PHY101 ELEMENTARY MECH HEAT & PROPERTIES OF MATTER

The planets are in motion with respect to each other.
True

A body is at _____ with respect to another when it does not change its position relative to the latter.
relative rest

All bodies in our earth move with respect to the earth.
True

_____ takes note of what is around us and tries to explain it.
Science

The whole basis of science is rooted in_____.
measurement

There are _____aspects to measurement.
two

The measurement of a physical quantity consists of a _____and a unit.
pure number

The measurement of a physical quantity consists of a pure number and_____.
a unit

A very long time ago people used what was available as _____ for measurement.
standards

A very long time ago people used what was available as standards for_____.
measurement

The second was defined as _____ of a mean solar day.
1/86,400

The _____ was defined as the mass of a certain quantity of water.
kilogram

The _____ was defined as one ten-millionth (10-7) of the distance along Earth's surface between the equator and the North pole.
metre

In_____, an International organization called the General conference on weights and measures was formed.
1889

SI stands for_____
Systeme International

Systeme International is also known as _____
metric system

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F.P.S. system meaning_____
foot, pound and second

The physical quantities, length, time and mass are known as the_____.
fundamental quantities

The unit of measurements of length is the_____
metre

The unit of measurement of time is the_____
second

the unit of measurement of mass is the_____
kilogram

The units of all physical quantities which are based on the three fundamental units are termed _____
derived units

_____ is another example of a physical quantity with a derived unit.
Velocity

A body has unit velocity when_____
it moves over a distance of unit length in unit time in a constant direction or straight line

The unit of velocity is derived from the units of _____ and time.
length

The unit of velocity is derived from the units of length and_____.
time

The unit of velocity is_____
metres per second

The device used to subdivide the standard of mass, the kilogram, into equal submasses is called the_____.
equal arm balance

The _____ is taken to be the unit of time
mean solar second

Three basic ways to describe a physical quantity are _____
the space it occupies, the matter it contains and how long it persists

The relation of the unit of any physical quantity to the fundamental units (length, mass and time) is indicated by what is known as the _____ of the unit concerned.
dimensions

The _____ of a physical quantity is the algebraic combination of [L], [T] and [M] from which the quantity is formed.
dimension

Volume is not dependent of the units of mass and time.
True

The equation such as [V] = [L3 M0 T0] or [v] = [LT-1] is called _____
dimensional equation

The study of the dimensions of an equation is called_____.
dimensional analysis

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Any physical quantity which requires both magnitude and direction for it to be completely specified is called a _____
vector

Vector composition is done by the method of vector_____.
addition

All motion is_____
relative

_____ is the rigid or fixed frame work, relative to which the position and movements of a particle or of a system of particles, or of a rigid body may be measured.
Frame of reference

If coordinates of the object remain fixed despite the elapse of time the object is at_____.
rest

If a change occurs in one, or two, or all three coordinates with time, then the object is said to be in_____.
motion

The coordinate system in which the motion of any object depends only on the interactions of the constituent particles among themselves is called_____.
Inertial frame of reference

In_____, the motion of the objects is partly due to interactions among constituents particles and partly due to the movement of the frame with respect to an inertial frame.
non-inertial frame

When the axes of reference are mutually perpendicular to each other for example, in a two dimensional plane they are called_____.
rectangular axes

When axes of reference are inclined to each other at an angle, other than a right angle, they are called_____.
oblique axes

The coordinates referred to either rectangular or oblique axes are called_____.
Cartesian co-ordinates

The _____ are more commonly used because they are more convenient to draw.
rectangular axes

The rectangular axes are more commonly used because_____
they are more convenient to draw

The _____ at a place is an imaginary vertical plane through it.
meridian

The sun is said to be in the meridian when_____
it reaches the highest position in the course of its apparent journey in the sky

The meridian at a place is an _____ plane through it.
imaginary vertical

The meridian at a place is an _____ vertical plane through it.
imaginary

The meridian at a place is an imaginary vertical _____through it.
plane

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The _____ is said to be in the meridian when it reaches the highest position in the course of its apparent journey in the sky.
sun

The interval of time between two successive transitions of the centre of the sun's disc across the meridian at any place is called_____.
solar day

The mean of the actual solar days averaged over a full year is called_____.
mean solar day

A _____, _____ or_____ keeps the mean solar time.
clock, watch or chronometer

A clock, watch or chronometer keeps the_____.
mean solar time

The mean solar day is divided into_____.
24 hours

An hour is divided into 60 minutes and a minute is divided into 60 seconds.
True

A mean solar second is _____ part of the mean solar day.
86,400th

There are _____ aspects to measurement.
two

_____ is defined as the average length of the feet of 20 German men.
Foot

_____ was defined as one ten-millionth (10-7) of the distance along Earth's surface between the equator and the North pole.
Metre

The _____ was defined as 1/86,400 of a mean solar day.
second

The _____ was defined as the mass of a certain quantity of water.
kilogram

The General conference on weights and measures was formed in_____
1889

SI stands for____
International System or Systeme International

The physical quantities, length, time and mass are known as_____.
fundamental quantities

The unit of measurement of time is_____
second

The unit of measurement of mass is_____
kilogram

The units of all physical quantities which are based on the three fundamental units are termed_____.
derived units

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The value of the unit area is _____.
one square metre

A body has unit velocity when_____
it moves over a distance of unit length in unit time in a constant direction or straight line

The unit of _____ is derived from the units of length and time.
velocity

The unit of velocity is derived from the units of_____ and_____.
length and time

The unit of velocity is_____
metres per second

The _____ is taken to be the unit of time
mean solar second

Three basic ways to describe a physical quantity are the following
- the space it occupies
- the matter it contains
- how long it persists

The _____ of a physical quantity is the algebraic combination of [L], [T] and [M] from which the quantity is formed.
dimension

The dimensions of velocity is given by_____
[L] or [LT-1]

The equation such as $[V] = [L^3 M^0 T^0]$ or $[v] = [LT^{-1}]$ is called_____.
dimensional equation

Convenient quantity used as the standard of measurement is called_____.
unit

Physical quantities are also known as_____.
fundamental quantities

Any physical quantity which requires both magnitude and direction for it to be completely specified is called_____
vector

The following factors must consider while representing a vector
(i) a starting point also called the point of application
(ii) a direction
(iii) a magnitude

_____ is done by the method of vector addition.
Vector composition

Vector composition is done by the method of_____.
vector addition

Newton's second law, F = _____
ma

Newton's second law, _____ = ma

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F

A _____ is a vector whose magnitude is zero and whose direction is not defined.
Null vector

A _____ is used to denote direction in space
unit vector

A unit vector is used to denote_____ in space
direction

A unit vector is used to denote direction in _____
space

_____ are quantities which are specified by a positive real number called magnitude or modulus
Vectors

Vectors are quantities which are specified by a positive real number called _____
magnitude or modulus

The axes of reference are defined by the_____.
right-hand-rule

The vector of two vectors is also known as _____
cross product of the two vectors

_____ may be defined as a continuous change of position with time.
Motion

Speed is _____ quantity
scalar

The velocity of a particle at some one instant of time or at some one point of its path is called its_____.
instantaneous velocity

The instantaneous velocity at any point of a coordinate-time graph therefore equals the slope of the tangent to the graph at that point.
True

When a body accelerates in motion it means that _____
its velocity changes continuously as the motion proceeds

Kinematics alone cannot predict the possible motion of an object.
True

The parameters that describe motion such as velocity and acceleration is called_____
Kinematics

_____ described the laws that govern motion in 1687.
Sir Isaac Newton

Sir Isaac Newton described the laws that govern _____ in 1687.
motion

Sir Isaac Newton described the laws that govern motion in_____.
1687

_____ are forces resulting from direct contact of two or more objects.
Contact forces

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_____ are said to be mainly as a result of attraction and repulsion of the electrons and nuclei making up the atom of materials.
Contact forces

_____, electrical and magnetic forces can act through empty space without contact.
Gravitational

Gravitational, _____and magnetic forces can act through empty space without contact.
electrical

Gravitational, electrical and _____ forces can act through empty space without contact.
magnetic

Gravitational, electrical and magnetic forces can act through empty space without contact.
True

_____ occurs when the forces in the displaced position act such that they return the body in its original position
Stable equilibrium

If the forces act to increase the displacement still further, the equilibrium is_____.
unstable

If the body after being displaced is still in equilibrium, the equilibrium is _____.
neutral

Newton's _____ Law of Motion states that "To every action there is an equal and opposite reaction."
Third

A body can only be in static or dynamic equilibrium_____
if all the forces acting on it cancel each other

The study of the parametres that describe linear motion is called_____
kinematics

The studies of the causes of motion is called_____
dynamics

_____ is a push or a pull exerted on a body by another body.
Force

_____ can be represented graphically just like vectors
Forces

Forces can be represented _____ just like vectors
graphically

Forces can be represented graphically just like_____
vectors

Forces can be represented graphically just like vectors
True
We defined the _____ of a projectile launched from the ground y = 0, to be the horizontal distance that the projectile travels over level ground.
range

_____ is a type of motion with constant acceleration.
Projectile motion

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_____ is an example of motion in two dimensions in the earth's gravitational field.
Projectile motion

Projectile motion is an example of motion in _____ dimensions
two

The concept of projectile motion can be employed in_____.
warfare

The path followed by the projectile is called_____
trajectory

_____ can be described as a combination of horizontal motion with constant velocity and vertical motion with constant acceleration.
Projectile motion

Projectile motion is a form of _____ motion.
parabolic

A _____ produces a change in momentum.
force

When a system of particles is isolated_____
the total momentum is constant

A force produces a change in_____.
momentum

When a system of particles is isolated the total momentum is _____.
constant

The product, mv has a special name called_____.
momentum

Momentum during a linear motion is also called_____.
linear momentum

_____ is a force of very short duration
Impulse

_____ is given by the product of the force and velocity.
Linear momentum

_____ is as a result of change of momentum of a particle
force

When two objects collide_____
their momentum must be conserved

The laws that describe collisions in one dimension were formulated by John Wallis, Christopher Wren and Christian Huygens in_____.
1668

_____ is the sudden impact felt between two objects.
Collision

There are _____ types of collisions
two

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There are two types of collisions_____ and_____
elastic and inelastic

_____ is a collision between two or more objects during which no energy is lost.
Elastic collision

If the kinetic energy is not conserved in a collision the collision is called_____.
inelastic collision

During inelastic collision kinetic energy is not conserved.
True

Collision is the sudden impact felt between_____ objects.
two

_____ state that every particle of matter in the universe attracts other particles with a force which is directly proportional to the product of their masses and inversely proportional to the square of their distances apart.
Newton's law of universal gravitation

G is a constant called_____
universal gravitational constant

The gravitational force exerted on a body by a homogeneous sphere is the same as if the entire mass of the sphere were concentrated in a point at its centre.
True

_____ excited the interest of earliest scientists, Babylonian and Greek astronomers.
Planetary motion

_____ act along the surface between two bodies when one tries to move or succeeds in moving over the other.
Frictional forces

_____ is a contact force which acts along the surface between two bodies in contact when one tries to move or succeeds in moving.
Friction

_____ opposes motion
friction

Friction opposes_____
motion

Friction opposes motion
True

_____ and_____ is central to life.
Work and energy

Work and energy is central to_____.
life

The energy a body possesses by virtue of its position called_____.
potential energy

A body is said to expend _____ when it does work on another body.
energy

A body is said to expend energy when_____
it does work on another body

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The unit of power is the _____
watt (W)

_____ can be taken to be a measure of the quantity of energy transferred between two bodies.
Work done

_____ is the energy a body passes by virtue of its motion.
Kinetic energy

The _____ of a system of bodies is the energy the body has by virtue of the relative position of the parts of the body of the system.
potential energy

S.H.M stands for_____
Simple Harmonic Motion

If the acceleration of a body is directly proportional to its distance from a fixed point and is always directed towards this point, the motion is _____.
simple harmonic

A motion which has a constant period whatever the amplitude is said to be_____.
isochronous

The _____ provides a fairly accurate means of determining acceleration due to gravity g.
simple pendulum method

_____ occurs in the production of musical sounds from air columns in wind instruments.
Resonance

_____ occurs when a radio circuit is tuned by making its natural frequency for electrical oscillations equal to that of the incoming radio signal.
Electrical resonance

A life example is the breaking of the Tacoma Narrows Suspension Bridge in America in_____.
1940

In mechanical system, _____ can constitute a menace to engineers.
resonance

A _____ is defined as an aggregate of point masses such that the relative separation between any two of these always remains invariant, that is, for any position of the body
rigid body

A _____ is one which has a definite shape.
rigid body

A rigid body is said to execute pure _____ if each particle in it undergoes the same displacement as every other particle in a given interval of time.
translational motion

The simplest rotating object that we can contemplate is a_____.
dumbbell

The _____ of a force about a point is measured by the product of the force and the perpendicular distance from the line of action of the force to the point.
moment or torque

A _____ is applied to a water tap to open it.

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couple

_____ is a vector that points in the same direction as ω.
Angular momentum

_____ states that the total angular momentum of a system remains constant provided no external torque acts on the system rigid or otherwise.
Principle of angular momentum

A symmetrical body rotating about an axis, one point of which is fixed is called a_____.
top

_____ is the rotational analogue of force in linear motion.
Torque

When the net torque on a system in rotational motion is_____
zero

A _____ is a symmetrical body rotating about its centre of gravity
gyroscope

_____ is a fundamental quantity in the study of heat (thermal energy) or thermodynamics.
Temperature

Heat is a form of_____.
energy

_____ is a form of energy
Heat

Heat flows from higher temperature to a lower temperature.
True

Heat is a form of energy.
True

_____ is a sensation of hotness and coldness.
Temperature

Temperature is a sensation of_____ and_____.
hotness and coldness

Heat measurement is referred to as_____.
Calorimetry

Temperature measurement in physics is referred to as_____.
thermometry

Why is heat a form of energy?
It is a form of energy because we use it to do work for us

_____ is an intangible agency that causes increase of hotness of a body.
Heat

A body is said to be _____ if it receives heat and colder when it losses heat.
warmer

A body is said to be warmer _____
if it receives heat and colder when it losses heat

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A _____ is a standard length of a bar of platinum – iridium kept in Paris.
meter

Two bodies may be at different temperature
True

_____ exists between two bodies when they are in thermal contact with each other and there is no net flow of heat between them.
Thermal equilibrium

_____ determines the direction of flow of heat from that body to another.
Temperature

_____ helps us to quantify the concept of temperature objectively.
The zeroth law of thermodynamics

In_____, bodies are brought into contact in order to establish the common temperature
thermodynamics

The types of wall are namely_____.
adiabatic and diathermic

_____ are those walls through which no heat can be transmitted
Adiabatic walls

The walls through which heat can be transmitted are known as_____.
diathermic walls

A wall which allows free exchange of heat energy is called_____
diathermic wall

Examples of diathermic walls are_____ and_____.
copper and aluminium

The joint state of both systems that exist when all changes in the state coordinates have ceased is called_____.
thermal equilibrium

_____ states that: "Two thermodynamics systems A and B are separately in thermal equilibrium with a third system C, then the systems A and B are in Thermal equilibrium with each other".
The zeroth law of thermodynamics

_____determines whether or not given two systems are in thermal equilibrium.
Temperature

The ____ is used in establishing the temperature of a body quantitatively and objectively.
zeroth law

The _____ of a system is that property that determines whether or not it will be in thermal equilibrium with other system when two or more systems are in thermal equilibrium, they are said to have the same temperature.
temperature

A _____ is a variable which is assigned a constant value during a discussion or event.
parameter or property

_____ are temperatures chosen which are fixed and reproducible.
Fixed points

Fixed points are temperatures chosen which are_____ and_____.

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fixed and reproducible

_____ are useful as reference temperatures.
Fixed points

Fixed points are useful as_____.
reference temperatures

Changes in the parameters from the fixed points are assigned numbers called _____on a calibrated scale.
degrees

_____ is the temperature of equilibrium between ice, water and air saturated at standard pressure.
The Lower fixed point (ice point)

_____ is the temperature of steam rising from pure water boiling under standard atmospheric pressure.
The Upper fixed point (steam point)

_____ is the difference between the upper fixed point and the Lower fixed point divided into equal parts.
The fundamental interval

The following are factors that can change the fixed points on a temperature scale

- Changes in the atmospheric pressure and latitude cause variation in freezing and boiling points.
- Freezing point depression and Boiling point elevation are caused by impurities of slats.
- Daily floatation of barometric reading call for the correction of the boiling point.

_____ is the standard temperature scale used in scientific measurements.
Thermodynamic scale

The temperature of the triple point of water is_____
273.16K

The temperature of triple point of ice is_____
273.15K

When the graph is extrapolated it meets the temperature axis at _____
- 273.15^{o} C

When the graph is extrapolated, it meets the temperature axis at - 273.15o C. This value of temperature is called _____
absolute zero

_____ thermometers use the expansion of the liquid in the glass tube.
Liquid-in-Glass

_____ makes use of a given mass of gas whose pressure varies with temperature at constant volume.
Constant Volume-Gas Thermometer

_____ makes use of the variation of resistance of a given conductor such as platinum with temperature.
Resistance Thermometer

_____ makes use of the variation of electromotive force (emf) developed between the pair of junctions of two dissimilar metals with temperature.
Thermo-electric Thermometer

The liquid-in-glass thermometer makes use of two liquids_____
alcohol or mercury

The mercury-in glass thermometers are commonly used in the laboratory or in the hospitals as_____.
clinical thermometers

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The _____ are used in temperate countries because alcohol has a much lower melting point than mercury.
alcohol-in-glass thermometers

The _____ is usually used in the hospital clinics
clinical thermometer

The stem of the clinical thermometer is graduated from_____.
35^{o} C to 45^{o} C

The laboratory thermometers are longer than the clinical thermometer
True

The _____ is used to measure the maximum and minimum temperatures on a particular day
Six's thermometer

_____is used to record the minimum and maximum temperatures of the day.
Minimum and Maximum thermometer

The two properties that are kept constant in the construction of this thermometer are_____
volume (V) and the amount of the gas in moles (n)

The _____ is used to obtain a balance point which enables the experiment to determine the various values of Rt, R100 and R0
bridge

The thermo-electric thermometer is otherwise called_____.
thermo-couple

The thermo-electric thermometer type of thermometer is constructed by using the_____.
Seebeck effect

_____ simply states that if two dissimilar metals, such as copper and iron are joined to make a complete circuit, then on heating one end of the junctions, a current flows round the circuit.
Seebeck effect

The presence of the _____ is to detect and measure the magnitude of the current that flows in the circuit.
galvanometer

The presence of the galvanometer is _____
to detect and measure the magnitude of the current that flows in the circuit

The _____ is usually maintained at ice point.
cold junction

The cold junction is usually maintained at_____.
ice point

A _____ uses the property of a substance which varies uniformly with changes in temperature.
thermometer

A thermometer uses the property of a substance which varies _____ with changes in temperature.
uniformly

A thermometer uses the property of a substance which varies uniformly with changes in_____.
temperature

Thermometers ate constructed using a specified physical property known as_____.
thermometric property

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The following are different types of thermometers.
(i) Liquid-in-glass thermometers
(ii) Resistance thermometers
(iii) Thermo-electric thermometer

Heat and temperature are not the same but they are closely related.
True

The degree of coldness or hotness is measured objectively and quantitatively by using the_____.
thermometer

The study of heat measurement is known as **_____**.
Calorimetry

The _____ of substance plays an important role in the study of thermal phenomena.
nature

The nature of substance plays an important role in the study of_____.
thermal phenomena

_____ first showed that heat is a form of energy in an experiment in which mechanical work (energy) was transformed into heat.
Prescot Joule

In an electric power station heat from fuel is changed to _____
electrical energy

The unit of energy is_____
Joule (J)

The unit of measuring mechanical energy and electrical energy_____
Joule (J)

_____ is the rate of doing work.
Power

_____ is defined as the rate at which heat energy is given out by a source.
Power

Power is measured in_____.
watts (W)

One watt is therefore defined as _____
one joule per second (J/s or Js-1)

Sources of _____ are the sun, fuels such as coal, gas, oil and electricity.
heat energy

The following are the sources of heat energy

- sun
- coal
- gas
- oil
- electricity

The amount of heat in joules that is capable of changing its temperature through 1o C is_____
Heat capacity

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_____ of a body is the quantity heat (Q) in joules required to change its temperature by one degree (Celsius or one Kelvin).
Heat capacity

The amount of heat to change the temperature of the body is described as the _____of the body.
heat capacity

The _____ of a substance is therefore defined as the amount of heat Q (in joules) required to raise the temperature of 1kg mass of substance through unit degree (1o C or 1o K).
specific heat capacity

_____ states that "the heat lost by a hot body is equal to the heat gained by the cold body in any system provided there is no heat exchange between the substances involved and their surrounding"
The principle of conservation of heat energy

The _____ is usually in form of water or any liquid and the hot body could be a solid body or liquid at a higher temperature.
cold body

Heat causes matter to undergo the following changes

- Expand
- Change its temperature
- Change its state

_____ is defined as the amount of heat required to change 1kg of mass of solid at its melting point to liquid at the same temperature.
Specific latent heat of fusion

The _____ is the quantity of heat required to change 1kg of a liquid at its boiling point to vapour at the same temperature.
specific latent heat of vaporization of a liquid

_____ is the heat required to melt a whole mass of solid at melting point to liquid at the same temperature.
Latent heat of fusion

_____ is the heat required to convert a whole mass of liquid at boiling point to vapour at the same temperature.
Latent heat of vapourization

A solid consists of atoms or molecules held in affixed structure by _____ between them.
forces of attraction

A _____ consists of atoms or molecules held in affixed structure by forces of attraction between them.
solid

When heat is supplied to the solid_____
the kinetic energy of vibration increases thus increasing the temperature of the solid

The heat supplied is measured by_____.
mCΔθ

_____ is the quantity of heat required to change 1kg mass of a solid at its melting point to liquid at the same temperature.
specific latent heat of fusion

A liquid has no definite form
True

_____ usually takes the shape of its container.

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liquid

Evaporation takes place at all temperatures.
True

Boiling occurs at a definite temperature
True

Water boils at _____and at a pressure_____.
100^{o} C, 760mmHg

The boiling point of water at the top of a mountain is less that 100^{o} C.
True

_____ is the quantity of heat required to change 1kg mass of liquid at boiling point to vapour at the same temperature.
Specify latent heat of vapourization

When solids are heated, the effect of heat on them could be found in the change of:

- the length
- the area
- volume of the solids as temperature changes

The changes in length, area and volume of the solids depends on:

- the material making up the solid
- the range of the temperature change
- the initial dimensions of the solid

_____ is the increase in length O length per degree Celsiusλ) per the original λof the material (Δ change in temperature (Δθ).
Linear expansivity

The following methods used are in determining the linear expansivity (α) of a metal:

- Optical lever method
- Screw gauge method
- Comparator method
- Henning's tube method
- Fizeau's method

_____ is a laboratory methods for determining the coefficient of linear expansion of a metal.
Screw gauge method

When a _____ is heated, the area increases.
solid

When a solid is heated, the _____ increases.
area

When a solid is heated, the area_____.
increases

The volume of a solid _____as a result of heat.
increases

The volume of a solid increases as a result of_____.
heat

The volume of a solid increases as a result of heat.
True

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Linear expansivity is applied in the formation of bimetallic element which are used as:
(i) thermostatic control switches
(ii) in the construction of expansion loops for use in steam lines
(iii) bimetallic thermometers

_____ is used in the construction of bridges where gaps are left between the girders to accommodate expansion.
Linear expansivity

_____ is the fractional change in volume per the original volume for degree change in temperature.
The coefficient of volume expansion of a liquid

_____ are used in the determination of thermal expansion of liquids.
Volume dilatometers

When _____ is heated, it expands.
matter

When matter is heated, it_____.
expands

Expansion in liquids is greater than that of solids.
True

There are **_____** types of coefficient of expansion
three

There are three types of coefficient of expansion _____
linear expansivity, superficial expansivity and cubical expansivity

The expansion of a material depends on the following

- nature
- temperature range
- initial dimensions of the material

_____ is twice the linear expansivity of solid material
Superficial expansivity

Superficial expansivity is _____ the linear expansivity of solid material
twice

The _____ is thrice the linear expansivity of a solid material
cubical expansivity

The cubical expansivity is _____ the linear expansivity of a solid material
thrice

There is no absolute expansion of a liquid because_____
it is contained in a container which also expands

When solids and liquids are heated_____
they are not significantly affected by changes in pressure as their temperatures change

The following are the properties or parameters are used to describe the state of a given mass of a gas

- pressure (P)
- volume (V)
- temperature (T)
- the number of moles (n) of the gases

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_____ investigated the relationship between the pressure (P) and the volume (V) of a given mass of gas when the temperature (T) and the number of moles (n) are kept constant.
Boyle (1662)

_____ states that: "The pressure on a given mass of gas is inversely proportional to its volume (V) provided its temperature is kept constant".
Boyle's law

Boyle's law may be demonstrated by using a _____
'J' tube

_____ is applied in air compressors and exhaust (vacuum) pumps.
Boyle's law

_____ deals with the behaviour of a given mass of gas at constant pressure.
Charles's law

_____ state that: "At constant pressure, the volume of a given amount of gas increases by a constant fraction of its volume at 0o C for each Celsius degree rise in temperature".
Charles's law
The volume coefficient is called_____.
volume expansivity

The volume of a given mass of gas is directly proportional to its absolute temperature provided the pressure is kept constant is_____
Charles's law

_____ states that: "For a given mass of a gas at constant volume, its pressure increases by a constant fraction of pressure at 0o C for each Celsius degree rise in temperature".
Pressure law

_____ is defined as the increase in pressure expressed as a fraction of the pressure at 0o C for one celsius degree rise in temperature when a fixed mass of that as is heated at constant volume.
Pressure coefficient

_____ is used to determine the pressure coefficient β for a gas
Constant volume air thermometer

The product PV has a value of **_____** when the temperature t is -273o C.
zero

The SI unit of temperature is_____
Kelvin

There are _____ kinds of units of mass
two

An _____ gas will obey Boyle's law at any temperature.
ideal

Real gases obey Boyle's law within less than one part in a thousand at ordinary pressures and temperatures.
True

_____ suggest that Boyle's law should be obeyed if the molecules are themselves infinitesimally small and if they do not attract each other at all.
Kinetic theory of gases

The relation PV is no longer valid.
True

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_____ is the quantity of matter such that its mass in grammes is numerically equal to the molecular mass M (often called the molecular weight).
One mole (1 mol) of any substance

The product Mc is called_____
molar heat capacity

_____ is defined as the quantity of heat Q in joules required to raise the temperature of 1 mole of gas through 1 K or 1o C.
molar heat capacity

_____ is defined as one which obeys Boyle's law and whose internal energy depends on the temperature of the gas and is independent of its volume.
An ideal gas

The heat capacity of a gas depends on the condition under which it is heated namely:_____
constant volume or constant pressure

_____ is defined as the heat required to raise 1 mole of gas by 1 Kelvin (or 1 Celsius) degree when its volume is kept constant.
molar heat capacity at constant volume

The _____ of a gas at constant pressure CP is the heat required to raise the temperature of 1 mole of gas at constant pressure by 1K or 1o C.
molar heat capacity

When an ideal gas is allowed to expand under a constant temperature, the process is described as_____.
isothermal expansion

That _____ is used for the heat absorbed by a gas constant volume CV and constant pressure CP
molar heat capacity

_____ at constant volume CV is defined as the heat required to raise one mole of gas by 1K when its volume is kept constant
Molar heat capacity

_____ of a gas at constant pressure CP is the heat required to raise the temperature of 1 mole of the gas at constant pressure by 1K
Molar heat capacity

When a gas is allowed to expand at constant temperature the process is described as_____
isothermal expansion

When a gas is allowed to expand without heat entering or leaving the gas_____
the gas is said to undergo an adiabatic expansion

_____ is done with rise in internal energy.
Work

Work is done with rise in_____.
internal energy

The _____ of a material is the rate of transfer of heat per unit area per unit temperature gradient through the face of the material with the face perpendicular to the direction of the transfer of heat provided steady state is maintained.
thermal conductivity

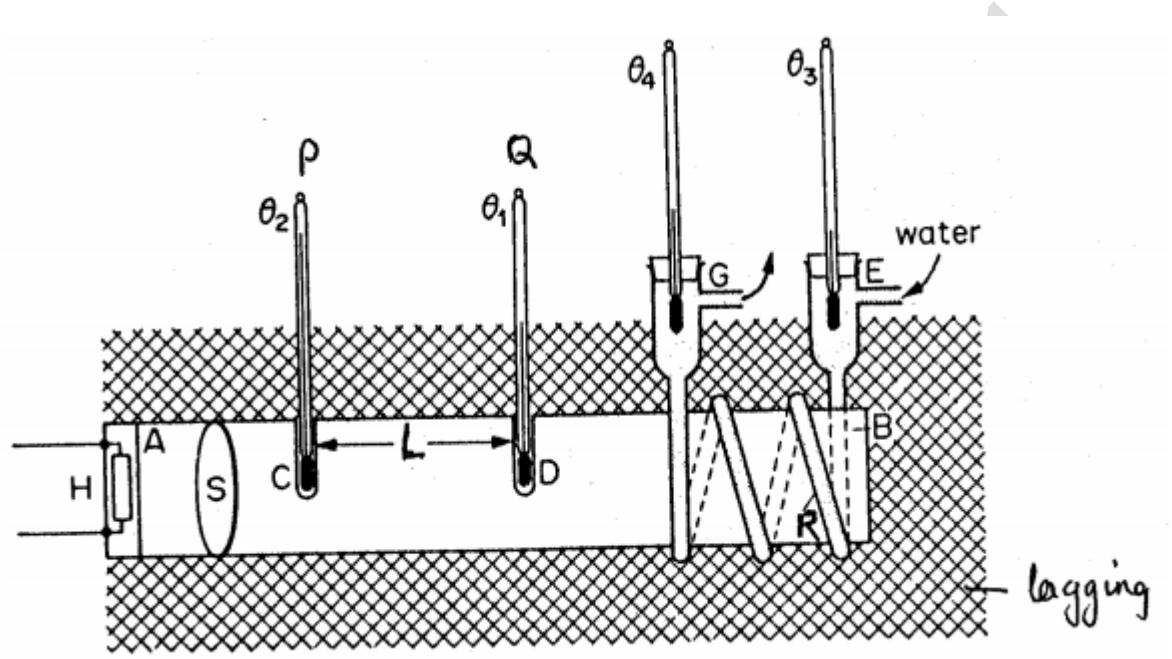
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A _____ is reached when the rate of transfer of heat through a given cross-sectional area does not change with respect to time.
steady state

A steady state is reached when_____
the rate of transfer of heat through a given cross-sectional area does not change with respect to time

Heat may be transferred under _____conditions
two

Heat may be transferred under two conditions:_____ and_____
lagged material and unlagged material



The apparatus shown above is called_____
Searle's apparatus

The following are the essential features of the Searle's apparatus for measuring the thermal conductivity of a good conductor

- A thick bar so that appreciable heat is transferred through a cross-section
- A reasonable long bar AB so that the temperature gradient can be measured accurately.
- A lagged bar so that no heat escapes and the heat being transferred is linear along the bar under steady state conditions.

The concept of thermal conductivity is applied to both good and bad conductors of heat
True

The thermal conductivity of a conductor is used to solve problems under _____ state condition
steady

The factors that affect the conduction of heat through a solid material are:
(i) The cross-sectional area A
(ii) The temperature difference
(iii) The length of the material
(iv) The time for the heat to be transferred

Liquids and gases are usually referred to as_____.
fluids

Air and gases are generally worse conductors of heat.
True

Air is a poor conductor of heat.
True

_____ have shown that air is a poor conductor of heat.
Experiments

The _____ stays at the top.
heat

The heat stays _____.
at the top

Steel wool, crumpled aluminum foil, wollen materials are bad conductors of heat because _____
of the large number of small air pockets within these materials

_____ is transferred in fluids by convection.
Heat

Heat is transferred in _____ by convection.
fluids

Heat is transferred in fluids by**_____**.
convection

_____ is a mechanical displacement of heated part of a fluid.
Convection

_____ is a phenomenon of transfer of heat with the actual movement on the particles of the body.
Convection

When water molecules are heated they _____
expand

The term _____ is usually applied to the transfer off heat in fluids from one point to another by the actual movement of the particles that make up the fluid.
convection

When the material fluid carries the heat from one place to another due to the differences in density as a result of thermal expansion, the process of the heat transfer is called_____.
natural convection

When the material of the fluid is forced to carry the heat from one place to another by a blower or pump, the process is called_____.
forced convection

_____ in liquids may be demonstrated by placing a crystal of potassium permanganate carefully in a round bottomed flask and then heating the bottom of the flask gently
Convection

The Newton's law of cooling was propounded by_____
Newton

_____ states that the rate of loss of heat by a hot body is proportional to the temperature difference between the hot body and its surroundings.
Newton's law of cooling

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Newton's law of cooling states that_____
the rate of loss of heat by a hot body is proportional to the temperature difference between the hot body and its surroundings

Conduction does not take place in fluids
True

Heat is transferred in fluids (liquids & gases) by _____
convection

There are _____ and_____ convection in fluids
natural and forced

_____ involves the material medium in the transfer of heat in fluids
Convection

_____ may be used to explain loss of heat by convection under natural and forced condition
Newton's law of cooling

The following are the properties of radiation

- It can be reflected
- It can be refracted
- It can be diffracted
- It can be polarized
- It can produce interference
- It can be absorbed

Naturally our skins are capable of detecting heat radiation but a more sensitive and reliable instrument that is more commonly used to detect heat radiation is the_____.
thermopile

A **_____** is a series of arrangements of thermocouples made up of two dissimilar metals such as Bismuth (Bi), Antimony (Ag).
thermopile

A black body is the best radiator or absorber of heat radiation that falls upon it.
True

A _____ is defined as one which emits every wavelength with the maximum energy for each wavelength for the particular temperature of the body.
perfectly black body

A perfectly _____is defined as one which emits every wavelength with the maximum energy for each wavelength for the particular temperature of the body.
black body

A perfectly _____ body is defined as one which emits every wavelength with the maximum energy for each wavelength for the particular temperature of the body.
black

A perfectly black body is defined as _____
one which emits every wavelength with the maximum energy for each wavelength for the particular temperature of the body

Black body is also known as_____.
an ideal radiator

A good example of black body is_____

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a ceramic-lined closed container with a hole in it

The _____ inside a black body may be silvery so that the reflection is high.
absorber

The absorber inside a _____ may be silvery so that the reflection is high.
black body

The absorber inside a black body may be _____ so that the reflection is high.
silvery

The absorber inside a black body may be silvery so that the _____is high.
reflection

The absorber inside a black body may be silvery so that the reflection is_____.
high

Black body radiation is also called_____.
temperature radiation

_____ states that when an object is at constant temperature or is in thermal equilibrium, it is losing and gaining heat at equal rates.
Provost's Theory of Heat Exchange

_____ was originally designed for the purpose of storing liquefied gases.
Thermos flask

The thermos flask was originally designed for the purpose of storing_____.
liquefied gases

_____ law of radiation is used in solving problems on radiation of heat energy
Stefan-Boltzmann

_____ is a substance that has mass and occupies space.
Matter

Matter is a substance that has _____ and occupies space.
mass

Matter is a substance that has mass and occupies_____
space

Matter is a substance that has_____ and_____.
mass and occupies space

_____ occurs when atoms are ionized at high temperatures.
Plasma

Plasma occurs when _____ are ionized at high temperatures.
atoms

Plasma occurs when atoms are _____at high temperatures.
ionized

Plasma occurs when atoms are ionized at_____.
high temperatures

Plasma occurs when atoms are ionized at _____ temperatures.
high

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At very high temperatures a substance consisting of positive ions and electrons is known as_____.
plasma

The idea of the atomic nature of matter dates as far back as the time the _____
Greek Philosophers

The Greek Philosophers proposed that the smallest indivisible unit of matter is the_____.
atom

The _____ proposed that the smallest indivisible unit of matter is the atom.
Greek Philosophers

_____ have no charges.
Neutrons

Neutrons have _____.
no charges

Neutrons have no charges.
True

_____ have been found to be fundamental particles of matter.
protons, neutrons and electron

_____, neutrons and electron have been found to be fundamental particles of matter.
protons

protons, _____ and electron have been found to be fundamental particles of matter.
neutrons

protons, neutrons and _____ have been found to be fundamental particles of matter.
electron

The limit of the divisibility is what the Greeks called_____.
atom

_____ is the tiniest form of matter that can exist by itself.
An atom

The molecules of matter are always in _____
random motion

HCl is_____
hydrochloric acid

NH_4OH is_____
ammonium hydroxide

_____ is defined as the process in which molecules move from area of high concentration to another area of low concentration until an equilibrium concentration is established within the system under consideration.
Diffusion

The volume occupied by a molecule is the_____.
molecular volume

The _____ of a substance is the mass of that substance per unit volume.
density

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_____ has been found to be the lightest gas on earth.
Hydrogen molecule

_____ molecule has been found to be the lightest gas on earth.
Hydrogen

Matter is made up of _____ and_____
atoms and molecules

Two or more atoms combine to form a _____
molecule

Matter exists in _____ states
three

Matter exists in three states_____, _____, and_____
solid, liquid and gas

The molecules of matter are forever in _____ motion
random

The _____ of matter are forever in random motion
molecules

The molecules of _____ are forever in random motion
matter

The _____ is obtained from the knowledge of the mass and volume of the molecule.
molecular density

The molecular density is obtained from the _____ of the mass and volume of the molecule.
knowledge

The molecular density is obtained from the knowledge of the _____ and volume of the molecule.
mass

The molecular density is obtained from the knowledge of the mass and _____ of the molecule.
volume

Matter as a whole may be subjected to lads and forces.
True

_____ is the property of a material to regain its original shape or form after removing the deforming force, or load provided the elastic limit is not exceeded.
Elasticity

Elasticity is the property of a material to regain its _____ or form after removing the deforming force, or load provided the elastic limit is not exceeded.
original shape

Elasticity is the property of a material to regain its original shape or form after removing the deforming_____, or load provided the elastic limit is not exceeded.
force

Elasticity is the property of a material to regain its original shape or form after removing the deforming force, or load provided the _____ is not exceeded.
elastic limit

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Elasticity is the property of a material to regain its original shape or form after removing the_____, or load provided the elastic limit is not exceeded.
deforming force

Elasticity is the property of a material to regain its original shape or form after removing the deforming force, or load provided the _____ limit is not exceeded.
elastic

The _____ on an elastic material is defined as the force exerted on the material per unit area.
stress

_____ states that the force applied on elastic material is directly proportional to the extension produced provided the elastic limit is not exceeded.
Hooke's law

K is a property of_____.
elastic material

_____ is a property of elastic material.
K

K is a property of **_____** material.
elastic

Where k is a constant of proportionality usually referred to as the_____.
spring constant

Substances which lengthen considerably and undergo plastic deformation until they break are _____.
ductile substances

The following are examples of ductile substances

- Lead (Pb)
- Copper (Cu)
- Wrought Iron (Fe)

When substances break just after the elastic limit is attained, then, such substances are said to be_____.
Brittle

The following are examples of brittle substances

- Glass
- High carbon steel brass
- Bronze and other alloys

When _____ is applied to a material it changes its shape.
force

When force is applied to a material it changes its_____.
shape

When a force is applied to a material it changes its shape.
True

_____ established the relationship between the force applied to a material and the extension produced within the elastic limit.
Robert Hooke

A substance is said to be _____ if undergoes a plastic deformation and breaks.
ductile

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A substance is said to be _____ if it breaks just when it has exceeded its elastic limit.
brittle

The force applied per unit area of the material described the _____ on the material.
stress

The ratio of the extension produced by the force and the original length of the material known as _____ on the material.
strain

A material is described as being ductile when_____
it undergoes a plastic deformation and then breaks

A material is described as being brittle if just when_____
it is at its elastic limit any additional load makes it to break

_____ is defined as the product of the force and the distance moved by the force
work done

When a liquid or gas is subjected to an increase pressure the substance_____.
contracts

_____ is defined as the change in volume (ΔV) of a gas (or liquid) to the original volume
bulk strain

A system whereby heat is not allowed to escape into it or get out of it is called_____
Adiabatic

A _____ is described as adiabatic when no heat is allowed to leave the system or enter the system of a gas.
state

_____ is applicable to the helical spring.
Shear modulus

Shear modulus is applicable to the_____.
helical spring

There are _____ moduli of elasticity
three

The following are the moduli of elasticity

- Young modulus
- Bulk modulus
- Shear modulus

Bulk modulus of elasticity may be considered under _____ conditions.
two

Bulk modulus of elasticity may be considered under two conditions:_____ and_____
Isothermal condition and adiabatic condition

_____ is when there is no exchange of heat energy between the gas and its environment
Adiabatic condition

A material is said to be **_____** if it is capable of regaining its original shape when the applied force is removed.
elastic

A material is said to be elastic if_____
it is capable of regaining its original shape when the applied force is removed

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All direction of _____ are equally probable.
motions

All direction of motions are equally probable.
True

A _____ molecule consists of two atoms with a bond between them
diatomic

_____ is a physical property of matter that describes the degree of compactness of a substance.
Density
The _____ of an object refers to how heavy or light that object is relative to water or air.
density

_____ is defined as the mass of the body per unit volume.
Density

Density is defined as _____
the mass of the body per unit volume

The quantity of matter in a body defines its_____.
mass

Mass is measured in_____
kilogram

The _____ is used to measure the mass of a body.
beam balance
The _____ is the amount of space it occupies – its capacity.
volume of a body

A _____ has a height (h), a breadth (b) and a length
cuboid

A _____ is like a ball with a constant radius r or diameter D.
sphere

A _____ is like a drum or tin of milk with a height h and circular cross-section of radius r
cylinder

A _____ is like a toy top with a circular surface, which tapers to a vertex
cone

_____ is defined as the mass per unit volume of a substance
Density

The density of a substance can be determined from the knowledge of its _____ and_____
mass and volume

Buoyancy was developed by_____
Archimedes

_____ is a concept that describes the floatation of an object in fluids generally
Buoyancy

_____ states that when a body is either partially or totally immersed in a fluid, it will experience an upthrust equal to the weight of the fluid displaced
Archimedes' Principle

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The weight of a body in air is equal to its apparent weight because_____
the displaced air will exert an upthrust

The _____ is a special stopper, which ensures constant volume of the liquid to be measured.
relative density bottle

_____ states that a floating body displaces its own weight of the liquid in which it floats
The law of floatation

When a body is fully or partially immersed in a fluid it experiences an upward force called_____
upthrust

A _____ is a type of shoe worn by ladies which has a sharp pointed heel.
stiletto-heeled shoe

_____ is the force exerted by a body per unit surface area.
Pressure

The _____ explains why the free surface of a liquid in equilibrium under the force of gravity is always horizontal.
mobility of liquids

Pressure is the _____ exerted on a unit area of the surface.
force

The pressure due to air around us is described as_____.
atmospheric pressure

The pressure due to air around us is described as_____.
atmospheric pressure

Air pressure is highest at sea level
True

The forces of pressure are transmitted in a liquid in all directions.
True

_____ states that "Pressure applied to any point to a fluid in a closed vessel is transmitted equally to every other point in the fluid"
Pascal's Principle

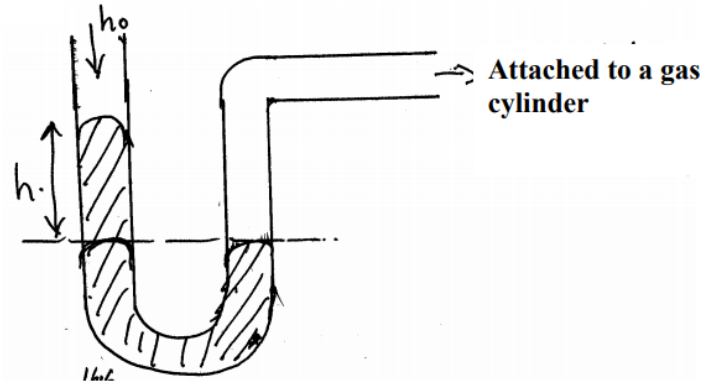
_____ states that "The pressure exerted by surface forces is transmitted without loss to any point of a liquid".
Pascal's Principle

Pascal's Principle is applied in the following machines

- The hydraulic press
- The hydraulic jack
- The hydraulic brakes

The _____ is made up of a U-tube open at both ends filled with mercury or any other liquid
manometer

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The diagram shown above is a_____
manometer

A _____ is used to measure the atmospheric pressure.
mercury barometer

A mercury barometer is used to measure the_____.
atmospheric pressure

The space is called the_____.
Torricellian vacuum

A Fortin barometer is similar in structure with the simple barometer.
True

The _____ is used to determine the relative densities of liquids through the use of pressure method.
Hare's apparatus

Pressure is the force exerted by matter_____.
per unit area

Pressure transmitted in fluids obeys Pascal's Principle
True

Pressure transmitted in fluids obeys_____
Pascal's Principle

_____ and the barometer are used in measuring pressures in the laboratory.
Manometer

Manometer and _____ are used in measuring pressures in the laboratory.
barometer

_____ is used to measure the relative density of a liquid by the use of pressure method.
Hare's apparatus

The unit of pressure is_____
Newton per meter square

_____ of a liquid can be measured using the pressure method as described in the use of Hare's apparatus.
Relative density

Relative density of a liquid can be measured using the pressure method as described in the use of_____.
Hare's apparatus

_____ is the study of fluids in motion.
Hydrodynamics

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Hydrodynamics is the study of_____.
fluids in motion

The ability of both the bird and the aeroplane to fly is dependent on the knowledge of _____especially the Bernoulli's Principle.
hydrodynamics

The ability of both the bird and the aeroplane to fly is dependent on the knowledge of hydrodynamics especially the_____.
Bernoulli's Principle

A flow is _____or laminar.
uniform

A flow is uniform or_____.
laminar

A _____ is uniform or laminar.
flow

_____ form another set of elements of hydrodynamics.
Pressure and velocity

_____ observed and obtained the relationship between pressure and velocity at different parts of a moving incompressible fluid.
Daniel Bernoulli (1740)

_____ is a general expression that relates the pressure difference between two points in a flow tube to both velocity changes ad elevation changes.
Bernoulli's equation

_____ states that: In a streamline flow of an ideal fluid, the sum of the pressure energy per unit volume of the kinetic energy per unit volume are potential energy per unit volume is always constant at all cross-section of the liquid.
Bernoulli's principle

A person standing close to the platform at a railway station experiences _____ when a fast train passes by.
suction effect

_____ is used in most laboratories for fast effective filtration of precipitates in solutions.
filter pump

From_____, the pressure of the air below is greater than that above.
Bernoulli's principle

The velocity of the fluid is _____ where they seem to diverge
decreased

The _____ of the fluid is decreased where they seem to diverge
velocity

The velocity of the fluid is decreased where they seem to _____
diverge

Bernoulli's principle could be used to explain certain phenomena in life such as:
(a) The attraction between an object and a moving train
(b) The filter pump
(c) The aerofoil lift

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(d) The flow of liquids from a sprout at the bottom of a tank

_____ deals with friction in the flow of fluids.
Viscosity

_____ is a property of fluids in motion.
Viscosity

Viscosity is a property of_____.
fluids in motion

Viscosity is also called_____
fluid friction

_____ is the frictional force in fluids.
Viscosity

Viscosity is the _____ in fluids.
frictional force

Viscosity is the frictional force in_____.
fluids

Viscosity is the frictional _____ in fluids.
force

The viscosity of fluids affects the volume of the fluid flowing per second as the fluid flows in a pipe.
True

The viscosity of motor oil is _____at 20^{o} C.
2 poise

The viscosity of motor oil is 2 poise at_____.
20^{o} C

The viscosity of _____ is 2 poise at 20^{o} C.
motor oil

The viscosity of water is_____.
1×10^{-3} poise at 10^{o} C

Viscosity _____ with _____ in temperature
decreases, increase

Viscosity decreases with increase in _____
temperature
Viscosity decreases with increase in temperature
True

_____ helps us to determine the coefficient of viscosity of a liquid by observing the rate of low of the liquid.
Poiseuille's formula

A time is reached when the net is then attained by the sphere which is called_____.
terminal velocity

_____ is the maximum velocity acquired by the body while falling forcely in a viscous medium.
Terminal velocity

The friction in fluids is called_____.

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viscosity

The _____ is the factor that is used in describing the ability of a fluid to flow.
coefficient of viscosity

The _____ is defined as the ratio of tangential stress is velocity gradient
coefficient of viscosity

_____ methods can be used to determine the coefficient of viscosity of a fluid
Two

Two methods can be used to determine the coefficient of viscosity of a fluid_____ and_____
capillary flow method from Poiseuille's formula and the falling of sphere method

The resistance offered by a moving fluid is called_____
viscosity

_____ is defined as the rate of change in velocity of fluid layers per the distance between the layers of fluid
velocity gradient

_____ is the velocity acquired by a falling object in a fluid when the net force of the frictional force F, its weight W and upthrust U is zero
terminal velocity

The formation of soap bubbles could be explained through the existence of_____.
surface tension

Molecules at the surface of water and other liquids have more energy than those in the bulk volume of the liquid.
True

At_____, the surface will have a minimum energy.
equilibrium

At equilibrium, the _____ will have a minimum energy.
surface

At equilibrium, the surface will have a_____ energy.
minimum

At equilibrium, the surface will have a minimum_____.
energy

At equilibrium, the surface will have a_____.
minimum energy

A _____ is the volume of a liquid whose surface area is minimum.
sphere

_____ are manufactured by spraying molten lead from the top of a tower.
Leads shots

The liquid forms _____ as they fall due to surface tension.
spheres

Leads shots are manufactured by spraying _____ lead from the top of a tower.
molten

The _____ forms spheres as they fall due to surface tension.

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liquid

The liquid forms spheres as they fall due to_____.
surface tension

Surface tension is a property of a liquid.
True

The magnitude of a surface tension across/perpendicular to a unit length is known as the_____.
coefficient of surface tension

_____ varies with purity of the liquid and temperature.
Surface tension

Surface tension varies with _____ of the liquid and temperature.
purity

Surface tension varies with purity of the liquid and_____.
temperature

The _____ is defined as the force per unit length in the surface acting perpendicular to one side of a line in the surface.
coefficient of surface tension

Surface tension is independent of the_____.
surface area

_____ is independent of the surface area.
Surface tension

Surface tension is _____ of the surface area.
independent

Molecular forces between like molecules are called_____.
forces of cohesion

Water molecules have cohesion forces between them.
True

Water molecules have _____ between them.
cohesion forces

The molecular forces between unlike molecules are called_____.
forces of adhesion

Water wets are clings to clean glass because_____
the adhesive forces between glass and water molecules are greater than the cohesive forces of water

Mercury does not wet clean glass but shrinks away from it because_____
the adhesive forces between mercury and glass molecules a re less than the cohesive forces of mercury

The _____ is another property used to show the different kinds of meniscus (concave and convex) we obtain when a liquid is contained in a tube.
angle of contact

_____ is defined as the angle measured through the liquid between the tangent to the liquid surface where it touches the solid surface and the solid surface itself.
Angle of contact

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The angle of contact for olive oil is _____
15^o

The angle of contact for mercury is _____.
150^o

The curvature of a liquid or a bubble formed in a liquid is related to the _____ of the liquid.
surface tension

When capillary tubes are dipped in liquids we have curved surfaces otherwise known as_____
meniscus

A soap bubble has _____ liquid surfaces in contact with air.
two

A smaller soap bubble has a greater pressure inside it than a larger bubble.
True

The behaviour of liquids in _____ can be associated with surface tension of liquids.
capillary tubes

The behaviour of liquids in capillary tubes can be associated with _____ of liquids.
surface tension

_____ rises in capillary tubes.
Water

Water rises in_____.
capillary tubes

Water rises in capillary tubes.
True

Surface tension of water may be determined by _____ methods
two

Surface tension of water may be determined by two methods:_____ and_____
capillary rise and microscopic slide

_____ of the liquid is defined as force per unit length.
surface tension

The rise in a capillary tube is not suitable for measuring the variation of surface tension of water with temperature.
True

_____ can be defined as the work done per unit area in increasing the surface area of a liquid under isothermal conditions
Free surface energy

_____ explains then formation and shapes of the meniscus of a liquid inside a tube.
Surface tension

_____ is a surface phenomenon in liquids
Surface tension

Surface tension is a surface phenomenon in _____
liquids

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Surface tension is a _____ phenomenon in liquids
surface

The angle of contact is _____ for mercury and glass
obtuse

The angle of contact is obtuse for _____ and glass
mercury

The angle of contact is obtuse for _____ and_____
mercury and glass

The _____ is obtuse for mercury and glass
angle of contact

The angle of contact is obtuse for mercury and _____
glass

_____ is defined in terms of the coefficient of surface tension γ
Surface energy

_____ is the work done in increasing the surface area by unit amount under constant temperature (isothermal) condition.
Surface energy

A closed vessel may contain a mixture of gases.
True

_____ describes the pressures of the two gases in a container.
Dalton's law of partial pressure

_____ of partial pressure states that; "In a mixture of gases, the total pressure is the sum of the pressures of the parts or individual gases each gas occupying the volume of the mixture e provided the gases do not reach chemically with one another".
Dalton's law

_____ established the law that governs the diffusion of gases as they pass through porous membranes or porous pots.
Graham

_____ of gases states that "the rates of diffusion of gases through a porous membrane or pot under given conditions are inversely proportional to the square roots of their densities".
Graham's law of diffusion

_____ states that, "Equal volumes of all gases under the same conditions such as temperature and pressure contain equal numbers of molecules"
Avogadro's law

_____ states that the rate of diffusion of a gas is inversely proportional to the relative density of the gas or its relative molecular mass.
Graham's law of diffusion

The algebraic sum of the resolved parts of a number of forces in a given direction is equal to the resolved part of their resultant in the same direction. This is as per the principle of resolution of_____
forces

Forces are called coplanar when all of them acting on body lie in_____
one plane

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A 2kg box is at the top of a frictionless ramp at an angle of 60o. The top of the ramp is 30m above the ground. The box is sitting still while at the top of the ramp, and is then released. What is the velocity of the box just before it hits the ground?
32.2 m/s

An object is shot from the ground at 125m/s at an angle of 30o above the horizontal. How far away does the object land?
1350 m

An object is shot from the ground at 75m/s at an angle of 45° above the horizontal. How high does the object get before beginning its descent?
140 m

A body moving with uniform acceleration has a velocity of 12.0 cm/s when its x coordinate is 3.00cm. If its x coordinate 2.00 s later is −5.00cm, what is the magnitude of its acceleration?
-16.0 cm s-2

A football player could routinely kick a ball at a horizontal speed of 160 km/hr. How long did the ball take to reach a point 18.4m away?
0.414 s

A body moves, from rest with a constant acceleration of 5 m per squared sec. The distance covered in 5 sec is most nearly_____
62.5 m

3-vectors are only properly represented in a_____
3-dimensional space

The frictional force in fluids is known as ____
Viscosity

The rise in the level of a liquid in a tube is h. If half the amount is poured outside, what will be the new rise in the liquid level?
h

Calculate the root-mean-square velocity of oxygen molecules at room temperature, 25 oC. Given that molar mass of oxygen and molar gas constant are 31.9998 g/mol and 8.3143 J/mol K, respectively in meter per second.
482.1

Gases occupy volume of the _____.
container

A perfectly ____ body is defined as one which emits every wavelength with the maximum energy for each wavelength for the particular temperature of the body.
black

3-vectors are only properly represented in a 3-dimensional _____.
space

The coefficient of limiting static friction is the ratio of the ____ to the normal force.
frictional force

An object is shot from the ground at 75m/s at an angle of 45 degrees above the horizontal. How high does the object get before beginning its descent?
140 m

If a force of 40N acting in the direction due East and a force of 30N is acting in the direction due North. Then the magnitude of the resultant forces will be _____

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50N

A Null vector is a vector whose magnitude is_____.
zero

The heat required to raise the temperature of the body through 1K is called _____.
heat capacity

When an object is in thermal equilibrium, it is losing and gaining heat at ____ rates.
equal

The physical pendulum is any real pendulum in which all the mass is taken to be concentrated at a_____.
point

The _____of oscillations of a particle in simple harmonic motion is damped by resistive forces due to the surrounding medium.
amplitude

What is the unit of impulse?
Ns

The _____ occurs when the driving frequency is the same as the natural frequency of the oscillator.
resonance

Forces are called coplanar when all of them acting on body lie in one _____.
plane

The ____ of the instantaneous centre of a moving rigid body is called centroid.
locus

The _____ is an aggregate of point masses such as that the relative separation between any two points remains invariant
rigid body

The general motion of a rigid body is a combination of _____and rotation.
translation

The specific latent heat of vapourization of a liquid is the quantity of heat in joules required to change 1kg mass of the liquid at its _____to gas at the same temperature.
boiling point

Radius of _____ is the radial distance from any given axis at which the mass of a body is concentrated without changing the moment of inertia of the body about that axis.
gyration

_____forces meet at one point and have their lines of action in different planes.
non-coplanar current

Applied force is proportional to extension produced is a statement of ____ law.
Hooke's

A _____ is the turning effect caused by a couple.
torque

A _____ consists of two equal and opposite parallel forces.
couple

When a gas is allowed to expand at constant _____the process is described as isothermal.
temperature

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The velocity of a particle moving with simple harmonic motion is ____ at the mean position.
maximum

Instantaneous velocity is the velocity of a particle at some _____of its path.
points

According to principle of moment, if a system of coplanar forces is in equilibrium, then the algebraic ____of their moments about any point in their plane is zero
sum

_____ is that which enables a body to perform work.
Energy

When trying to turn a key into a lock, ____ of forces are applied.
couple

According to the kinetic-molecular theory, particles of matter are in motion in both gas and _____.
liquid

The main condition for the rigid body is that the distance between various particles of the body does not ____.
vary

A piece of stone has mass 80kg and density of 0.10 kg per meter cube. What is its volume in meter cube?
800

Calculate the pressure due to the water at a depth of 15 m in water. Given that density of water is 1000 kg/squared metre and acceleration due to gravity is 9.8 metres per squared second.
147000 Newton per square metre

A cubical block of concrete edge 0.30 m, rests on a horizontal surface. If its weight is 240N, what pressure does it exert on the surface?
888.89 N/m2

Kerosene is supplied to a tap from a tank in which the kerosene level is 1.5 m above the tap. If the density of kerosene is 800 kg/m3. Calculate pressure of the kerosene at the tap.
1200 Pa

The sum of the pressure at any point plus the kinetic energy per unit volume plus the potential energy per unit volume is always a constant". This statement is coined from_____
Charles' law

A metal rod 80cm long lengthens by 0.090cm when its temperature rises by 93.6oC. What is the linear expansivity of the metal?
0.0012/K

A body moves, from rest with a constant acceleration of 5 m per squared sec. The distance covered in 5 sec is most nearly_____
100m

The amount of heat energy per mole that must be added or removed when a substance changes from one phase to another is called _____.
Specific heat

A football player could routinely kick a ball at a horizontal speed of 160 km/hr. How long did the ball take to reach a point 18.4m away?
32s

The rate of evaporation decreases with increasing _____

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Pressure

The____ pendulum is any real pendulum in which all the mass is taken to be concentrated at a point.
physical

The amplitude of oscillations of a particle in simple harmonic motion is damped by _____ forces due to the surrounding medium
Resistive

A man will exert the greatest pressure on a bench when he _____
stands on the toes of one foot

The gravitational force on a satellite produces the centripetal acceleration that keeps the satellite in_____
Orbit

The ____ occurs when the driving frequency is the same as the natural frequency of the oscillator.
Sound

A 2kg box is at the top of a frictionless ramp at an angle of 60o. The top of the ramp is 30m above the ground. The box is sitting still while at the top of the ramp, and is then released. What is the velocity of the box just before it hits the ground?
22.8 m/s

An ungraduated mercury thermometer attached to a millimeter scale reads 22.8mm in ice and 242mm in steam at standard pressure. What will the millimetre read when the temperature is 20oC?
132.4mm

Convert 45oC to oF_____
100oF

Alcohol boils at_____
100oc

The path followed by the projectile is known as_____
Curve

How much heat is required to melt 1.5kg of ice and then to raise the temperature of the resulting water to 50oC?
3.15 x 105J

When matter is heated, it____
Shrinks

If the linear expansivity is of a metal is 2.0 x 10-5 oC-1, calculate its cubical expansivity.
2.0 x 10-5 oC-1

A fixed mass of gas of volume 546cm3 at 0oC is heated at constant pressure. Calculate the volume of the gas at 2oC.
546cm3

When a gas is allowed to expand without heat entering or leaving the gas, the gas is said to undergo an ____.
isothermal expansion

Effect of a force on a body depends upon ____
magnitude

The work done by stretching a string is ____.
Zero

The unit of work is the unit of _____multiplied by the unit of distance.

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Force

A system that its boundary allows transfer of mass and energy into or out of the system is known as___.
Close system

Two bowling balls, each with a mass of 8.52 kg, are traveling toward each other. One bowling ball has a velocity of 2.45 m/s to the right while the other bowling ball has a _____
1.20 Ns

The algebraic sum of the resolved parts of a number of forces in a given direction is equal to the resolved part of their resultant in the same direction. This is as per the principle of ____.
independence of forces

A baseball is hit such that it travels straight upward after being struck by the bat. A fan observes that it requires 3.00 s for the ball to reach its maximum height. Find its initial velocity. Ignore the effects of air resistance.
2.94 m/s

A 1500 kg truck traveling at 80 km/h collides with another car of mass 1000 kg travelling at 30 km/h in the same direction. The two cars stick together after the collision. Their speed immediately after the collision is _____.
40 km/h

You throw a ball with a speed of 25.0 m/s at an angle of 40.0◦ above the horizontal directly toward a wall. The wall is 22.0 m from the release point of the ball. How long does the ball take to reach the wall?
11.5 s

Which of the following do not have identical dimensions?
Momentum and impulse

A rifle is aimed horizontally at a target 30m away. The bullet hits the target 1.9 cm below the aiming point. What is the bullet's time of flight?
0.062 s

The unit of force in S.I. units is_____
Newton

The unit of work or energy in S.I. units is _____.
Joule

Find the distance a hiker walks if he travels 3.50 km north, and then turns around and walks 3.00 km south.
6.5 km

The SI unit of absolute temperature is _____
Kelvin

The reluctance of an object to start or stop moving is known as _____.
inertia

3-vectors are only properly represented in a 3-dimensional _____.
space

The coefficient of limiting static friction is the ratio of the _____ to the normal force.
frictional force

An object is shot from the ground at 75m/s at an angle of 45 degrees above the horizontal. How high does the object get before beginning its descent?
140 m

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If a force of 40N acting in the direction due East and a force of 30N is acting in the direction due North. Then the magnitude of the resultant forces will be _____
50N

A Null vector is a vector whose magnitude is _____
zero

The heat required to raise the temperature of the body through 1K is called _____
heat capacity

An object is shot from the ground at 125m/s at an angle of 30 degrees above the horizontal. How far away does the object land?
1350 m

The _____ pendulum is any real pendulum in which all the mass is taken to be concentrated at a point
physical

The amplitude of oscillations of a particle in simple harmonic motion is damped by _____ forces due to the surrounding medium.
Resistive

What is the unit of impulse?
Ns

The _____ occurs when the driving frequency is the same as the natural frequency of the oscillator.
resonance

Forces are called coplanar when all of them acting on body lie in one _____.
plane

The locus of the instantaneous centre of a moving rigid body is called _____.
centroid

The _____ is an aggregate of point masses such as that the relative separation between any two points remains invariant
rigid body

The general motion of a rigid body is a combination of _____and rotation.
translation

The general motion of a rigid body is a combination of translation and_____
rotation

The specific latent heat of vapourization of a liquid is the quantity of heat in joules required to change 1kg mass of the liquid at its _____to gas at the same temperature.
boiling point

Radius of_____ is the radial distance from any given axis at which the mass of a body is concentrated without changing the moment of inertia of the body about that axis.
gyration

_____forces meet at one point and have their lines of action in different planes.
non-coplanar current

Applied force is proportional to extension produced is a statement of ____ law.
Hooke's

A _____ is the turning effect caused by a couple.
torque

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A _____ consists of two equal and opposite parallel forces.
couple

When a gas is allowed to expand at constant temperature the process is described as ____.
isothermal

What is the spring constant (in N/m) of an elastic material that produces an extension of 5 cm when a weight of 0.35 N is applied?
7

The velocity of a particle at some point of its path is called_____.
instantaneous velocity

In a circular motion which of the quantities is constant?
acceleration

_____ is that which enables a body to perform work.
Energy

According to the kinetic-molecular theory, particles of matter are in____ motion.
constant

According to the kinetic-molecular theory, particles of matter are in motion in both gas and _____.
liquid

When an adiabatic work is done on or by a system the change in internal energy is equal to the _____ work done.
adiabatic

According to the kinetic-molecular theory, particles of an ideal gas neither attract nor repel each other but _____.
collide

One of the following is not a fundamental quantity.
Volume

Which of the following is a coordinate system for specifying the precise location of objects in space?
Frame of reference

In physics, frames of reference are classified by two main types: _____.
fast and slow

Which of the following quantities is considered a vector?
Displacement

For the 3-vector (-2, 5, 6) in an xyz-coordinate plane the 5 corresponds to a_____
positive value along the x-axis

A body moves, from rest with a constant acceleration of 5 m per squared sec. The distance covered in 5 sec is most nearly_____
62.5 m

The amount of heat energy per mole that must be added or removed when a substance changes from one phase to another is called _____.
latent heat

A football player could routinely kick a ball at a horizontal speed of 160 km/hr. How long did the ball take to reach a point 18.4m away?

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0.414 s

The rate of evaporation decreases with increasing _____
pressure

The_____ pendulum is any real pendulum in which all the mass is taken to be concentrated at a point.
physical

The amplitude of oscillations of a particle in simple harmonic motion is damped by _____ forces due to the surrounding medium
Resistive

A man will exert the greatest pressure on a bench when he _____
stands on the toes of one foot

The gravitational force on a satellite produces the centripetal acceleration that keeps the satellite in_____
orbit

The _____ occurs when the driving frequency is the same as the natural frequency of the oscillator.
Sound

A 2kg box is at the top of a frictionless ramp at an angle of 60o. The top of the ramp is 30m above the ground. The box is sitting still while at the top of the ramp, and is then released. What is the velocity **of the box just before it hits the ground?**
32.2 m/s

An ungraduated mercury thermometer attached to a millimeter scale reads 22.8mm in ice and 242mm in steam at standard pressure. What will the millimetre read when the temperature is 20oC?
66.64mm

The specific latent heat of vapourization of a liquid is the quantity of heat in joules required to change 1kg mass of the liquid at its ____to gas at the same temperature.
boiling point

Upthrust force can be explained in terms of the forces acting on the body _____.
due to the pressure acting on each of the surfaces of the body.

A stone weighs 450 N in air and 200 N in water. Compute the volume of the stone.
0.025 m3

In a perfectly inelastic collision____
energy is lost

The collision between two or more objects during which no energy is lost is called_____
elastic collision

The sudden impact felt between two or more objects is called_____
collision

Linear momentum is always conserved when the rate of change of momentum is_____
zero

Work is a product of____
force x distance

The path followed by the projectile is known as____
Trajectory

The range of a projectile launched from the ground is the_____

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horizontal distance

In a projectile motion, at maximum height the vertical component of velocity is_____
zero

The transfer of heat through solids is known as____
Conduction

The constant volume gas thermometer is normally referred to as the_____
standard thermometer

Force is equal to the product of____ and acceleration
mass

Force is equal to the product of mass and_____
acceleration

The product of force and time is equal to____
impulse

A symmetrical body rotating about an axis with one point fixed at the centre of gravity is called____
gyroscope

A body starts from rest and accelerates uniformly at a rate of 5m/s2. Calculate its velocity after 90m.
30m/s

A ball is thrown vertically upwards from the ground with an initial velocity of 50m/s. The total time spent by the ball in the air will be_____
10sec

A man will exert the greatest pressure on a bench when he_____
stands on the toes of one foot

The slope of a straight line displacement time graph gives the_____
uniform velocity

The force of ____ allow cars to move on the roads without skidding
friction

Acceleration due to gravity is____ at the poles than at the equator
greater

The____ velocity is the minimum velocity needed by an object to be project into space from the surface of the earth.
escape

Acceleration due to gravity increases with____
latitude

Below the earth's surface, the acceleration due to gravity decreases linearly with____
depth

The acceleration due to gravity vary from location to location because of the effect of earth's____
rotation

The internal energy U of a system depends on the_____
state of the system

The gravitational force on a satellite produces the centripetal acceleration that keeps the satellite in____

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orbit

The path describe by a satellite round the sun is a____
conical section

When there is no reaction force to an objects weight, the object becomes_____
weightless

The path of a satellite whose period of revolution is equal to the period of rotation of the earth about its axis is known as____
parking orbit

The process in which energy is transferred by means of electromagnetic waves is known as____
radiation

Energy expended per time is called_____
power

The quantity of matter contained in a body is called_____
mass

Newton's second law states that the rate of change of momentum is directly proportional to the____
force

Stable equilibrium happens when the forces in the displaced position act such that they return the body to its_____
original position

When a body accelerates in motion it means that its_____
velocity changes continuously

The velocity of a particle at some point of its path is called_____
instantaneous velocity

Velocity is defined as____
displacement/time

A car that takes 2hrs to travel from Kaduna to Kagoro along a winding road over a distance of 200km is said to have an average speed of_____
100km/hr

If you run on a winding path from point A to point B and travel a distance of 240m in 20sec then your average speed is____
12m/s

The result of the cross product of two vectors is a____
vector

The scalar product of any two vectors at right angles to each other is always____
zero

The degree of hotness or coldness of a body is called____
temperature

A Null vector is a vector whose magnitude is____
zero

If a force of 40N acting in the direction due East and a force of 30N is acting in the direction due North. Then the magnitude of the resultant forces will be____

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50N

A Scalar quantity has only_____
magnitude

A Vector quantity has both ____ and magnitude
direction

A Vector quantity has both direction and_____
magnitude

The change in the thermo-electric e.m.f per degree Celsius in temperature between the hot and cold junctions is known as____
thermo-electric power

The thermometer that is constructed by using the Seebeck effect is known as____
Thermo-electric

The SI Unit of time is____
seconds

The SI Unit of velocity is_____
m/s

The SI unit of absolute temperature is_____
Kelvin

The convenient quantity used as the standard of measurement of a physical quantity is called____
unit

The mean solar day is equal to _____ mean solar seconds
86400

A car is moving at a speed of 100kmh-1 what will be the distance covered after 20 seconds?
555.6m

The first Newton's law of motion is also called the_____
law of inertia

The coordinate system in which the motion of any object depends only on the interactions of the constituents particles is called_____
inertial reference frame

The reluctance of an object to start or stop moving is known as_____
inertia

When coordinates of an object changes over time the object is said to be_____
in motion

When coordinates of an object remain fixed despite the time , the object is said to be_____
at rest

Every object on the surface of the earth is in constant motion with respect to_____
earth

A body is said to be at rest when it does not change position with_____
time

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