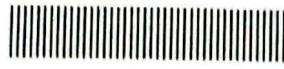




03



متعلقہ سوال کا جواب صرف نقش کردہ جگہ پر دیا جائے۔



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Q. No. 2 (i)

Importance of Physics in our daily life :- Physics plays a vital role in our daily life, often in ways we don't even realize. Here are some examples:-

Physics in Technology:- Physics is foundation of most modern technologies, including smart phones, computers and many other devices.

Physics in transportation:- Physics principles govern the design and functionality of vehicles, air planes and trains etc.

Physics in Medical applications:- Physics is widely used in medical imaging e.g (MRI, CT Scans), radiation therapy etc.

Q. No. 2 (ii)

Force :- $F = ma$
 $m \rightarrow$ mass $a \rightarrow$ length and Time

Base quantities involved in force :- Mass, length and Time

Pressure :- $P = \frac{F}{A}$ $\rightarrow$ Mass, length and Time
 $A \rightarrow$ length

Base quantities included in Pressure :- Mass, length and Time

Power :- $P = \frac{W}{t} = \frac{Fd}{t}$ $\rightarrow$ length time
 $t \rightarrow$ Time

Mass, length and Time

Base quantities involved in Power = Mass, length and Time

Charge Current - $\frac{\text{Charge}}{\text{Time}}$ = Current $\times$ Time = charge

Base Quantities involved in charge :- Current and Time



04



Please attempt the questions at specified spaces only.



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Q. No. 2 (iii)

15 years :- In Minutes :-

$$\Rightarrow 1 \text{ year} = 365 \text{ days} \quad \because 1 \text{ day} = 24 \text{ hours}$$

$$\Rightarrow 365 \text{ days} \times 24 \text{ hours} \quad \because 1 \text{ hour} = 60 \text{ min}$$

$$\Rightarrow 365 \times 24 \times 60$$

$$\Rightarrow 15 \times 365 \times 24 \times 60$$

$$15 \times 12$$

$$15 \text{ years} = 7,884,000 \text{ minutes}$$

$$1 \text{ yr}$$

∴ In Seconds :-

$$\Rightarrow 7884000 \times 60 \text{ sec}$$

$$\Rightarrow 473040,000 \text{ Seconds}$$



Q. No. 2 (iv)

Proof :- Compare the prefix 10^{-3} with 10^{-6}

$$\Rightarrow \frac{10^{-3}}{10^{-6}} = 10^{-3} \times 10^{+6} = 10^{-3+6} = 10^{+3} = 1000$$

So, we can say that :-

$$\Rightarrow \frac{10^{-3}}{10^{-6}} = 1000$$

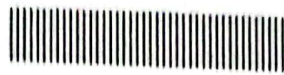
$$\Rightarrow 10^{-3} = 1000 \times 10^{-6}$$



Cutting Line



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متعلقہ سوال کا جواب صرف نقش کردہ جگہ پر دیا جائے۔



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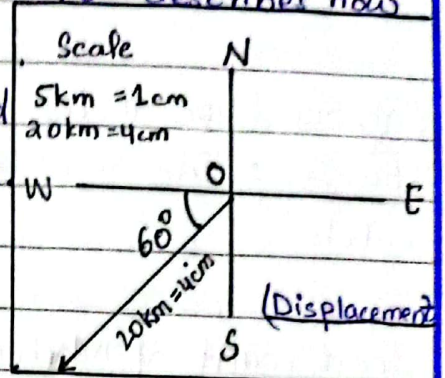
Q. No. 2 (v)

Displacement:- Displacement refers to the shortest path between two points. It describes how far and in what direction since it includes both magnitude (distance) and direction so it is a vector quantity.

Energy:- Energy is the ability of a system to do work. It comes in various forms like: kinetic, potential and thermal etc. Energy has a magnitude (amount) but no direction therefore it is scalar quantity.

Examples:- Displacement:- I moved five meter east (vector).

Energy:- I have 10 joules of energy (scalar)



Cutting Line

Q. No. 2 (vi) Screw gauge can give more precise length than vernier calipers because:- **Explanation:-**

→ The instrument which have smaller least count will give more precise value.

→ The least count of screw gauge (0.01 mm) is less than the least count of vernier callipers (0.1 mm).

→ So, screw gauge can give more precise length than vernier callipers because of its least count.



Please attempt the questions at specified spaces only.

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Q. No. 2 (vii) Mechanical Stop Watch | Digital Stop watch

∴ Start/stop ∴

Only one knob at top of it for start, stop and reset the stop watch

has two buttons on top one for start and stop other for reset. the stop watch

∴ Least Count ∴

least count of Mechanical stop watch is 0.1s

least count of digital stop watch is 0.01s

∴ Accurate ∴

Mechanical stop watch is less accurate than digital stop watch

Digital stop watch is more accurate than Mechanical stop watch.

Q. No. 2 (viii)

Measuring volume of an irregular Shaped Stone by using Measuring Cylinder:-

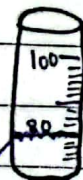
∴ Steps ∴

- ↳ Take some water in measuring cylinder.
- ↳ Note the volume V_i of water in cylinder
- ↳ Tie an irregular shaped stone with a thread and put it into the water.
- ↳ Note the volume V_f of water having stone in it
- ↳ Volume of solid will be $V = V_f - V_i$

$$V = V_f - V_i$$

$$100 - 80 = 20\text{ml}$$

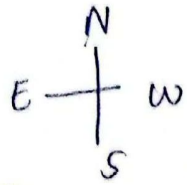
V_i



Cutting Line



07



متعلقہ سوال کا جواب صرف نقش کردہ جگہ پر دیا جائے۔



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Q. No. 3 (i)

Precautions while taking Measurement using measuring cylinder

- Make sure the measuring cylinder is placed on flat surface.
- Take care of meniscus and take the reading accurately.
- Avoid parallax error while taking the measurement.
- Formation of bubbles inside cylinder should be completely avoid. Any bubble within leads to wrong measurements.



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Q. No. 3 (ii)

Importance of Significant digits in measurements:-

• Accurate value:-

- We need to consider significant digits in measurements to get accurate values.

• Precision:-

- Precision depends upon the number of significant digits, greater number of significant digits means greater precision.

• Prevent false precision:-

- Significant digits also help us to prevent false precision in measurements.



Cutting Line





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Please attempt the questions at specified spaces only.



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Q. No. 3 (iii)

Strategies For reducing Random errors:-

:- Increase Sample Space:-

- Larger samples average out random fluctuations
- More data points reduce the impact of errors.

:- Improve Measurement Techniques:-

- Refine data collection methods to minimize inconsistencies
- Use high-precision instruments and tools.

:- Repeat Measurements:-

- Take Multiple readings to average out random errors.
- Increase the number of trials or experiments.

:- Enhance Instrument Calibration:-

- Regularly calibrate instruments to ensure accuracy.
- Use certified reference materials for calibration.

Q. No. 3 (iv)

Precision

Accuracy

:- Definition :-

Refers to how close individual measurements are to each other

Refers to how close a measurement is to the true value

:- Focus :-

focus on the consistency of result

focus on the correctness of the result.

:- Aim :-

Aim to hit the same spot.

Aim to hit the target (True value)

:- Example :-

Hitting Same Spot on target everytime, even if its not centre.

Hitting the center of the target.



Cutting Line

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Please attempt the questions at specified spaces only.

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Q. No. 3 (vii)

Prefixes: Prefixes are letter or symbols added to the beginning of a unit to indicate a multiple or fraction of that unit. They simplify and standardize the way we express large or small quantities in measurement.

Uses of Prefixes in measurement:

Convenience: Prefixes make it easier to write and communicate large or small numbers.

Standardization: Prefixes ensure consistency in measurement notation across different fields and countries.

Clarity: Prefixes avoid confusion when dealing with very large or small numbers.

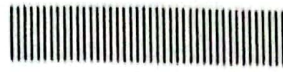
Precision: Prefixes enable precise expression of measurements, reducing errors.

Prefix	decimal Multiplier	Symbol	Prefix	Decimal Sub-multi	Symbol
Exa	10^{18}	E	deci	10^{-1}	d
Peta	10^{15}	P	centi	10^{-2}	c
Tera	10^{12}	T	milli	10^{-3}	m
Giga	10^9	G	micro	10^{-6}	μ
Mega	10^6	M	nano	10^{-9}	n
Kilo	10^3	k	Pico	10^{-12}	p
Hecto	10^2	h	femto	10^{-15}	f
deca	10^1	da	atto	10^{-18}	a

Example: The distance to the nearest star alpha centauri is: $4.132 \times 10^{16} \text{ m} = 41.32 \times 10^{15} \text{ m}$
 $\longleftrightarrow = 41.32 \text{ Pm}$

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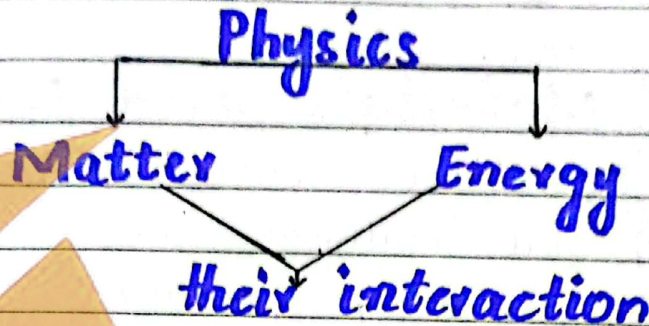


متعلقہ سوال کا جواب صرف نقش کر دو جائے۔

11

Q. No. 4 Page 1

Physics:- Physics is the study of matter, energy and their interaction.



Physics in technology:- Physics is behind every technology and plays a key role in the further development of these technologies such as airplanes, Computers, PET scans and nuclear weapons.

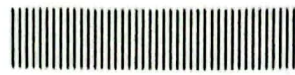
Examples of technologies based on the principles of physics:-

:- Computing and Information technology:- Physics research lead to the invention of the transistor, semiconductor and microprocessor, driving the computer revolution and modern information age.

:- Internet and Telecommunication:- Physics enabled the development of fibre optics satellite communication and wireless technologies, connecting the world and transforming global communication.

:- Laser Technology:- Physics led to the invention of lasers, which transformed industries like manufacturing, medicine and telecommunication.

Cutting Line



Please attempt the questions at specified spaces only.

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Q. No. 4 Page 2

:- Semiconductor technology :-

Physics research enabled the development of Semiconductors, which power modern electronics, computers and solar panels.

:- Advanced Materials and Nano-Technology :-

Physics research led to the discovery of new materials and nano scale phenomena, driving innovations in fields like energy, aerospace, and biotechnology.

:- Electrification :-

Physics led to understanding of electricity, enabling the development of power generation, transmission, and distribution which transformed industry and society.

:- Medical Imaging and Diagnostic

Physics led to the invention of X-rays, MRI, CT Scans and PET scans, revolutionizing medical diagnosis and treatment.

:- Nuclear Energy and Medicine :-

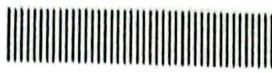
Physics led to the discovery of nuclear reactions, enabling nuclear power generation and medical applications like radiation therapy.



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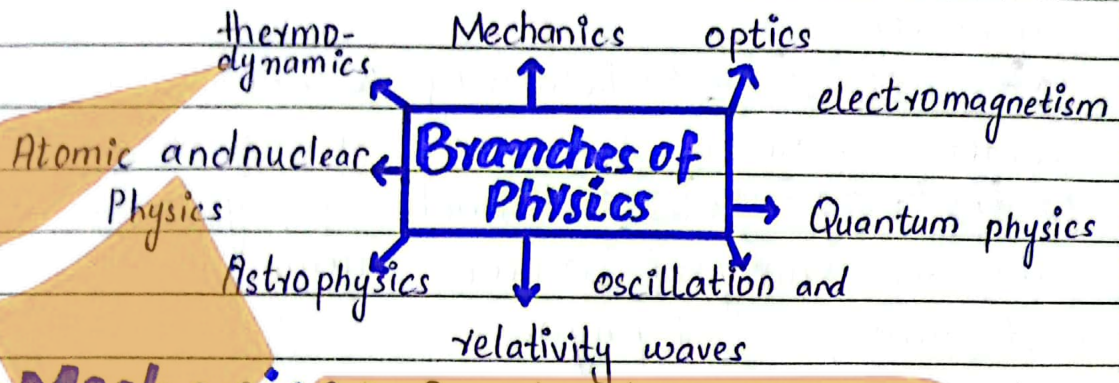
منطقہ سوال کا جواب صرف مختص کردہ جگہ پر دیا جائے۔



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Q. No. 4 Page 5

Branches of Physics: Physics is vast and therefore subdivided in many other branches. These branches of physics include:-



:- Mechanics:- Branch of physics related with "Motion". It is further divided into "kinematic" and "dynamics".

:- Quantum Physics:- Quantum physics is the study of matter and energy at the most fundamental levels.

:- Optics:- Branch of Physics that deals with study of "light" its behaviour, properties and use of light optical instruments.

:- Electromagnetism:- Electromagnetism is a branch of physics that deals with the relation b/w electricity and magnetism it explore how electric current create magnetic field.

:- Thermodynamics:- The study of flow or motion of heat.

:- Oscillation and waves:-

Oscillation:- The study of to and fro movement of an object or body.

Waves:- Waves are the disturbance in Medium.

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Please attempt the questions at specified spaces only.

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Q. No. 4 Page 4

Atomic and Nuclear

Physics :- Branches of physics that focus on the study of structures, behavior and interaction of atoms and atomic nuclei respectively.

Relativity :- Relativity describes the relation between space time and gravity.

Astrophysics :- Branch of physics deals with the study of universe using the laws and principles of physics.

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متعلقہ سوال کا جواب صرف مختص کردہ جگہ پر دیا جائے۔

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Q. No. 5 Page 1

Physical Quantities :-

Physical Quantities are those quantities which can be observed and measured.

Examples of Physical Quantities :-

length, mass, time, temperature. These quantities can be observed and measured so these are physical quantities.

Difference between Physical and Non-physical Quantities :-

<u>Physical Quantities</u>	<u>Non-Physical Quantities</u>
----------------------------	--------------------------------

Definition :-

Physical Quantities are those quantities which can be observed and measured.

Non-physical Quantities are those quantities which can't be observed and measured.

SOCH B

Quantification :-

Can be quantified and expressed numerically

Can't be quantified and expressed numerically

Unit :-

Have Units of measurement (length, mass, time)

Don't have units of measurement

Example :-

length, mass, time, temperature, velocity, force, Energy

Happiness, beauty, intelligence, Emotions, thought, opinions.

Examples of Derived quantities

Derived from Base quantities :-

velocity :- $V = \frac{d}{t}$ • Unit = (m/s)

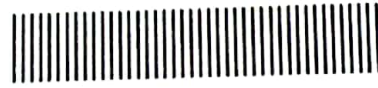
Base quantities : (length and time)

Pressure :- Pressure = force/area • Unit pascal (pa)

Base quantities (force and area)

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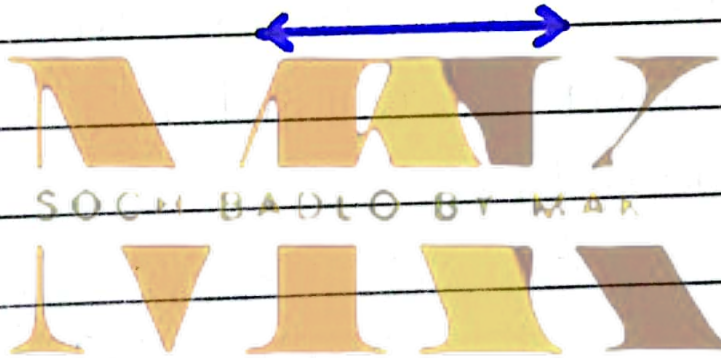
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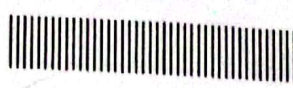
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Q. No. 5 Page 2

Energy:- $\text{energy} = \text{force} \times \text{Distance}$

Unit: joule (J) Base quantities (force and

Power:- $\text{Power} = \text{Energy} / \text{Time}$. Unit (energy, ^{watt} time) Distance)
Base quantities (energy and Time).



Q. No. 5 Page 3

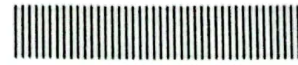
Unit of a Physical quantity
A unit of a physical quantity is a standard quantity used to express the magnitude of a physical quantity.

Base Units:- Base Units are the fundamental units of measurement that cannot be derived from other units. They are the basic building blocks of the International System of Units (SI) and are used to define all other units.

Seven Base Units of SI System are:-

SI Base Quantity		SI Base Unit	
Name	Symbol	Name	Symbol
Length	L	meter	m
mass	m	kilogram	kg
time	t	second	s
electric current	I	ampere	A
temperature	T	kelvin	K
amount of substance	n	mole	mol
light intensity	I _v	candela	cd

Derived Units:- The physical quantity obtained by multiplying or dividing base physical quantities are termed as derived units. For example:- The unit of area is $m \times m = m^2$, in this example base unit of length is used.



Please attempt the questions at specified spaces only.



Q. No. 5 Page 4

Derived Quantity | SI Derived Units

Name	Symbol	Name	Symbol
area	A	Square meter	m^2
volume	V	Cubic meter	m^3
Speed, velocity	v	meter per second	ms^{-1}
acceleration	a	meter per second squared	ms^{-2}
density	ρ	kilogram per cubic meter	kgm^{-3}
force	F	Newton (N)	$kgms^{-2}$
Pressure	P	pascal (Pa)	$kgm^{-1}s^{-2}$
Energy	E, U	joule (J)	kgm^2s^{-2}





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متعلقہ سوال کا جواب صرف مختص کردہ جگہ پر دیا جائے۔

Q. No. 6 Page 1

Scientific notation/ Standard form:-

Scientific notation also known as standard form is a way of writing numbers that are too large or too small to be conveniently written in decimal form. It consists of a number between 1 and 10, multiplied by a power of 10.

∴ The general format:- $a \times 10^n$

- Where a is a number between 1 and 10
- n is an integer (positive or negative).

∴ Here are some Examples:-

456,789:- Can be written in Scientific notation as 4.56789×10^5

0.0000678:- Can be written in Scientific notation as 6.78×10^{-5} .

123,400,000:- Can be written in Scientific notation as 1.234×10^8

0.00000342:- Can be written in Scientific notation as 3.42×10^{-6}

984,657,321:- Can be written in Scientific notation as 9.84657321×10^8 .





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Q. No. 6 Page 2

Errors:- Every measurement, no matter how carefully taken, has a certain amount of doubt known as an error. Error is simply the uncertainty that arises during measurement.

Types of errors:- There are two main types of errors in measurement: Systematic and random errors.

Difference between Systematic and Random errors:-

Systematic Error

Random Error

Definition:-

Consistent and repeatable deviation from true values due to flawed methodology and equipment.

Unpredictable fluctuations in measured values due to chance or uncontrollable factors.

Causes:-

Instrument calibration errors, Biased measurement techniques.

Instrumental noise, Human error, Environmental factors.

Example:-

Using a thermometer with a faulty calibration, consistently reading 2°C higher than true temperature.

Measuring the length of a room with tape measure, getting slightly different values each time.

Reducing these errors:-

Systematic errors:- These systematic errors can be reduced by Calibration, Standardization, Instrumental correction, Methodology refinement.

Random error:- These random errors can be reduced by Replication, Averaging, Increased sample size, Controlled environment, Improved instruments.

Cutting Line