>Static friction</th>
<th>Exerted between two static surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kinetic friction</td>
<td>Exerted between two surfaces in relative motion</td>
</tr>
<tr>
<td></td>
<td>Rolling friction</td>
<td>Exerted in case of rolling motion</td>
</tr>
</tbody>
</table>

The friction exerting between two static surfaces is called Static Friction. There is a range of it. The maximum value of static friction is called Limiting Friction. Limiting friction is of static nature after which body moves and kinetic friction comes into play. Among the mentioned friction types, which one is of greater value?

**Limiting Friction**

Limiting friction is of static nature after which body moves and kinetic friction comes into play. Among the mentioned friction types, which one is of greater value?

**Laws of Friction**

The kinetic friction does not depend on the relative speed, up to a limit. For a vehicle moving with very high speed, kinetic friction is assumed to be zero.

**Types of Mechanical Energy**

<table>
<thead>
<tr>
<th>Energies</th>
<th>Mathematical Formula</th>
<th>SI Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kinetic energy</td>
<td>$K = \frac{1}{2} , m , v^2$ Where $m =$ mass, Joule</td>
<td></td>
</tr>
<tr>
<td>Potential energy</td>
<td>$U = m , g , h$</td>
<td>Joule</td>
</tr>
<tr>
<td>Total mechanical energy</td>
<td>$E = K + U$</td>
<td>Joule</td>
</tr>
</tbody>
</table>

**MOLECULAR PROPERTIES OF MATTER**

Surface tension of a material is the ratio i.e., force per unit length (imaginary). It is molecular property of a matter. The surface tension of liquid is due to what type of force between the molecules?

**Cohesive Force**

The property to restore the natural shape or to oppose the deformation of a body is called Elasticity of the same body. The body itself called Elastic Body. If a body remains in deformed shape after removal of force, it is called Plastic Body.

**Elasticity**

When a solid body forced and is deformed, stress is developed within it the body and strain comes into play. The stress developed here can be compressive or tensile.

According to Hook’s law, under elastic limit, stress in the body is proportional to corresponding strain. The strain is the ratio of change in length to the original length.

**Nature**

A body when deformed, external force appear and work has to be done against these forces. The potential energy of body is increased, which is known as Elastic Potential Energy. The surface of material has tendency to acquire the minimum area. That is why the raindrops are of spherical shape (nearly). We use detergent in water to clean our clothes because it............ surface tension of water.

**Decreases**

The materials that can flow are called Fluid. The property of fluid to oppose the relative motion between its layers is called Viscosity. If fluid is heated, its viscosity will decrease.

When a solid is dropped inside the fluid. There can be exerted two forces on it i.e., Force1 of Buoyancy and Viscous Force. The speed of solid at the instant when forces on solid balances each other, is known as Terminal Speed.

Reynold number plays an important role in determining the nature of flow. It can have the value between 2000 to 3000, which decides the speed whether it is steady or Turbulent.

A tube of small radius is called Capillary Tube. By inserting this tube in a liquid, it rises or depressed in the tube. This phenomenon is known as...
HEAT
Heat can be transferred by three modes, Conduction, Convection and Radiation. Among these three modes, radiation is non-mechanical process. The speed of heat radiation in vacuum is same as that for Light. Wool is a material with low thermal conductivity. It keeps the body warm. The specific heat of wool is More. A circular plate, a cube and a sphere (all made up of same material and having the same mass) are heated to 300°C left in a room. The object with slowest rate of cooling is Sphere. The process of ‘heating’ means the transfer of energy from hotter body to colder body. The hotness or coldness of a body is measured by Thermometer. The specific heat capacity is defined as the amount of heat required to raise the temperature of unit mass of a substance by unit degree centigrade. Two unequal masses of the same material have their specific heat capacity as Same. Heat is a scalar quantity and is a form of energy having SI unit Joule (J). Heat can be transformed as the work and vice-versa. Commercially, heat-work transformation is done by Heat Engines. The quantity of heat transformed can be measured by Calorimeter. The latent heat of a substance is the heat required to change its unit mass at Constant Temperature. A body that absorbs all the radiations incident on it, is called a Black Body. Such a body will emit radiations at the fastest possible rate. The radiation emitted by a black body, in general, are called Black Body Radiation. A black body is also called Ideal Radiator. A perfect black body absorbing as well as emitting 100% of radiations falling on it, is only an Ideal Concept. The ability of a material to conduct heat is measured as thermal conductivity. It depends on the nature of Material. Convection is the process of heat transfer due to actual transfer of heated material. It takes place in Liquid and Gases.
connected to an electric circuit, they observe

**A Spark**

A fuse material is made up of alloy of tin and lead. Fuse is employed in a electrical circuit in series to prevent the short circuiting, it must have **Low Melting Point and High Resistance**

Transformer is a static electrical device that can reduce the current level of power supply by increasing value of **Voltage**

The origin of electricity is the motion of free electrons within the volume of material. If the motion of electrons is opposed, the conductivity of material decreases. How will the temperature rise affect the conductivity of material?

**Decreases**

The redistribution of change in a material, due to the presence of nearby charged body is called **Induction.** During the process of induction, charge on system of two bodies will remains **Constant or Conserved**

When amber rubbed with wool, it acquires the property of attractive light objects such as small pieces of paper. **This** is because amber becomes electrically charged. This phenomenon is studied under **Frictional Electricity.**

Afield created around a charge is called **Electric Field.** If another charge is taken into this, it will experience a force which is known as **Electrostatic Force**

Electric current is rate of flow of current. The SI unit of current is ampere (A). It is also known as **Coulomb Per Second**

According to Ohm’s law, the voltage across two terminals of a current carrying conductor is equal to product of current and resistance of wire. The resistance depends upon temperature as it increases, the resistance **Increases**

Conductors are materials with electrons free to move throughout the volume of material. These moveable electrons are known to as **Free Electrons**

The fundamental scientific principle in the operation of all batteries is dissociation of **Electrolytes**

Energy cannot be created or destroyed however it is converted from one form to another. In an electrical circuit with a battery, which form of energy is converted into electrical energy?

**Chemical Energy**

Most of the power plants in our country are hydroelectric, which utilises ........ of water to create electricity, **Potential Energy**

For the propagation of sound, a medium is always required. The speed of sound depends on inertial property of material medium. The other property of medium on which speed of sound depends, is **Elasticity**

“The light wave can be polarised”. Is this statement true?

**Yes**

An apparatus using sound wave to locate a submerged object is **Radar**

The time period of a simple pendulum depends on the length of thread used in pendulum. If length of thread is halved then time period is changed by a factor \( \frac{1}{\sqrt{2}} \)

The sound level is measured in decibel (dB). What is the range of loudness in decibel, audible to human ear?

**60 to 80 dB**

Wave is a pattern of disturbances produced in a medium. Basically it is of two” types — Transverse and Longitudinal. When a stone is thrown into a calm water then which type of wave is produced in the water?

**Transverse Wave**

The acceleration of bob of a simple pendulum depends upon its position from the mean position. During the oscillation, acceleration will be maximum at position with **Maximum Displacement**

The longitudinal waves cannot travel through **Vacuum**

In an oscillation, the acceleration can be same at two positions with same displacement with respect to **Mean Position**

When particle oscillates, the restoring force always act towards the mean position. The force will be maximum at **Extreme Positions**

In a damped oscillation, the amplitude of the wave changes with time. The change is due to presence of a periodic **Damping Force**

Damping is always present in a mechanical vibrations and amplitude becomes infinite. So the effect of damping considerable in **Civil Constructions**

In 1940, a newly constructed bridge Tacoma Narrows Bridge (Washington) broke off and went into the water. This was happened as the amplitude become
GENERAL SCIENCE PHYSICS

So Large
When a heavier body is suspended from a fixed support, it is known as physical pendulum. It makes oscillation under

Restoring Torque
The physical effect produced by mixing of two waves, is known as Interference. Which type of wave is produced by mixing of two waves of same amplitudes and same frequencies?

Standing Wave
The waves produced in a string are transverse. The speed of wave depends upon tension produced in string and

Mass Density
If you pluck your guitar string, its pitch of sound is known as Resonant Frequency. Name one of the quantities on which pitch depends.

Tension in String
The sound wave travels in a medium by line mean compression and rarefaction. At the place of rarefaction, the pressure is

Minimum
In solids, sound wave can exist as either a longitudinal or a transverse wave. But in fluid medium, it is only be

Longitudinal
When sound is propagated through air, its molecules are only temporarily disturbed from their mean position and comes back at initial physical condition. In this process, which quantity is transported by wave?

Energy
Sound is a sensation to our ears, which propagates as mechanical wave of pressure and

Displacement
This sound, generates by a sound source, propagates through a medium and is collected by which portion of our ear?

Pinnae
Sometimes sound refers to only those vibrations with frequencies that are within the range of hearing for

Human or Particular Animal
The appearance of sound to a human ear is characterised by three parameters pitch, loudness and

Quality
The light is splitted into its individual colours when passed through a prism. This phenomenon is called Dispersion. After dispersion, the minimum deviation is for

Red Rays
Light can be reflected, refracted, scattered, polarised, etc. The red-light is used as the signals due to its

Less Scattering
Holography is a technique for video recording. Three dimensional photograph of an object is produced by this process. Regarding colour of recorded object, it may be of single' colour or

Multicolour
When a light ray passes from one medium to another, the speed of light changes. Under the similar conditions, the frequency of light will remain [NDA 2011]

Unchanged
Light in studied in two branches of Optics named Ray Optics and Geometrical Optics. Reflection, refraction, etc, are studied under Ray Optics which Scattering of light is studied under

Wave Optics
Reflection of light obeys two laws, according to one of them angle of incidence is equal to angle of reflection. If mirror is rotated through an angle $\theta$. The angle of reflection is differed by

2$\theta$

Branches of Optics

<table>
<thead>
<tr>
<th>Optics</th>
<th>Phenomenon</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ray Optics</td>
<td>Reflection, refraction, aberrations</td>
</tr>
<tr>
<td>Geometrical Optics</td>
<td>Reflection, refraction, superposition, diffraction, scattering, polarisation</td>
</tr>
</tbody>
</table>

According to sign convention in Ray Optics, every distance along the direction of incident light Is taken as positive and is measure from

Optical Centre
Light is a form of energy which gives sensation to our eyes. For an object to be visible the light reflected from it is of same colour as that of

Object

<table>
<thead>
<tr>
<th>Defect</th>
<th>Cause</th>
<th>Remedy</th>
<th>Images</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myopia (Short Sightedness)</td>
<td>curvature of eye lens, elongation of eye ball</td>
<td>Concave lens of appropriate power</td>
<td>Image some shorter than retina</td>
</tr>
<tr>
<td>Hypermetropia (Long Sightedness)</td>
<td>Focal length of eye ball becomes large, shorten of eye ball</td>
<td>Convex lens of appropriate power</td>
<td>Image formed behind retina</td>
</tr>
<tr>
<td>Presbyopia</td>
<td>Weakness of ciliary muscles, hardening of eye lens</td>
<td>Bifocal lens with both convex and concave lens</td>
<td>Image can be formed behind retina or at a place shorter than retina</td>
</tr>
</tbody>
</table>

Light is an electro-magnetic wave, contains two types of vibration naming Electric Field and Magnetic Field Vibration. The vibrations are in mutually

Perpendicular Direction
Ability of a lense to change the shape and size of
the image with respect to object is its power. It is just reciprocal of focal length and measured in dioptre when the length has unit.

**Metre**
Image formed in plane mirror is always virtual, erect and same in size. What type of image formed in convex mirror when object placed in front of mirror?

**Virtual and Erect**
When object placed between focus and centre of curvature then image formed in concave mirror is between centre of curvature and infinity, real, inverse, bigger in size but when object placed between focus and pole, image is virtual and erect then what is the size of image?

**Bigger than Object**
Convex mirror is used as reflector in street light lamps. Which type of mirror used in side view mirror in cars?

**Convex Mirror**
As relation between focus and radius of curvature of mirrors is $f = \frac{R}{2}$ then for convex mirror $R$ and $f$ is positive while for concave mirror $Ft$ and $f$ is negative. What is the value of $R$ and $f$ for plane mirror?

**Infinity**
When light move from one medium to other is called **Refraction**. Velocity and wavelength of light changes in refraction. Which factor remains constant in refraction?

**Frequency**
In refraction, when light enter from rarer medium to denser, ray shift towards the normal and when light enter from denser to rarer medium ray shift away from normal. This law was given by Snell and the term refractive index ($\mu$) give the information about refraction. What is value of refractive index?

$$\mu = \frac{c}{v} = \frac{\text{Velocity of Light in Vacuum}}{\text{Velocity of Light in Medium}}$$

Total internal reflection takes place when object in denser medium and its angle of incidence is more than critical angle. As critical angle is that angle of incidence of which angle of refraction become $90^\circ$. For which material, the critical angle is least?

**Diamond ($\approx 24.4^\circ$)**
Optical fibres used in communication system are based upon the phenomenon of total internal reflection. Which type of material used to fabricate the fibres?

**Quartz Fibres**
Speed of light is uneffected by temperature of medium but decrease when it pass through rarer to denser medium and increase from denser to rarer medium. What effect on wavelength of light is visible when it pass through rarer to denser medium?

**Decrease**
As scattering of light is inversely depends upon wavelength. Blue colour scattered more due to least wavelength, so blue colour of sky is due to more scattering of blue colour. What is the colour of sky when someone looks towards sky from the Moon?

**Black**
Red colour of danger signal and lights is because of least scattering of red colour while wavelength is maximum for red colour. What is the reason for twinkling of stars?

**Atmospheric Refraction**
When white light pass through a prism light split in colours. This is called **Dispersion of Light**. Violet colour deviate more and red colour deviate least. When there is not dispersion of white light, the phenomenon is called **Achromatism**

As two mirrors are at an angle $9^\circ$ from each other than formula for number of images will be $N = \left(\frac{360^\circ}{\theta} - 1\right) = 3$ then what is the number of images when both mirrors are at right angle from each other?

**Three**

Dioptre is a unit of power of the lens. For convex lens, power $P = \frac{1}{f(m)}$ is positive while for concave lens, power is negative. What is the power of combination of two lenses — one convex (+2D) and other concave (–2D)?

$P = 2 – 2 = 0$ (Behave as a Plane Glass Plate)

**Microscope** is an instrument use to see the large image of an object. There are two lenses one is **objective** and other is **eye piece** in compound microscope. Objective is of small size while eye piece is of big size in compound microscope. Where should the object be placed to see the large size in simple microscope?

**Between Focus and Pole**
Telescope is an instrument use to see the distant object. There are two lenses one is **objective** of large size and other is **eye piece** of small size. What type of image formed in Astronomical Telescope?

**Inverted**
When final image is at Least Distance of Distinct Vision (LDDV) then eye is in most strain position and magnifying power is maximum. What is the magnifying power when final image is at infinity i.e., at normal position or most relaxed position of eye?
**Magnifying Power is Minimum**

<table>
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<tr>
<th>Concave Mirror</th>
<th>Convex Mirror</th>
<th>Convex Lens</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position of Object</strong></td>
<td><strong>Image Position</strong></td>
<td><strong>Nature of Image</strong></td>
</tr>
<tr>
<td>Between pole and focus</td>
<td><strong>Behind the mirror</strong></td>
<td>Enlarged, virtual and erect</td>
</tr>
<tr>
<td>Between focus and centre of curvature</td>
<td><strong>Beyond the centre of curvature</strong></td>
<td>Enlarged, real and inverted</td>
</tr>
<tr>
<td>At centre of curvature</td>
<td><strong>At centre of curvature</strong></td>
<td>Real, inverted and of the same size as that of object</td>
</tr>
<tr>
<td>Little beyond centre of curvature</td>
<td>Between centre of curvature and focus</td>
<td>Diminished, real and inverted</td>
</tr>
<tr>
<td>At infinity</td>
<td><strong>At the focus</strong></td>
<td>Real, inverted and highly diminished</td>
</tr>
</tbody>
</table>

**FLUID MECHANICS**

Archimedes principle tells that volume displaced of a liquid is equal to weight of object immersed in the liquid. If \( g \) is a acceleration due to gravity, then weight of immersed object of volume \( V \) and density \( \rho \) is

\[
\rho V g
\]

Density is ratio to mass and volume. The density of a liquid increases with temperature. How will the increase of pressure affect the density?

**Increases**

In general, the atmospheric pressure is found to be \( 10^5 \) Nm\(^{-2} \). The density of air decreases with increase in temperature. How will the increase in temperature affect atmospheric pressure?

**Decreases**

Pressure is defined as force per unit area. For two similar shaped container having different base area filled with same liquid up to same height, the pressure at the bottom are

**Equal**

In the study of properties of fluid, we assume, liquid are incompressible and non viscous. The incompressible means that pressure have .......... on the volume of liquid.

**No Effect**

Pascal’s law states that pressure is equally transmitted into the volume of an incompressible liquid without being diminished in magnitude. Name a machine which works on Pascal’s law.

**Hydraulic Lift**

Manometer is a device to measure the pressure. It contains a closed vessel containing a gas. The excess pressure of arm of is known as

**Gauge Pressure**

When a solid is dipped into a fluid, the fluid exerts upward buoyant force on the solid. If this upwards force balances the weight of solid, this is called floatation. When overall density of solid is smaller than density of fluid, the solid

**Floats**

Bernoulli’s theorem is like work-energy theorem in case of flow of fluid. The work-energy theorem states that work done by all the forces is equal to change in

**Kinetic Energy**

In storms, roof made of tin flies up. This event follows “ Bernoulli’s theorem because if speed at a place increases then pressure at the same place will

**Decrease**

During the flow of fluid, mechanical energy is lost against viscous force. Assumption of a non-viscous fluid means that there is no internal friction. Similar irrotational flow means that there is no

**Angular Motion**

The speed of a liquid coming out through a hole at bottom of the container is known as speed of efflux. The speed of efflux is directly proportional to distance of hole from the

**Liquid Surface**

When a fluid passes through a region at a large speed, the pressure there decrease. In an aspirator pump, liquid is raised from vessel and is sprayed with

**Expelled Air**

**MAGNETISM**

On the basis of electrical property; materials are divided into three category—conductor, insulator and semiconductors. The domestic supply of power is done with the help of conductor. Name the type of material used in electronics.

**Semiconductor**

The combination of diodes is transistor. The combination of transistors, which is commonly used in electronic devices, is known as
Integrated Circuits (ICs)

The largest application of LASERS is in optical storage devices such as CD and DVD in which a focused beam from laser hits the disc surface.

Scans and Reads

Semiconductors are of two types—p-type and n-type. Both the types of semiconductors are Electrically Neutral.

A magnet can attract small pieces of magnetic substances like iron, cobalt, nickel, etc. It can be of two types—natural or artificial magnet. The natural magnet is an ore of Fe₃O₄.

Magnetism of a bar magnet can be destroyed if it is kept in magnetic meridian. When a magnet placed in a direction opposite to that of Earth’s horizontal intensity, what will be effect on its magnetism?

Destroyed

A field generates around a magnet is known as magnetic field, which a vector quantity directed from North to South. Out side the magnet, the direction of this field, inside the magnet is South to North.

The extrinsic semiconductors, after doping becomes an intrinsic semiconductor. The process Dop ing roughly means mixing of Impurity.

A freely suspended magnetic needle of a compass always stay in North-South alignment. The point at which the same needle stays in any direction is called Neutral Point.

In which one among four, horse shoe magnet, a cylindrical conductor, a solenoid in between two parallel conductors, a fairly uniform magnetic field is produced?

Solenoid

The magnetic behaviour of a material depends on temperature. At high temperature, the alignment of electron is disturbed. There is another thing on which the magnetic behaviour of a material primarily depends, is Electronic Configuration.

Magnetic materials are of three types naming Paramagnetic, Diamagnetic and Ferromagnetic. The permanent magnets are made of Ferromagnetic Materials.

When electric current is passed through a resistor, it gets heated in accordance with Joule’s Law of Heating. The filament of electric bulb work upon Joule’s Law of Heating, its filament is made of tungsten because it has High Melting Point.

The resistance of a conductor is its ability to oppose the current through it, while conductance is reciprocal of resistance. The SI unit used for conductance is mho.

Electronics deals with semiconductors and not with the conductors. Ohm’s Law is valid for electronics. Is this statement correct? [SSC CGL 2013]

No

The changing electric field can produce a magnetic field in space. Can a changing magnetic field produces electric field?

Yes

A battery is a source electro motive force (emf). The emf is defined as the work done by the battery to drive and electron from its negative terminal to positive terminal. The SI unit of emf of a battery is Volt.

Resistors of different values are commercially available. To make a resistor carbon with a suitable binding agent is molded into a cylinder. Wire leads are attached to this cylinder and entire resistor is encased in a Ceramic or Plastic Jacket.

Thermistors are usually prepared from oxides of various metals such as nickel, iron, cobalt, copper etc. It is based on temperature dependence of resistance and used in Thermometers.

The capacity of secondary cell is measured in ampere hour. A cell that can supply 5 ampere current for 10 hours is rated as 50 ampere-hour. When a battery in connected to an electrical circuit current flows from positive terminal to negative terminal of battery. Current can also be driven into a battery in the reverse direction, such a process is called Charging.

An example of secondary cell is lead accumulator. For commercial use, of lead accumulator several cells are connected together in series. A six volt battery is obtained by connecting Three Identical Cell.

A positively charged insulating rod and is placed near a unchanged ball (another) suspended through a non magnetic string, it is observed that ball to be attracted to the rod. This is because of Induction.

A communication satellite is a spacecraft provided with microwave, receiver and transmitter. Name one remote sensing satellite of India.
GENERAL SCIENCE PHYSICS

**IRS-IA or IRS-IB or IRS-IC**

The orbit in which a geo-stationary satellite revolves around the Earth, is known as **Geo-synchronous Orbit**

Name the class of electromagnetic wave used by remote control of television.

**Infrared Ray**

An electromagnetic signal (wave) is used in radar. The wavelength of this signal is of order of a few millimetres. What is the name of class of signal?

**Microwave**

The satellite communication has its wide coverage range. Name a general utilisation of this type of communication in our modern life.

**Mobile Communication**

Electromagnetic waves used for communication purpose are ground wave, sky wave and space wave. Space waves are reflected to a specified region of Earth by Ionosphere The radio communication uses space waves in which signals are transmitted by [SSC 2013]

**Antennas**

NANO TECHNOLOGY

On environmental basis, the monitoring is more important step to have the control over further degradation of environment. Nanoscience is utilised for to clean air from **Volatile Organic Compounds**

The concepts of Nano Technology were discussed first time in 1959 by Richard Feynman. What is the name of the paper published by Richard Feynman about Nano Technology?

**There’s Plenty of Room at the Bottom**

A material is used instead of conventional insulator, which is non-porous, called

**Aerogel**

Inspired by Rechard Feynman’s concepts, who independently used the term Nano Technology in his book, ‘Engines of creation’. The coming Era of Nano Technology?’

**K. Eric Drexler**

ATOMIC AND NUCLEAR PHYSICS

Energy is being created continuously in the Sun due to nuclear fusion. Hydrogen bomb is based on the phenomenon of

**Nuclear Fusion**

Radioactivity is a process of spontaneous nuclear emission. So that atomic mass and number of atomic nuclei may be changed. SI unit for a radioactive integration is [SSC 2012]

**Bequerel**

When a heavier nucleus breaks into two unequal small nuclei, the process is known as Nuclear Fission. The nuclear process taking place in a reactor, is [SSC 2013]

**Nuclear Fission**

An atom is made of electrons, protons and neutrons. Among these, three individuals neutrons are chargeless. An atom is also electrically neutral because charges on protons and neutrons

**Cancels Each Other**

The main drawback of Bohr’s model is that it does not define atomic spectrum other than

**Hydrogen Atom**

A nuclear reaction is a process in which two nuclei or nuclear particles collide to produce different products than the

**Initial Particles**

Two elements said to be isotopes of each other, if their atomic numbers are same. Due to this, they have same Chemical Properties The two elements 14C5 and 16O8 are said to be isotope because they have equal number of

**Neutrons**

Electrical energy are also generate by nuclear reactors. In nuclear reactors, nuclear fission takes place. A type of reactor which generates fresh nuclear fuel which often exceeds the nuclear fuel used in it, is known as

**Breeder Reactor**

X-ray can photograph the bones inside the body on a photograph film. Such a photograph is called

**Radiograph**

There is also a unit which is widely used in describing mass in Nuclear Physics as well as in Atomic Physics, called unified atomic mass unit. It is denoted by \( \mu \)

The binding energy of a nucleus is the energy required to split a nucleus of an atom into its component parts. Greater the binding energy per unit nuclei, greater will be ...... of nucleus.

**Stability**

Radioactivity is the process of spontaneous emission of \( \alpha, \beta \) and \( \gamma \)-rays. Emission of these rays can affect atomic and mass number of atomic nuclei. These rays are collectively known as

**Nuclear Radiation**