متعلقہ سوال کا جواب صرف مختص 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 funtionalty 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:-** $F = ma$ (mass; length and Time)

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

• **Pressure:-** $P = \frac{F}{A}$ → Mass, length and Time; A → length

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

• **Power:-** $P = \frac{W}{t} = \frac{Fd}{t}$ → length time; t → Time

Mass, length and Time

Base quantities involved in Power = Mass, length and Time

• **Charge** **Current** • $\frac{\text{Charge}}{\text{Time}}$ = Current x Time = charge

Base Quantities involved in charge :- Current and Time

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Q. No. 2 (iii) **15 years :- In Minutes :-**

$\Rightarrow$ 1 year = 365 days $\because$ 1 day = 24 hours

$\Rightarrow$ 365 days x 24 hours $\because$ 1 hour = 60 min

$\Rightarrow$ 365 x 24 x 60

$\Rightarrow$ 15 x 365 x 24 x 60

15 x 12

1 y

15 years = 7,884,000 minutes

:- In Seconds :-

$\Rightarrow$ 7884000 x 60 sec

$\Rightarrow$ 473040,000 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 :-

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

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

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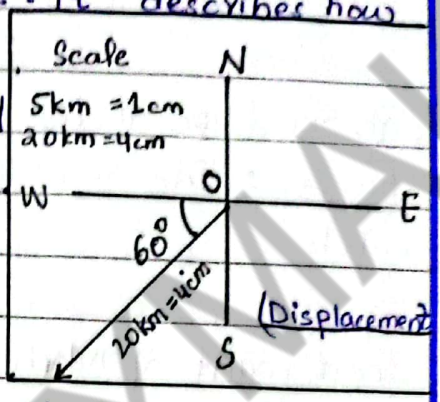
Q. No. 2 (v) **Displacement:-** Displacement refers to the shortest path between two points. It describes how far and in wat direction since it includes both magnitude (distance) and direction so it is a vector quantity.



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)

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

↳ The instrument which have smaller least count will give more precise valuce

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

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

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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 stops watch	Digital stop watch is more accurate than Mechanical stop watch.

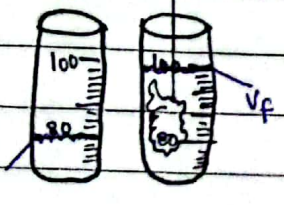
Q. No. 2 (viii) **Measuring volume of an irregular Shaped Stone by using Measuring Cylinder:-**

:: 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 $V = V_f - V_i$

$V = V_f - V_i$

$100 - 80 = 20ml$



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Q. No. 3 (i) **Precautions while taking Measurment 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 measurments.

Q. No. 3 (ii) **Importance of significant digits in measurments:-**

:Accurate value:-

- We need to consider significant digits in measurments 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.

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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 Measurment Techniques :-

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

-: Repeat Measurments :-

- 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 measurments are to each other	Refers to how close a measurment 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 on target everytime, even if its not centre.	Hitting the center of the target.

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Q. No. 3 (vii) **Prefixes:-** Prefixes are letter or symbols added to the beginning of a unit to indicate a mutiple or fraction of that unit. They simplify and standarized 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 confussion when dealing with very large or small numbers.

Precision:- Prefixes enable precise expression of measurments, 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
Hector	10^{2}	h	femto	10^{-15}	f
deca	10^{1}	da	atto	10^{-18}	a

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

$= 41.32 Pm$

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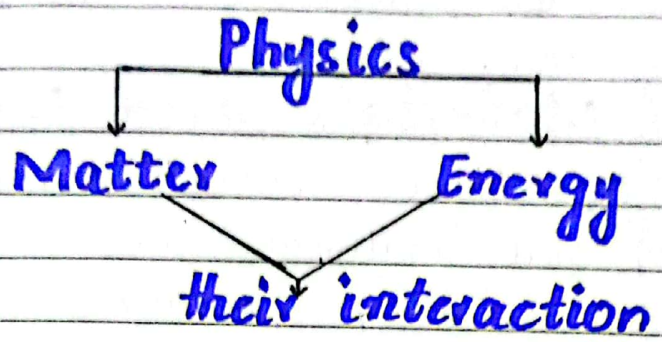
Q. No. 4 Page 1

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 futher developement of these techologies 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 developement 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 telecommunicatio

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Q. No. 4 Page 2

:Semiconductor technology:-
Physics research enabled the developement of Semiconductors, which power modern electronics, computers and solar panels.

:Advanced Materials and Nano-Technology:- Physics research led to the ~~dis~~ discovery of new materials and and nano scale phenomena, driving innovations in fields like energy, aerospace, and biotechnology.

-:Electrification:- physis 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:-
Physis led to the oliscovery of nuclear reactions, enabling nucleur power generation and medical applications like radiation therapy.

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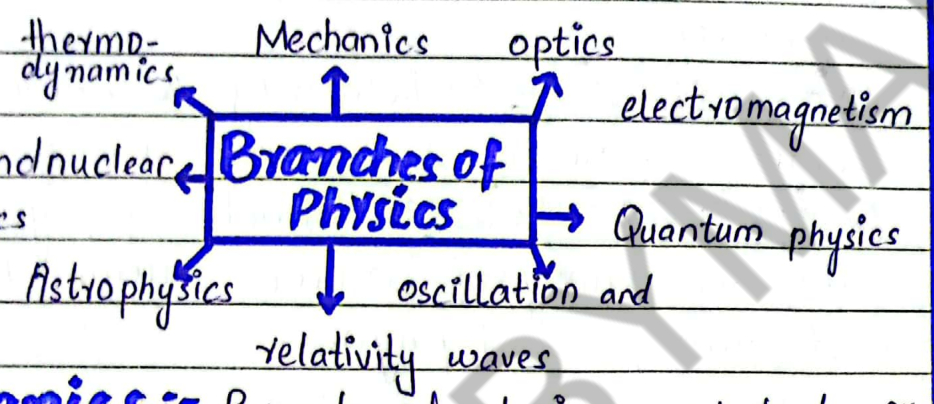
Q. No. 4 Page 5: **Branches of Physics:-** Physics is vast and therefore subdivided in many other branches. These branches of physics include:-



-: Mechanics:- Branch of physics related with "Motion". It is futher 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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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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Q. No. 5 Page 7: **Physical Quantities :-** Physical Quantities are those quantities which can be observed and measured.

:- Examples of Physical Quantities :-

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

:- Difference between Physical and Non-physical Quantities :-

Physical Quantities	Non-Physical Quantities
:- 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
:- 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, temprature, 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 quantites : (Length and Time)

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

Base quantities (force and area)

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Q. No. 5 Page 2

Energy:- energy = force x Distance

Unit: joule (J) Base quantities (force and Distance)

Power:- Power = Energy / Time. Unit (watt, energy, time) Base quantities (energy and Time).

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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 othe 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	sebond	s
electric current	I	ampere	A
temprature	T	kelvin	k
amount of substance	n	mole	mol
light intensity	I	candela	cd

Derieved 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.

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Q. No. 5 Page 4

Derieved Quantity		SI Derieved 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	kms^{-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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Q. No. 6 Page 1

Scientific notation/ Standard form:-

Scientific notation also known as standard form, is a way of writting numbers that are too large or too small to be conveniently written in decimal form. It consist of a number between 1 and 10, Multiplied by a powev 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 measurment, no matter how carefully taken, has a certain amout of doubt known a error. Error is simply the uncertainty that arrises during measurment.

-: Types of errors :- There are two main types of errors in measurment: 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 callibration errors, Biased measurmed techniques.	Instrumental noise, Human error, Environmental factors.
-: Example :-	
Using a thermometer with a faulty calibration, consistently reading 2°C higher than true temp	Measuring the length of a room with tape measure, getting slightly different values each time

-: Reducing these errors :-

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

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

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