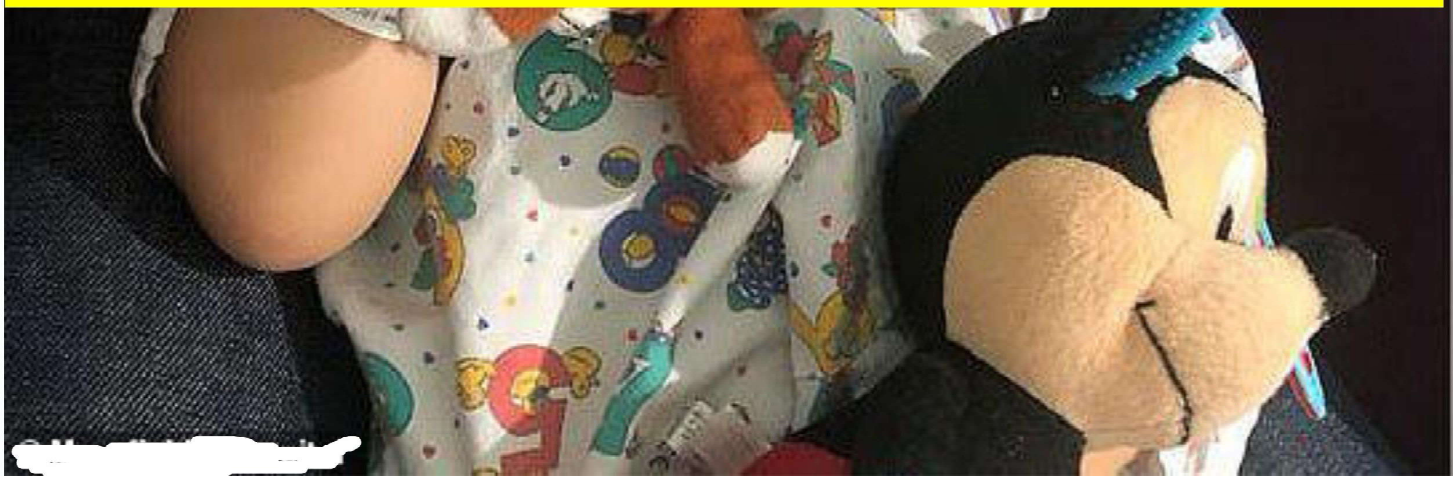
Empowering the Scientists of Tomorrow (Ages + 13)

SCIENCE PARK

July 2025 ISSN 2321-0559 Vol:19 Issue:9 Rs.60

Editing Genes to Restore Vision
The Power of DNA Medicine



CONTENTS

SCIENCEPARK PUBLICATIONS
5 /171- B Natesan Nagar
3rd Main road,
2nd Cross st, Chennai. 600092
www.scienceparkmagazine.com
Tel : 044 - 2479 0618
Mb : 9444153483

Owned and Published from
Plot No.13, Flat No.4,
Jakkammal Koil Street,
Postal Audit Colony,
Chinmaya Nagar,
Chennai - 600092

Printed by T.R. Raghavaram
Archish, Sri Annai Press
25,Arunachalapuram Main Road
Adyar, Chennai - 600020
Editor : L.Krishnamoorthy
Scienceparkmagazine@gmail.com
www..scienceparkmagazine.com
(044 - 24790 618)
Mb: 9444153483

Science Park
The Magazine for Future Scientists

Science for Kids
The Magazine for Tech Crazy Kids

~~Subscribe~~

Invest in Science Park / Science for Kids & Explore Science

Features of Science Park (Above 12 years)

* Emerging Technology
* Focus on IIT / Olympiad
* NTSE Series for SchoolStudents
* SAT (Scholastic Aptitude Test)
* Science attraction in each & every Issue
* Basic Science Concepts
* Research Opportunities
* Startup Opportunities

Features of Science for Kids (Under 12 years)

* Visual Quiz
* Science Challenges
* Junior Olympiad Problems
* Amazing Things
* Every day Mathematics
* Kids Mental Ability
* Coding For Kids
* Pre algebra kids

MAGAZINES	DURATION	ISSUES	COVER PRICE	YOU PAY
Science Park	1	12	720	690
	2	24	1440	1350
	3	36	2160	1990
	5	60	3600	3200
Science For Kids	1	12	720	690
	2	24	1440	1350
	3	36	2160	1990
	5	60	3600	3200
Ariviyal Ulgam (Tamil)	1	12	720	690
	2	24	1440	1350
	3	36	2160	1990
	5	60	3600	3200

Science Park Publications
5/171 – B, 2nd Cross Street,
3rd Main Road,
Natesan Nagar,Virugambakkam,
Chennai -600092

Benefit for Institutional Subscription

1.During the subscription period, Entire school children will get our free ***E- Magazine with no extra cost.***

2. All school Children will get ***Free 5 News letter from Monday to Friday***

* Rates and offer valid only in India
* All the magazines will be sent thru ordinary post only
* Science Park will not be responsible for postal delays, transit losses.

Missing issues will be sent along with next issues

* *Please write your Institution, , name of the Magazine to be subscribed on the reverse side of the cheque/DD

Disputes if any will be settled in a Chennai jurisdiction only

* Please allow 4 – 6 weeks for delivery of your first copy of the Magazine

All the missing issues should be informed to useitherthru email(**scienceparkmagazine@gmaill.com**) or in writng to our Chennai office

Vidushi Book Cafe	**Union Bank Of India** **Virugambakkam** **CHENNAI** **IFSC : UBIN0814709**	**Current A/C** **1 4 7 0 1 1010000052**

Send Cheque or DD in favour of "Vidushi Book Cafe" payable at Chennai

Surgical Excellence for a Rare Fight – Salute to Lifeline Hospitals Chennai

Five-Year-Old Bangladeshi Girl with Rare Disorder Undergoes Life-Saving Bariatric Surgery at Chennai Hospital. 5-Year-Old Bangladeshi Girl with Rare Genetic Disorder Undergoes Bariatric Surgery at Lifeline Hospitals, Chennai

In a groundbreaking medical case, a five-year-old girl from Bangladesh, Mayesha Siddika, suffering from a rare genetic disorder, successfully underwent laparoscopic sleeve gastrectomy at the Lifeline Group of Hospitals in Chennai.

The surgery, performed by a team led by Dr. Anirudh Rajkumar, advanced laparoscopic and bariatric surgeon, involved trimming the size of the stomach to help reduce the patient's excessive hunger and manage weight gain.

At a press conference held on Saturday, Dr. Anirudh revealed that Mayesha weighed 68 kg and stood 115 cm tall when she was admitted. Her excessive weight had started affecting her mobility, breathing, and sleep. Detailed evaluations also showed that she was suffering from high blood pressure, new-onset diabetes, and abnormal liver function.

The rapid weight gain in recent years was attributed to Prader-Willi Syndrome (PWS) — a rare genetic condition that affects metabolism and causes a persistent sensation of hunger, even after meals. This uncontrollable urge to eat leads to severe childhood obesity, often resistant to conventional treatments.

Dr. Anirudh and his team took a multi-disciplinary approach, thoroughly assessing the risks and long-term benefits before proceeding with the surgery. The laparoscopic sleeve gastrectomy, though rare at this age, was deemed essential to prevent future complications and improve the child's quality of life.

he team's efforts have not only brought relief to Mayesha and her family but have also opened new possibilities for treating complex childhood metabolic disorders across the region.

We wish to congratulate the team of doctors for successfully conducting the surgery, and we hope it will inspire our young doctors to take on more challenges in their medical careers.

L.Krishnamoorthy
scienceparkmagazine@gmail.com

Women in Science

Maryam Mirzakhani: The Queen of Mathematics

Maryam Mirzakhani, The Queen of Mathematics Maryam Mirzakhani (1977–2017) was a trailblazing Iranian mathematician, often referred to as The Queen of Mathematics, not only for her brilliant contributions to the field but also for breaking barriers in a male-dominated discipline.

She holds a special place in history as the first woman and the first Iranian to be awarded the Fields Medal, the highest honor in mathematics, often considered the equivalent of the Nobel Prize.

Early Life and Education

Born: May 12, 1977, in Tehran, Iran.

As a young girl, Maryam loved reading and initially wanted to become a writer. She studied at the Farzanegan School for gifted girls in Tehran, where her mathematical talent blossomed.

Represented Iran in the International Mathematical Olympiad (IMO):Won gold medals in 1994 and 1995 Achieved a perfect score in 1995.

Academic Career

Bachelor's degree: Sharif University of Technology, Tehran.

Ph.D.: Harvard University under Curtis McMullen, another Fields Medalist.

Her doctoral thesis was described as truly spectacular.

Professor at Princeton and later at Stanford University.

Mathematical Contributions

Maryam worked in some of the most abstract and complex areas of mathematics. Her research involved:

Riemann surfaces: Curved surfaces used to understand complex numbers and shapes.

Hyperbolic geometry: A type of non-Euclidean geometry with applications in string theory and cosmology.

Teichmüller theory: A field dealing with the geometric structures on surfaces.

Ergodic theory and moduli spaces: Ways to understand the dynamics of systems and how surfaces can be deformed.

Her work revealed deep connections between geometry, topology, and dynamical systems—fields that describe the shapes, spaces, and behaviors of complex systems.

Fields Medal (2014)

Awarded for: Outstanding contributions to the dynamics and geometry of Riemann surfaces and their moduli spaces.

Maryam became:

The first woman in the award's 78-year history to receive the Fields Medal.

A role model for girls and women in STEM worldwide.

Why She's Called "The Queen of Mathematics

Not just for her historic achievements, but for showing that intellectual brilliance, humility, and humanity can coexist.

She opened the door for future generations of women and minorities in math.

Death and Legacy

Maryam passed away in 2017 at the age of 40 due to breast cancer.

* Her passing was mourned globally.

* In her honor: UNESCO declared May 12 (her birthday) as the International Women in Mathematics Day.

* Streets, scholarships, and research programs are now named after her.

Gene Therapy Case Study

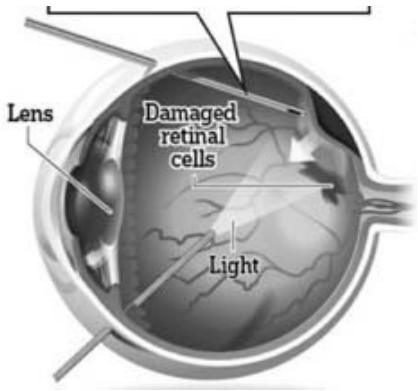
Rewriting Genes, Restoring Vision. DNA based Medicine

Lighting Up Young Lives: Gene Therapy for Childhood Blindness.

Jace was enrolled in an experimental gene therapy trial jointly run by Great Ormond Street Hospital and Moorfields Eye Hospital in London - both world leaders in pediatric and ophthalmic research. The trial aimed to treat the most severe form of LCA using gene replacement therapy

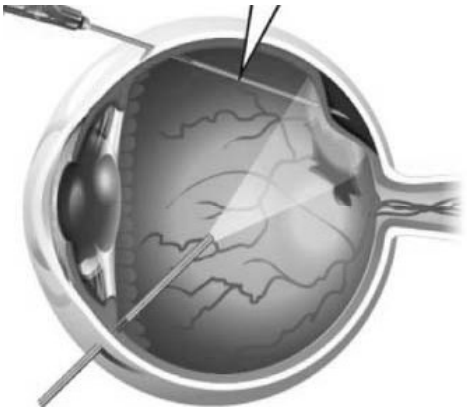
Jace was born with a severe impairment to their sight due to a rare genetic deficiency that affects the 'AIPL1' gene. The condition means those affected are born with only sufficient sight to distinguish between light and darkness. The gene defect causes the retinal cells to malfunction and die, with children affected being legally certified as blind from birth. The new treatment is designed to enable the retinal cells to work better and to survive longer.

Surgeons performed a 60-minute keyhole surgery, during which they injected a functional copy of the AIPL1 gene directly into Jace's retina using a fine needle. The idea was that once the healthy gene entered the retinal cells, it would allow those cells to start functioning properly - potentially restoring some level of vision



The retina the thin layer at the back of the eye is detached from surrounding blood vessels by spraying it with a saline solution.

The missing gene is injected into the light seeing cells of the retina where it starts producing protein and repairs damaged cells. The retina reattaches itself within a day



The treatment was given to just one eye, so researchers could monitor its effects while comparing it to the untreated eye, which continued to deteriorate as expected

Following the surgery, within one month Jace began to respond to light. Over time, he could identify shapes, see toys, and move around with a greater sense of spatial awareness. His mother shared emotional stories of him walking unaided and reacting to sunlight and reflections - things he'd never done before.

The improvement wasn't just anecdotal. Clinical tests confirmed a significant restoration of visual function in the treated eye. While his sight is still limited, the gains are life-changing and show that even in severe retinal dystrophies, some photoreceptor cells can be revived.

This case, published in The Lancet in 2024, is the first documented success of gene therapy for the AIPL1 subtype of LCA, which is one of the most aggressive and early-onset forms of inherited blindness.

Next steps are clinical trials and further testing before bringing this treatment to the wider population.

What is the AIPL1 Gene?

AIPL1 stands for Aryl Hydrocarbon Receptor Interacting Protein-Like 1. It’s a gene that gives instructions for making a protein that's really important for our eyes — especially for a part of the eye called the retina, which helps us see.

Why is AIPL1 Important ?

Inside your eye is a layer called the retina — it captures light, like film in a camera, and sends messages to your brain so you can see.

The retina has special cells called photoreceptors (rods and cones) that react to light.

The AIPL1 protein helps keep these cells healthy and working properly.

What Happens if AIPL1 Doesn’t Work?

If there’s a mutation (change) in the AIPL1 gene, it can cause a rare eye disease called. Leber Congenital Amaurosis (LCA)Starts in infancy or early childhood Causes severe vision loss or blindness

It's inherited (passed down from parents)

People with a faulty AIPL1 gene don’t make the protein correctly, so the retina can’t process light well, and vision problems start early.

Leber Congenital Amaurosis (LCA)

Starts in infancy or early childhood

Causes severe vision loss or blindness

It's inherited (passed down from parents)

People with a faulty AIPL1 gene don't make the protein correctly, so the retina can't process light well, and vision problems start early.

The study of genes like AIPL1 is part of a field called genetics. This helps doctors understand diseases better and may lead to future cures using DNA-based medicine.

Can Ayurveda, Siddha, or TCM Restore the AIPL1 Gene?

As of now, there is no known Ayurvedic, Siddha, or Chinese herbal treatment that can directly repair or restore a mutated AIPL1 gene.

The AIPL1 gene mutation causes Leber Congenital Amaurosis (LCA), a genetic condition. Genetic disorders are caused by changes in DNA, and ancient systems didn't have the tools to understand or fix genes at that level.

However:

These traditional systems may help support general eye health, slow degeneration, or reduce symptoms.

They may improve overall wellness, which can support long-term management.

But they cannot replace gene therapy or modern treatments for specific genetic defects like AIPL1.

Do Ancient Systems Offer Any Hope?

Ayurveda and Siddha:

(1) These systems describe herbs like Triphala, Amla (Indian Gooseberry), Saptamrita Lauha, and Madhuyashti (Licorice) for improving eye function.

(2) Nasya therapy (nasal administration) and Netra Tarpana (eye oil treatments) are used traditionally for vision.

(3) Siddha medicine includes preparations like Kanmai and Muppu-based therapies for rejuvenation. None of these can fix a mutated gene, but some are under research for neuroprotective or retinal support effects.

None of these can fix a mutated gene, but some are under research for neuroprotective or retinal support effects.

Traditional Chinese Medicine (TCM)

TCM uses herbs like Gou Qi Zi (Goji berry), Ju Hua (Chrysanthemum), and Zhi Bai Di Huang Wan to support liver and eye health.

Acupuncture has been explored for eye diseases, but again, it cannot alter genes.

Has Any Scientist in India or China Tried This?

Some efforts have been made, mostly in:

(1) Exploring herbs for retinal protection

Example: Indian scientists have studied Ashwagandha, Curcumin (from turmeric), and Brahmi for their antioxidant and neuroprotective effects.

Combining traditional medicine with modern research

Example:

In China, some labs combine herbal extracts with stem cell research to look at effects on retinal cells — but not yet targeting AIPL1 specifically.

Traditional Chines Medicine

TCS significantly larger globally, with a more mature and established presence.

Ayurvedic market in India includes multiple segments (products, medicine, wellness), with strong domestic growth driven by health interest and exporter recognition.

Global Ayurveda is a rapidly expanding trend, especially in wellness and herbal personal care.

Indian Ayuverdic Medicine:

India (2024): Market size is $50 million for commercial Ayurvedic medicines

Forecast: Grow to about $120 million by 2033 .

Global Ayurveda Market: Valued at $14.4 billion in 2023, expected to reach $76.9 billion by 2030

World's Fastest Microscope Built with Indian Expertise: Freezing Time, Frame by Frame

Indian Scientist Creates the World's Fastest Microscope – Captures 125 Billion Frames/Second

Dr. Ayan Ray, a physicist from India, has developed a revolutionary microscope that can capture an astonishing 125 billion frames per second — making it the fastest microscope in the world.

This breakthrough allows scientists to observe processes that were once impossible to capture — like how light interacts with matter, cellular movements, or chemical reactions, all in real time.

Think of it like freezing time — letting us see the invisible world in motion.

This ultra-fast microscope can be a game-changer for cancer research, material science, and space tech.

India Shines Again: A New Milestone in Science and Innovation

SAT – Scholastic Aptitude Test

1. The average (arithmetic mean) of 6 numbers is 6. If 3 is subtracted from each of 4 of the numbers, What is the new average

a. $1\frac{1}{2}$ b. 2 c. 3 d.4 e. $4\frac{1}{2}$

If 6 numbers have an average of 6 , their sum is 6 x 6 or 36. To subtract 3 from 4 of the numbers,

we subtract 4 x 3 = 12 from the sum.

The new sum is 36 – 12 = 24

The new average is $\frac{24}{6}=4$

So the answer is (d)

2.A bag contains 24 pairs of shoes. If 25% of those pairs of shoes are black, how many pairs are not black?

If 25% of the shoes are black,

then 100% – 25 % or 75% of the shoes are not black.

75% of 24 = $\frac{3}{4}\times 24=18$

So 18 pairs are not block.

3.The batting average of a batsman for 12 innings is 50. After his 13 th inning, his new average is 52.

How many runs did the batsman score in his 13 th inning?

a. 52 b.76 c.84 d.100

Runs scored in 12 innings =

Average x No.of innings

= 50 x 12 = 600 runs

Average in 13th innings

$= \frac{\text{Total runs scored}}{\text{No. of innings}}$

Total runs scored = Average x 13

= 52 x 13 = 676 runs

Runs scored i n 13 th innings

= Runs scored in 13 innings – Runs scored in 13 innings – Runs scored in 12 innings

= 676 – 600 = 76 runs

The answer is (b)

4. Pipe A can fill a tank in 24 minutes whereas pipe A along with pipe B can

fill a tank in 8 minutes.

In what time can pipe B alone fill the tank?

a.20 mins b.16 mins

c.12 mins d.8 mins

$\frac{1}{A}+\frac{1}{B}=\frac{1}{7}$ = $\frac{1}{24}+\frac{1}{B}=\frac{1}{8}$

$$\frac{1}{B}=\frac{1}{8}-\frac{1}{24}=\frac{3-1}{24}=\frac{2}{24}$$

B = 12 mins. **So the answer is (c)**

5. **Anil can do a piece of work in 10 days, Sunil can do the same work in 15 days and Aditya takes 20 days to complete the same work. If they work together for 3 days, what fraction of the work is left?**

a. $\frac{6}{20}$ b. $\frac{7}{20}$

c. $\frac{9}{20}$ d. $\frac{11}{20}$

Anil's work in 1 day = $\frac{1}{10}$

Sunil's work in 1 day = $\frac{1}{15}$

Aditya's work in 1 day = $\frac{1}{20}$

Total work done by all three in 1 day

= $\frac{1}{10}+\frac{1}{15}+\frac{1}{20}$

= $\frac{6+4+3}{60}=\frac{13}{60}$

Total work in 3days = $3\times\frac{13}{60}=\frac{13}{20}$

Therefore, remaining work

= $\left[1-\frac{13}{20}\right]=\frac{20-13}{20}=\frac{7}{20}$

So the answer is option (b)

6. The ratio of apples to oranges in a shop is 13: 25. If there are 60 more oranges than apples , find the total number of fruits in the shop?

a. 65 b. 125 c. 190 d. 180

Number of apples = x

Number of oranges = x + 65

$$\frac{Numberofapples}{Numberoforanges}=\frac{13}{25} = \frac{x}{x+60}=\frac{13}{25}$$

$$25x=13(x+60)$$

$$25x=13x+780$$

$$12x=780$$

$$x=65$$

Number of apples = 65

Number of oranges = 65 + 60 = 125

Total number of fruits = 65 + 125 = 190 fruits

So the answer is (c)

7.**If the selling price of 12 articles is equal to the cost price of 18 articles ,**

What is the profit percent?

a. 25% b. 50%

c. 75% d. 40%

Profit % = $\left[\frac{m-n}{n}\right]\times 100$, where m is the num-

ber of articles bought at cost price and n is the number of articles sold at selling price

$$\text{Profit \%} = \left[\frac{18-12}{12}\right]\times 100 = \frac{6}{12}\times 100 = 50\%$$

So the answer is (b)

8.On a cinema ticket, 50% entertainment tax is charged on the base price. If the total cost of the ticket RS.180, What is the basic price of ticket?

a.Rs.60 b.Rs.120

c.Rs.150 d.Rs.100

After 50% entertainment tax = 100 + 50%

So, the baseprice of ticket = $180\times\frac{100}{150} = 120$

So the basic price of ticket = Rs.120

So the option is (b)

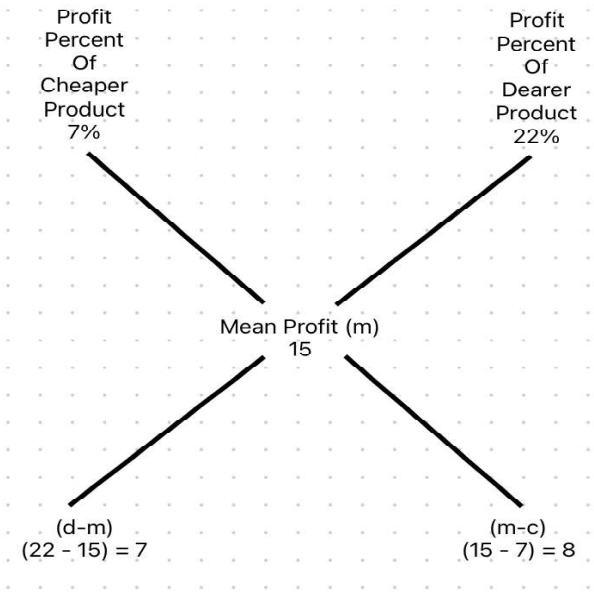
9. **Johny has 1000 kgs of mangoes. A part of the mangoes are sold at a profit of 7%, whilst the remaining part is sold at 22% profit, which earns him a net profit of 15%. How many kilograms of mangoes were sold at 22% profit?**

a. 467 kgs b. 533 kgs

c. 600 kgs d.400 kgs

By alligation rule, we have

The ratio is 7:8 to find how many kgs of mangoes were sold at 22% profit



$$1000\times\frac{8}{15} = 533.33 = 533kgs$$

So the option is (b)

10. In an examination a student must get 60% mark to pass. If a student who gets 120 marks fails by 60marks, find the maximum marks.

a.240 b.500

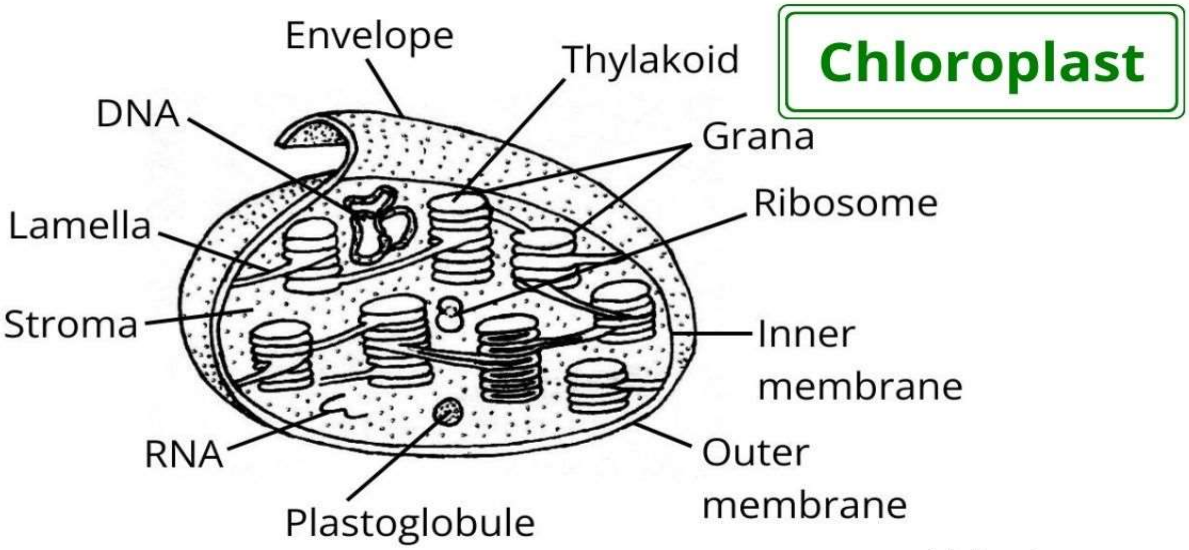
c.360 d.300

Minimum marks required to pass = Mark scored bystudent + Marks by which the student failed. = 120 + 60 = 180.If 180 is 60% So, The Maximum marks is 300.Answer : d.

Molecule of this Month

TOC-TIC Translocon: The Gatekeepers of Plant Cells

TOC stands for Translocon at the Outer membrane of Chloroplast



TIC stands for Translocon at the Inner membrane of Chloroplast

Have you ever wondered how plant cells work so efficiently, making food through photosynthesis and helping the plant grow? One of the secrets behind their smooth operation lies in tiny structures called chloroplasts, and the TOC-TIC translocon acts like a security gate that helps important materials get inside them

Let's break it down and explore what this amazing system does

What Are Chloroplasts

Chloroplasts are special parts of plant cells where photosynthesis happens—that's the process plants use to turn sunlight, water, and carbon dioxide into glucose (sugar) and oxygen. But to do their job, chloroplasts need a lot of special proteins that are made in another part of the cell, the cytoplasm.

These proteins can't just float in—they need a doorway to enter the chloroplast.

Enter the TOC-TIC Translocon

That's where the TOC-TIC translocon comes in. Think of it as a double-door security system that lets proteins enter the chloroplast safely and correctly.

TOC stands for Translocon at the Outer membrane of Chloroplast

TIC stands for Translocon at the Inner membrane of Chloroplast

These two systems work together like a team—TOC lets the protein through the outer layer, and TIC passes it through the inner layer, right into the chloroplast.

How Does It Work

(1) Signal Recognition:

Proteins that want to enter have a special address tag called a transit peptide. The TOC part recognizes this tag.

(2) First Gate – TOC:

The TOC proteins act like gatekeepers. Once they recognize the tag, they allow the protein to pass through the outer membrane.

(3) Second Gate – TIC:

After crossing TOC, the protein reaches the TIC complex, which guides it through the inner membrane into the chloroplast.

(4) Final Touch:

Once inside, another enzyme cuts off the transit tag, and the protein gets to work where it's needed

Why Is This Important?

Without the TOC-TIC system, proteins couldn't enter chloroplasts, and that would stop photosynthesis. If plants can't do photosynthesis, they can't make food. And if plants can't make food—we can't eat. So in a way, this tiny gatekeeping system is helping to feed the entire planet

In Summary:

* Chloroplasts are where photosynthesis happens.
* Proteins made outside must enter chloroplasts to help them work.
* The TOC-TIC translocon acts like a double-door system for these proteins.
* It's super important for plant life—and for our life too!

Every Day Science

1. Which part of the cell is known as the powerhouse?

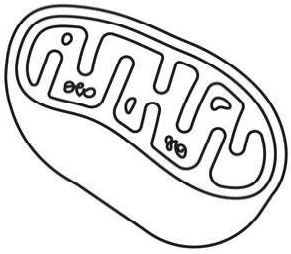
a. Nucleus

b. Mitochondria

c. Ribosome

Answer:

B) Mitochondria



Mitochondria are cellular organelles, often called the "powerhouse of the cell," because they generate most of the cell's energyThey convert energy from food into a usable form

2.What gas do plants absorb from the atmosphere for photosynthesis?

a. Oxygen

b. Nitrogen

c. Carbon Dioxide

Answer:

C) Carbon Dioxide

This process, which converts light energy into chemical energy, uses carbon dioxide as a raw material to produce glucose (sugar) and oxygen.

3.Which gas is most abundant in Earth's atmosphere?"

a.Oxygen

b.Carbon Dioxide

c. Nitrogen

Answer: C) Nitrogen

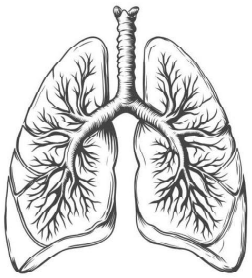
Nitrogen is the most abundant gas in Earth's atmosphere primarily because it is a stable, unreactive diatomic molecule (N2) with a strong triple bond

4.Which organ helps humans breathe?

a.Liver b. Lungs

c. Kidney

Answer: B) Lungs



The lungs receive air from the nose and mouth, and then exchange gases (oxygen and carbon dioxide) with the blood.

5.What is the center of an atom called?

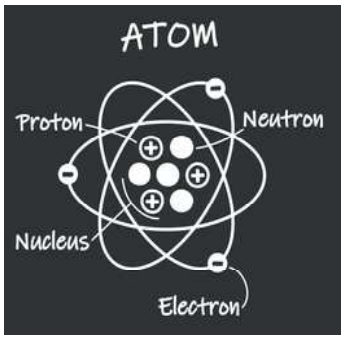
a. Electron

b.Nucleus

c.Proton

Answer:

B) Nucleus



It consists of protons and neutrons.

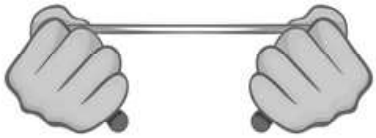
6.Which of these is not a source of renewable energy?

a. Solar b. Wind

c. Coal

Answer: C) Coal

7. What type of energy is stored in a stretched rubber band?



a. Thermal energy

b. Kinetic energy

c. Potential energy

Answer:

C) Potential energy

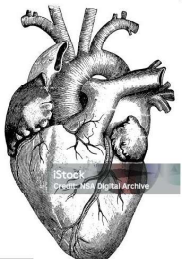
When a rubber band is stretched, work is done, and this energy is stored as potential energy within the rubber band

9.Which part of the human body is responsible for pumping blood?

a. Brain b.Heart

c. Lungs

Answer: B) Heart



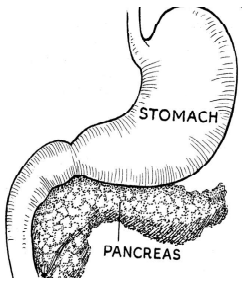
It's a muscular organ that acts as a pump, propelling blood through the circulatory system to deliver oxygen and nutrients to all parts of the body.

10. Which organ in the human body produces insulin?

a. Liver b. Pancreas

c.Kidney

Answer: B) Pancreas



The pancreas is a large gland located in the abdomen, behind the stomach and next to the small intestine. It plays a crucial role in both digestion and blood sugar regulation

Element of this month

Beryllium

Beryllium is a fascinating element with unique physical and chemical properties

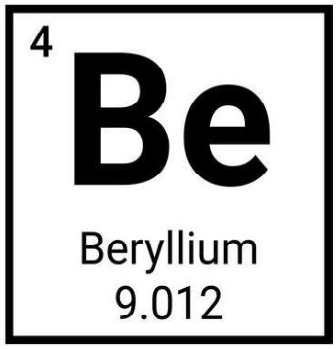
Symbol:

Be Atomic Number 4

Atomic Mass9.012 u

Group 2 (Alkaline Earth Metals)

Appearance Steel-gray, hard, and brittle metal



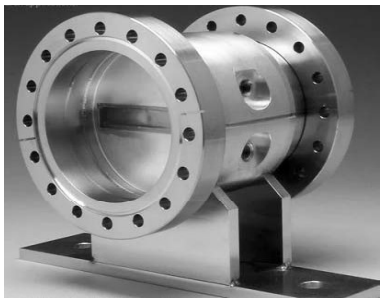
Physical Properties

Lightweight: One of the lightest metals, but six times stiffer than steel.

High Melting Point: 1287°C.

Thermal Conductivity: Excellent conductor of heat.

Non-magnetic and non-sparking.



In X – rays

Applications

(1) Aerospace:

Due to its lightness and strength, used in aircraft, missiles, and satellites.

(2) Nuclear Industry:

Acts as a neutron moderator and reflector in nuclear reactors.

Nuclear industry

(3) X-ray Windows:

Transparent to X-rays, so used in medical and scientific equipment.

(4) Alloys:

Beryllium-copper alloy is used in electrical connectors, springs, and tools.

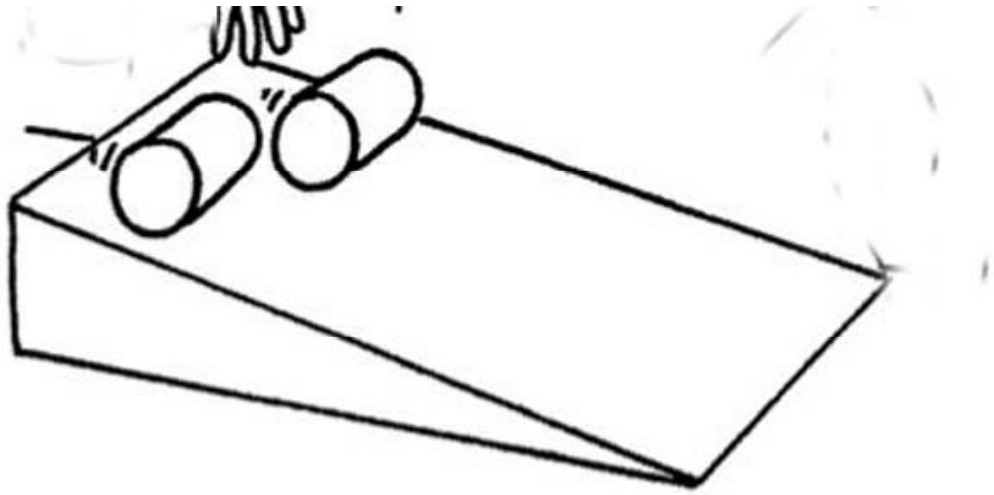
Fun Physics

Which will roll down a hill faster a can of regular fruit juice or a can of frozen fruit juice ?

a. Regular fruit juice

b. Frozen fruit juice

c. Depends on the relative sizes and weights of the cans.



To understand which will roll down the hill faster, we need to look at rotational inertia (also called the moment of inertia) and how mass is distributed inside the object.

Rotational Motion: When an object rolls, some of its energy goes into rotating as well as moving forward.

Distribution of Mass: The more mass is concentrated away from the center, the more rotational inertia it has, making it slower to accelerate.

Regular Fruit Juice (Liquid):

The juice inside a regular can is liquid, so it doesn't rotate much with the can.Most of the juice stays still while the can rolls, meaning less energy is needed to rotate the can.Thus, more energy goes into translational motion (moving forward), making it roll faster.

Frozen Fruit Juice (Solid):

When juice is frozen, it becomes solid and moves with the can.

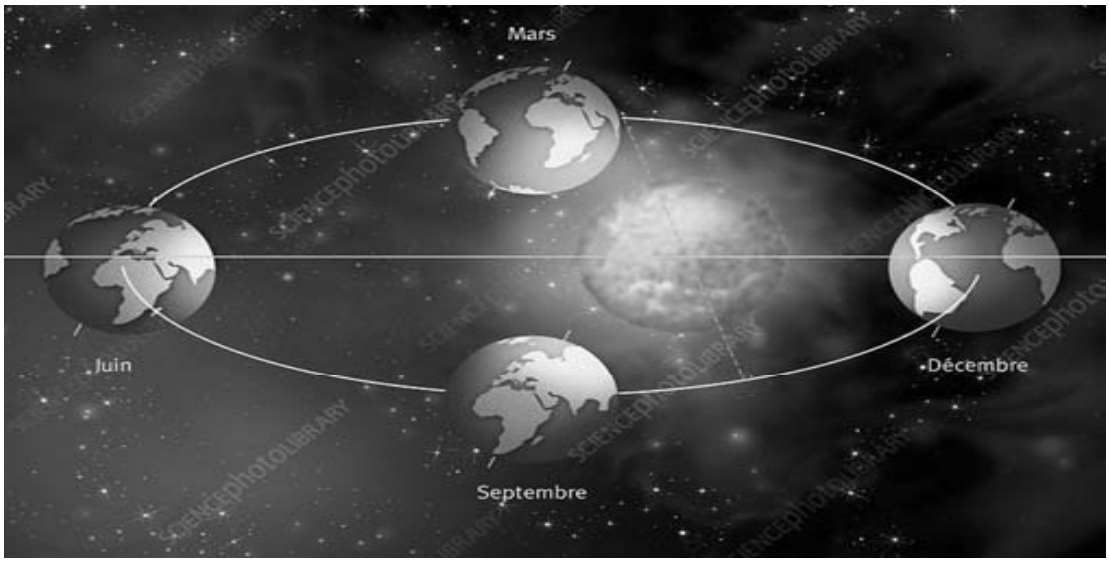
Now, the entire mass (including the frozen juice) rotates.This increases the moment of inertia, requiring more energy for rotation.So, it will roll down slower than the liquid version.

Regular (liquid) fruit juice rolls down faster because the liquid inside doesn't significantly contribute to rotational inertia.

Frozen juice rolls slower because the solid rotates with the can, increasing resistance to motion.

2. If the sun suddenly collapsed to become a black hole, the earth would

a. Leave the solar system in a straight line path



b.Spiral into the black hole

c.Continue to circle in its usual orbit

Ans : (c) Continue to circle in its usual orbit

Science Behind the Answer

If the Sun suddenly collapsed into a black hole without losing any mass, the gravitational pull it exerts on the Earth would remain the same.

This is because gravity depends only on the mass and distance between two objects — not on what the mass is made of or what form it takes.

The Sun's gravity is what keeps the Earth in orbit.

If the Sun suddenly collapsed into a black hole of the same mass, its gravity at the distance of Earth (about 150 million km) would be unchanged.

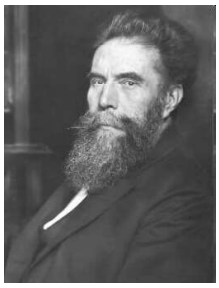
Therefore, Earth would continue orbiting the black hole just as it orbits the Sun now.

The only change is that the Sun would no longer shine — the Solar System would go dark.

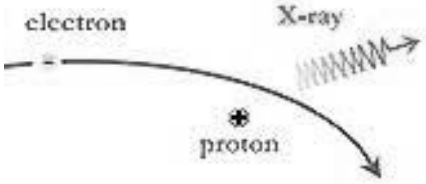
But gravitationally, Earth wouldn't get sucked in, because it's too far and not crossing the black hole's event horizon (which would be only about 3 km in radius for a Sun-mass black hole).

X-rays – another form of light

A new form of radiation was discovered in 1895 by



Wilhelm Roentgen, a German physicist. He called it X-radiation to denote its unknown nature. This mysterious radiation had the ability to pass through many materials that absorb visible light. X-rays also have the ability to knock electrons loose from atoms. Over the years these exceptional properties have made X-rays useful in many fields, such as medicine and research into the nature of the atom. Eventually, X-rays were found to be another form of light



One Step Ahead - Mathematics Series

(For Students class (VI to IX)

1. If Raj buys only pens costing Rs.13 each or only pencils costing Rs.5 each, he is left with Rs.2 in each case. Which of the following can be the amount of money with him?

a. Rs.240 b. Rs. 457

c. Rs.578 d. Rs.593

After subtracting 2 the number must be divided by both 13 and 5. So the amount is 457.

2.The LCM of two numbers is 150 and their ratio is 3:5. What are the numbers?

a. 28, 35 b. 8, 10

c. 16, 20 d. 30, 50

Let numbers be 3x and 5x

Then $3x \times 5x = 150$

$15x = 150,\ x = 10$

The numbers are = 30, 50

3.If y= 5, then what is the value of

$10y\sqrt{y^3 - y^2}$

a. $50\sqrt{2}$ b. 100

c. $200\sqrt{5}$ d.500

$10y\sqrt{y^3 - y^2} = 10 \times 5\sqrt{5^3 - 5^2}$

$50\sqrt{125 - 25} = 50\sqrt{100}$

= 50 x 10= 500

So the answer is (d)

4.Akash bought a washing machine with 20% discount on the labelled price. Had he bought it with 25% discount, he would have saved Rs.500. At what price did he buy the washing machine?

a. Rs. 16,000 b. Rs. 12,000

c. Rs. 10,000 d. Rs. 5,000

Let the labelled price be Rs.x

$\therefore$ S.P = $\frac{80}{100} \times x = \frac{4x}{5}$

New S.P = $\frac{75}{100}x = \frac{3x}{4}$

$\therefore\ \therefore \frac{4x}{5} - \frac{3x}{4} = 500$

$\frac{16x - 15x}{20}$ = 500

$x = 10,000$

He bought the washing machine @Rs. 10,000

So the answer is (c)

5.The remainder is 5 when 200 is divided by a whole number. The remainders

are 1 and 10 respectively if 300 and 400 respectively are divided by thr same whole number. What is the value of the whole number?

The whole number must be a factor of 195, 299, 390

By prime factorising 195, 199 and 390, we have the following

195, 199 and 390 are divisible by 13. Therefore the whole number is 13

6.Two numbers are in the ratio 2 : 5.If the sum of the numbers is 63 Find the numbers

The numbers are in the ratio 2 : 5

Let the numbers be 2x and 5x

The sum of these two numbers is 63

i.e 2x + 5x = 63

7x = 63

x = 63/7 = 9

One number is 2 x 9 = 18

The other number is 5 x 9 = 45

The numbers are 18 and 45

7. If the interest on a sum of Rs.1750 for a year is Rs.140/ What is the rate percent of interest per annum?

Let the interest for Rs.100 per annum be Rs.x

Principal : Principal : : Interest : Interest

1750 : 100 : : 140 : x

1750 x = 100 x 140

$$x = \frac{100 \times 140}{1750} = 8\%$$

The rate of interest is 8%

8.Both Shop X and shop Y selling the same brand of Air cooler at the same price. Shop X raised its price by 15% and finally sold it at a 15% discount. Shop B raised its price by 10% and ventually sold it at a discount 10%. Which shop sold the Air cooler at a higher price?

Let S be the price of the Air cooler

Selling price at Shop X

= S x 1. 15 x 0.85 = 0.9775S

Selling price at shop Y

= S x 1.10 x 0.90 = 0.99S

0.99 S> 0.9775

Shop Y sld the Air cooler at a higher price.

9. How many of the whole numbers from 1 to 100 are multiples of 5 and 7?

There are 100 numbers from 1 to 100

$100 \div 5 = 20$

There are 20 multiples of 5

$100 \div 7 = 14R2$

There are 14 multiples of 7

$100 \div 35 = 2R30$

There are 2 multiples of 35 which are also multiples of 5 and 7. They have to be subtracted as they have been counted twice.

20 + 14 – 2 = 32

32 numbers are multiples of 5 or 7

10. The length of two trains are 200 m and 100 m respectively. The shorter train travels 2m/s faster than the longer train. How long does it take for the faster train to completely overtake the slower train given that both trains travel from the same place at the same time?

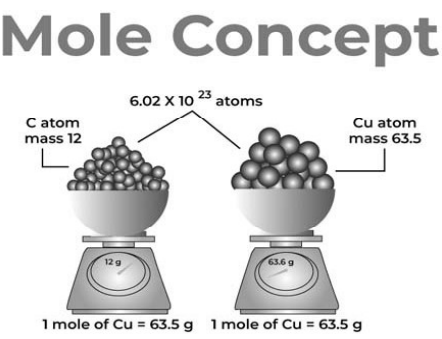
Distance to overtake = 200 – 100 = 100 m

Distance in speed = 2m /s

Time taken to overtake = $100 \div 2 = 50s$

It took **50s** for the faster train to completely overtook the slower train.

What Is A Mole?



In chemistry, a mole is precisely defined as the number of particles (such as atoms or molecules) found in exactly 12 grams of carbon-12. This definition is a globally accepted standard among chemists.

The choice of carbon-12 as the reference element is intentional. It allows the atomic mass unit and mole to be aligned with a single standard, ensuring consistency in chemical measurements worldwide.

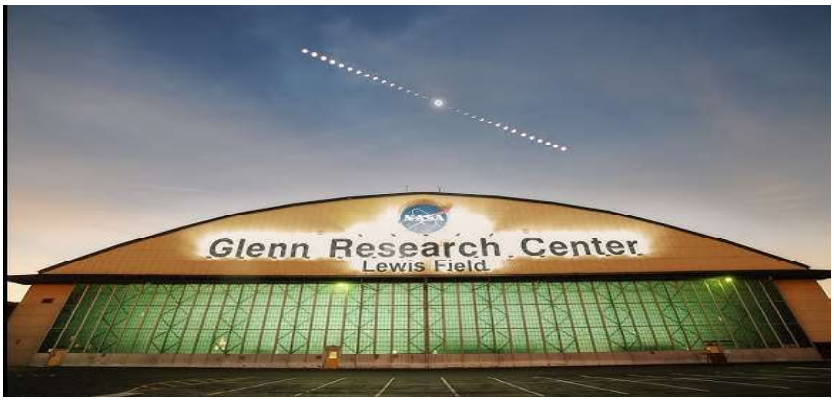
To further unify this system, scientists have agreed that 12 grams of carbon-12 contains exactly Avogadro's number of atoms, which is 6.02252×10^{23}.

Thanks to this standard, the terms "mole" and "gram molecular weight" are often used interchangeably.

A gram molecular weight (or gram atomic weight when referring to elements with single atoms) refers to the mass of a substance in grams that is numerically equal to its molecular or atomic mass.

Reimagining Flight: Can We Fuel Without Fire

Flying safely is a goal of NASA's Glenn Research Center (GRC) in Cleveland, Ohio USA. Located in Cleveland, Ohio, NASA's Glenn Research Center (GRC) works to advance NASA's missions in aeronautics in space exploration with their advanced technology.



Their workforce is shaped of more than 3,000 personnel focused on researching and testing technology in aeronautics, propulsion, communications, materials and structures, biomedical sciences, and power and energy storage.Using alternative energy sources and bettering the safety and expediency of flight is of utmost importance to the GRC.

Their efforts reduce the cost of travel, emissions, noise, and energy consumption while simultaneously advancing propulsion for aircraft. They're working on the problems that could arise if fuel in the tanks were to accidentally ignite in flight or during an emergency landing.

A team of Glenn's scientists, headed by , is trying to find better ways to make the stored fuel less flammable.

We know that in order to initiate combustion, three ingredients are needed: oxygen, fuel vapor and an ignition source,' Chang said. 'We can't remove the fuel from the tank, and we've already removed just about all of the known ignition sources. Since we can't remove the ignition sources we don't know about, decreasing the oxygen level is currently the easiest way to avoid fuel tank explosion.'

According to Chang, the U.S. military already uses inerting systems (a method of reducing the fire potential of fuel) to protect aircraft. But these systems are heavy, take up a lot of space and are very expensive to buy and operate.

The science team has been working on technologies for air separation modules that are smaller, more affordable and more efficient then the type currently being proposed for use in commercial aircraft fuel tanks today.

No current commercial aircraft as yet uses inerting technology. Ignition experiments are being performed to look at the amount of oxygen removal that would be needed to protect a fuel tank from accidents.

In addition, changes in the fuel itself can work in concert with inerting to make the fuel harder to ignite and decrease the need for inerting devices. The trick is to have a fuel that is safe in storage, but burns great in the engine.Also, scientists are developing sensors that monitor the gasses inside the tank.

But at this time the hostile environment inside the tank is a formidable challenge to overcome. These advanced technologies in inerting, gas detection and fuel reformulation will make future aircraft safer from fuel-fed fire.

Do you know ? Prader-Willi Syndrome (PWS)

Prader-Willi Syndrome (PWS) is a rare genetic disorder that affects many parts of the body, most notably growth, metabolism, behavior, and appetite control. It is caused by the loss of function of specific genes on chromosome 15, usually due to a deletion or abnormal expression. Key feature of this syndrome si Excessive hunger (hyperphagia) – People with PWS feel hungry all the time, leading to severe obesity if not managed.

Acids, Bases and Salts

An acid-base indicator is a chemical substance that changes color depending on the pH of the solution it is in. This color change helps determine whether a solution is acidic, neutral, or basic (alkaline).

How It Works:

Indicators are weak acids or bases themselves.They exist in two different forms (called conjugate acid and base), each with a different color.The color you see depends on the pH of the solution and the form that predominates.

Common Acid-Base Indicators

Indicator	Color in Acid	Color in Base	pH Range
Litmus	Red	Blue	4.5–8.3
Phenolphthalein	Colorless	Pink	8.3–10.0
Methyl Orange	Red	Yellow	3.1–4.4
Bromothymol	Yellow	Blue	6.0–7.6

If you add phenolphthalein to a solution and it turns pink, the solution is likely basic (pH > 8.3). If it remains colorless, it is acidic or neutral.

General characteristics properties of Acids

Taste

Sour in taste.“(e.g., lemon juice, vinegar)

Never taste laboratory acids — they are dangerous.

Reaction with Metals

Acids react with active metals (like zinc, magnesium) to produce

Reaction with Bases

Acids react with bases in a neutralization reaction to form

Salt + Water

Reaction with Carbonates/Bicarbonates

Produces Carbon dioxide (CO_2), water, and salt.

pH Value“Acids have a pH less than 7.

6. Indicator Reaction

Turn blue litmus paper red.

Some other indicators also change color (e.g., phenolphthalein becomes colorless in acid).

Electrical Conductivity

Acids conduct electricity in aqueous solutions because they release H+ ions.

Ionization

Acids release hydrogen ions (H+) in water.

General characteristics properties of Bases

1.**Taste** Bitter in taste.(e.g., baking soda, soap)

Do not taste laboratory bases — they are harmful.

2.Feel Soapy or slippery to touch.(like soap or bleach)

3.Reaction with Acids (Neutralization) Bases react with acids to form:Salt + Water

4.Ionization in Water Bases release hydroxide ions (OH–) in water.

5.Indicator Reaction Turn red litmus paper blue. Turn phenolphthalein pink. Turn methyl orange yellow.

6. pH Value Bases have a pH greater than 7.

7.Electrical Conductivity Conduct electricity in aqueous solution due to free OH – ions.

8.Reaction with Ammonium Salts Strong bases (like NaOH) release ammonia gas when they react with ammonium salts.

Importance of pH in every day life

Soil pH for Agriculture

Plants grow best at specific pH levels.

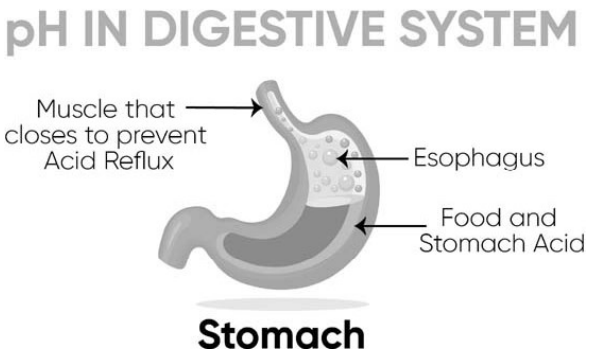
Farmers test soil pH to choose the right fertilizers and crops.““

Acidic soil – may need lime (base) to neutralize.

Alkaline soil – may need gypsum or sulfur.

2. Digestive System (Stomach Acid)

Our stomach has hydrochloric acid (HCl) with a pH ~2.



It helps in digesting food and killing germs.

If acid is too high → acidity or heartburn → antacids (bases) like milk of magnesia are used to neutralize.

3.Tooth Health

Bacteria in the mouth produce acids that lower pH.

If pHdrops below 5.5 → tooth enamel starts dissolving.

Brushing teeth and avoiding sugary foods helps maintain a safe pH.

4. Water Purity

Drinking water should be near neutral (pH ~7).

Very acidic or basic water is unsafe to drink.

Municipal water systems check pH regularly.

Cleaning Products

Many cleaners are either acidic (like toilet cleaner) or basic (like soap, bleach).

Choosing the right product depends on the surface and the type of dirt.

Aquatic Life

Fish and aquatic animals can only survive in water with a safe pH range (usually 6.5–8.5).

pH imbalance can kill fish and affect ecosystems.

Skin and Hair Care

Human skin has a pH around 5.5.

Shampoos and creams are made to match the skin's pH to prevent irritation or dryness.

Salts

Salts are the ionic compounds consisting of two parts, one part carrying a positive charge and the other carrying a negative charge. Salt as a whole is electrically neutral because the number of positive and negative ions present in the salt are equal.

What is Plaster of Paris and its properties

Plaster of Paris is a white powdery chemical used in construction, decoration, and medical applications.Its chemical name is Calcium Sulphate Hemihydrate.

Properties of Plaster of Paris:

Appearance	White, fine powder
Setting Time	Sets quickly (within 10–15 minutes when mixed with water)
Exothermic	Releases heat while setting
Porous	Absorbs moisture easily
Lightweight	Easy to handle
Non-shrinkable	Doesn't shrink while setting
Can be molded	Takes the shape of the mold before setting

Common Uses:

Making casts for broken bones in hospitals

Decorative ceiling work and sculptures

Molds and statues for art and education

False ceilings and wall finishing in buildings

Precautions:

Should be stored in a dry place (it absorbs moisture easily).

Not suitable for permanent water exposure (it gets soft).

Can cause burns on skin if handled carelessly due to heat while setting.

Sodium Hydroxide (NaOH) –

Common Name:"Caustic soda or Lye

Nature: Strong base, Highly corrosive

Physical Properties:

Appearance	White, solid (flakes or pellets)
Solubility	Highly soluble in water
Touch	Feels slippery but is corrosive
Taste	Bitter (Toxic – never taste)
Reaction	Exothermic (releases heat when dissolved in water)

Chemical Properties:

Reacts with acids to form salt + water

Uses:

Soap and detergent making

Paper and textile industries

Laboratory reagent Drain cleaner (breaks down grease)

Petroleum refining

Food industry (in small controlled amounts—for peeling fruits, making pretzels)

Safety Note:

Causes severe burns on skin and eyes

Must be handled with gloves and safety goggles

Always add NaOH to water (never the reverse), to prevent splashing and heat burst

Are crystalline salts really dry?

Not always. Many crystalline salts look dry but actually contain water molecules inside their crystal structure. This is called water of crystallization.

What is Water of Crystallization?

It is the fixed number of water molecules chemically bonded with each formula unit of a salt. These water molecules are not free — they are part of the solid crystal.

What happens when you heat them?

When heated, these salts lose water of crystallization and may change color.

Example:Blue copper sulfate becomes white when anhydrous (water-free).

So, are they dry?

They feel dry to the touch but chemically contain water — so they're not completely dry.

MCQ - Acids, Bases and Salts

1. Which of the following ions is furnished by acids in aqueous solution?

a. OH^- ions b. H^+ ions

c. H_3O^+ ions d. None

2. The term pH refers to

a. Pure hydrogen

b. Hydrogen purity

c. Hydrogen ion concentration

d. None of the above

3. Which of the following is acidic in nature?

a. Apple juice b. Soap solution

c. Lime d. Slaked lime

4. Which of the following acids is called the king of the acids

a. acetic acid b. Phosphoric acid

c. Oxalic acid d. Sulphuric acid

5.The sharp pain caused by the sting of an ant is due to

a. Malic acid b. Nitric acid

c. Formic acid d. Lactic acid

6.Which of the following acids is used in car batteries?

a. Nitric acid

b. Hydrochloric acid

c. Sulphuric acid

d. Carbonic acid

7. Acids are always stroed in containers made of

a. Plastic b. Glass

c. Metals d. Clay

8.pH of tomato juice is 4, that means it is

a. Basic b. Acidic

c. Neutral d. None

9. Acids turn blue litmus

a. Green b. Red

c. Yellow d. Orange

10. Which type of salts are stored in air tight containers

a. Anhydrous b. Hydrated

c. Dehydrated d. Deliquescence

11. Sodium bicarbonate is also known as

a. Washing soda b. Baking soda

c. Lime soda e.Glauber's salt

12.Which of the following is not a property of acids

a. All acids have a sour taste

b. Acids turn blue litmus red

c. Acids turn red litmus blue

d. All acids form H^+ ions in water

13.pH of water is 7 so it is

a. Acidic b. Neutral

c. Basic d. None

14.Which of the following acid is present in vinegar

a. Lactic acid b. Malic acid

c. Acetic acid d. Tartaric acid

15.Acids produce ————————— ions on dissolving in water

a. Chloride

b. Hydrogen

c. Nitrate

d. Hydroxyl

16.Which of the following acid is used in fire extinguishers

a. Sulphuric acid

b.Tartaric acid

c. Nitric acid

d. Hydrochloric acid

17.What is the approximate pH of human blood?

a. 5.4 b. 7 c. 7.4 d. 8.4

18.Sodium hydroxide is

a. A base b. An acid

c. An alkali d. Both base as well as alkali

19. Which of the following is an organic acid ?

a. Sulphurous acid

b. Nitric acid

c. Hydrochloric acid

d. Formic acid

20.The reaction of metal with acid results in the formation of

a. Only hydrogen gas

b. Only salt

c. Both salt and hydrogen gas

d. None of these

21.The loss of water of crystallization to the atmosphere by a compound is termed

a. Deliquescence b. Dehydration

c.Efflorescence d. Hydrolysis

22. The acidity and alkalinity of a compound is represented on a scale known as

a. pH scale

b. Kelvin Scale

c. Hess scale

23. Calcium hydroxide is also known as

a. Limestone b. Quick lime

c. Slaked lime d. Washing soda

24.A solution of sodium chloride will turn

a. Blue litmus red

b. Red litmus blue

c. Red litmus orange

d. Not change the colour of either red or blue litmus.

25.When bitten by ant, the sting causes irritation due to the presence of

a. Formic acid in the sting

b. A base in the sting

c.Poisonous chemicals

d. Both (a) and (b)

26. Vitamin C is an organic acid known as

a. Ascorbic acid

b. Citric acid

c. Acetic acid;

d.Tartaric acid

27.Soft drinks contain

a. Acetic acid

b. Carbonic acid

c. Nitric acid

d. Tartaric acid

28.Which one of the following types of medicines is used for treating indigestion?

a. Antacid

b.Antibiotic

c. Antiseptic

d. Analgesics

29."Alum' is an example of

a. Acids

b.Bases

c. Single salt

d. Double salt

30.Many salts absorb water from the atmosphere.This property is called

a. Hydration

b. Dehydration

c. Deliquescence

d. Efflorescence

31. A water soluable base is known as

a. Basic b. Alkali

c.Acidic e. Salty

32. The acidity and alkalinity of a compound is represented on a scale known as

a. pHscale b Hess scale

c.Kelvin scale d. None of these

33.Which of the following method is not used in preparing a base?

a. Burning of metal in air

b. Reaction between an acid and base

c. Adding water to a metal oxide

d. Heating metal carbonates

34.The acidity of soil, which is due to excessive use of fertilizer ammonium sulphate can be neutralied by adding

a. Washing soda

b. Lime

c. Caustic acid

35. Ammonium chloride is a salt of

a. Weak acid and a strong base

b. Weak acid and a weak base

c. Strong acid and strong base

d. Strong acid and a weak base

36.Alkalies turn methyl orange

a. Yellow

b. Red

c. Pink

d. Colourless

36.The reaction of acetic acid and sodiumhydroxide results in the formation of

a. Basic salt

b. Acidic salt

c. Neutral salt

d. None of these

37. The product formed when the white substance obtained by burning magnesium is dissoled in water is

a. Magnesium sulphate

b.Magnesium oxide

c. Magnesium sulphate

d. Magnesium hydroxide

38. Nitric acid does not react with

a. Silver

b. Copper

c. Gold

d. Zinc

39.Acid + Base $\rightarrow$Salt + Water. This reaction is known as

a. Precipitation reactions

b. Neutralisation reaction

c. Decomposition reaction

d. Displacement reaction

40. Which of the following acid is used by goldsmiths for cleaning gold and silver ornaments

a.Hydrochloric acid (HCl)

b. Sulfuric acid

c. Nitric acid (HNO3)

4. Phosphoric acid (H3Po4)

MCQ - Answers

1– c, 2– c, 3– a, 4– d, 5– c, 6– c, 7– a, 8 – b, 9– b, 10 – d

11 – b, 12– c, 13 – b, 14 – c, 15 – b, 16 – a, 17 – c, 18 – a, 19 – d, 20 – c

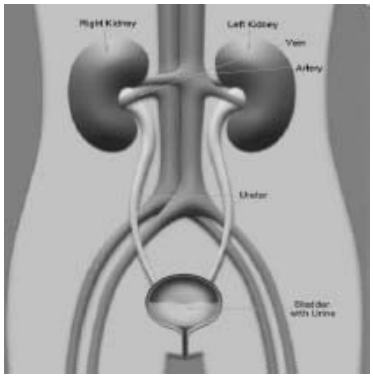
21 – c, 22 – a, 23 – c, 24 – a, 25– a, 26 – a, 27 – b, 28 – a, 29 – d, 30 – c

31 – b, 32 – a, 33 – c, 34 – b, 35 – d, 36 – a, 37 – d, 38 – c, 39 - b, 40 - c

Human Anatomy

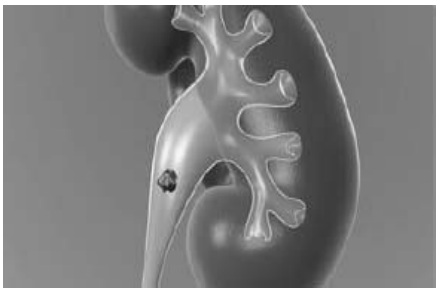
KIDNEY STONES – NEED TO KNOW

Arun Bharathi, Odisha.



Kidney stones are known as *Vrukka Ashmari* (*vrukka* means kidney and *ashmari* means stone) in Ayurveda. According to Ayurveda, improper diet and lifestyle lead to aggravation of all the three *doshas* and impair the digestive fire. This causes the formation of toxins called *ama* in the body. These toxins travel down the urinary tract, where aggravated *doshas* cause crystallization and the formation of kidney stones.

People with kidney stones may experience:



Pain while urinating

Blood in the urine

Sharp pain in the back or lower abdomen

Nausea and vomiting

If you have suffered from kidney stones, it is helpful to know what kind of stone you had because it helps the health care provider suggest specific diet changes to prevent them in future.wing type:

Calcium Stones

Calcium stones are the most common type of kidney stone and occur in two major forms – calcium oxalate and calcium phosphate. Calcium oxalate stones are more common. Calcium oxalate stone formation may be caused by high calcium and high oxalate excretion. Calcium phosphate stones are caused by the combination of high urine calcium and alkaline urine, meaning the urine has a high pH.

Uric Acid Stones

Uric acid stones form when the urine is persistently acidic. If uric acid becomes concentrated in the urine, it can settle and form a stone by itself or along with calcium.

Struvite Stones

Struvite stones result from kidney infections. Eliminating infected stones from the urinary tract and staying infection-free can prevent the formation of more struvite stones.

Cystine Stones

Cystine stones result from a genetic disorder that causes cystine to leak through the kidneys and into the urine, forming crystals that tend to accumulate into stones.es

Healthy kidneys are essential for proper detoxification. However, certain foods can cause kidney stones and keep these organs from functioning optimally.

A Diet Rich in Purines

Substances found in animal protein such as meats, fish and shellfish may increase uric acid in urine. This can lead to the formation of uric acid stones. Those who consume a high-protein diet may exert stress on their kidneys because protein waste is difficult to eliminate from the body efficiently.

Excessive Dairy Products

The problem with dairy products is that it is similar to that of other animal proteins. Consuming dairy products increases the excretion of calcium in the urine, which has been associated with a higher risk of developing kidney stones.

Excessive Caffeine

Too much caffeine in the form of coffee, tea and soda can exert stress on the kidneys and lead to the development of kidney stones due to higher calcium levels in the urine.

Sodium

A high-sodium diet increases the amount of calcium in your urine. Current guidelines suggest limiting total daily sodium intake to 2,300 mg.

Artificial Sweeteners

Non-caloric sweeteners can impair kidney function if consumed long-term. So, it's best to opt for natural sweeteners like honey, stevia or agave instead.

If your kidney stone is caused by an excess of calcium, you may be advised to reduce the amount of oxalates in your diet. Oxalates prevent calcium being absorbed by your body and can accumulate in your kidney to form a stone.

Foods that contain oxalates include beetroot, asparagus, rhubarb, chocolate, berries, leeks, parsley, celery, almonds, peanuts and cashew nuts, soy products and grains such as oatmeal, wheat germ and whole wheat. However, don't reduce the amount of calcium in your diet unless your general physician recommends it.

This is because optimal amount of calcium is very important for maintaining healthy bones and teeth.

Rhubarb

Diet is one of several factors that can promote or inhibit kidney stone formation. However, for a healthy individual, particular foods and drinks are unlikely to trigger kidney stones unless consumed in extremely high amounts.

celery

If you think that your diet may be a problem, schedule an appointment with a dietitian and review your food choices. Preventing kidney stones isn't complicated, but it does take some determination.

What is an IPO?

Types of Business Ownership

Have you ever wondered how companies like Zomato, 3D Films, Neptune Chemicals or even Apple , Facebook became so huge and powerful? One big step in their success story is something called an IPO. It might sound like a grown-up finance term—but it's actually super easy to understand. Let's dive in.

Before that, we must learn the basics of business ownership and how businesses raise money for their expansion.

Understanding how businesses are owned and run helps you make smarter choices—whether you dream of starting a company, investing in stocks, or just being financially aware.

Here are four common types of business ownership in India:

(1) Proprietorship (Sole Proprietorship)

One Owner One Business , (or) One owner Multiple Business . Owner keeps all the Profits or loss. Owner takes decision, whether it is right or wrong, he is liable for all the outcomes

(2) Partnership Firm

Two or more people run a business together. Decision can be take collectively , Profit or Loss shared by all the partners.

(3) Private Limited Company (Pvt. Ltd.)

A separate legal company with limited owners (called shareholders).Owners can be added upto 200. Profit are shared by everbody as mutually agreed by them. Risk: Limited – personal assets are not at risk

(4) Public Limited Company (Ltd.)

A large company where shares are sold to the public via the stock exchange.

What Does IPO Mean?

IPO stands for Initial Public Offering.

It's when a company sells its shares to the public for the very first time. That means regular people—not just business owners or early investors—can buy a small part of the company.

Imagine a startup called TeenTech, which creates an amazing new app. They want to grow fast but need more money to do so. Instead of borrowing from the bank, they decide to go public and raise money by selling shares. This process is called an IPO.

Why Do Companies Launch an IPO?

* To Raise Funds – For expansion, marketing, hiring, or building new products.
* To Get Fame – Being listed on the stock market increases visibility.
* To Reward Early Supporters – Early investors can sell their shares and earn profit.

Recently, companies have issued IPOs:

* N R Vandana Tex Industries Ltd
* Blue Water Logistics Ltd
* Neptune Petrochemicals Ltd
* Astonea Labs Ltd
* Schloss Bangalore Ltd
* Nikita Papers Ltd
* Unified Data- Tech Solutions Ltd

Importance of Water for Human Body

Water: The Elixir of Life and Key to Health

Water is not just a substance we consume—it is the foundation of life and an essential component of the human body. From regulating internal systems to maintaining pH balance, water plays a critical role in sustaining health.

The Importance of Water for Human Life

The human body is composed of up to 70% water, and its presence is vital in nearly every physiological function. Blood, for instance, is made up of about 94% water, which helps transport oxygen, nutrients, and waste products throughout the body. Without sufficient water, our organs cannot function properly, leading to fatigue, impaired immunity, and a host of other health issues.

Water helps:

(1) Regulate body temperature

(2) Lubricate joints

(3)Support digestion and nutrient absorption

(4) Remove toxins through sweat, urine, and breath

(5) Maintain healthy skin and organ function

Water is truly life's most essential nutrient—without it, survival beyond a few days is impossible.

Water, Electrolytes, and pH Balance

One of water's most critical roles lies in maintaining acid-base balance—or pH—within the body. The pH scale ranges from 0 (acidic) to 14 (alkaline), with 7 considered neutral. The body typically maintains a slightly alkaline pH of about 7.35 to 7.45, which is essential for enzyme

activity, cellular function, and overall health

Electrolytes like sodium, potassium, and chloride dissolved in water help regulate this balance. These ions act as carriers, transporting essential substances into and out of cells.

Imagine this scenario: you're ill, and a doctor administers an IV saline solution. This fluid, rich in electrolytes, helps restore the body's natural balance. Even minor imbalances in pH or electrolytes can lead to serious consequences—low energy, low blood pressure, or increased vulnerability to illness.

Different organs have specific pH levels. For example:

Blood, heart, and brain maintain a pH of around 7.4

Skin has a more acidic pH, ranging from 4 to 6, which protects against pathogens

Deviations from these levels, especially toward acidity, can hinder bodily functions, affect circulation, and promote disease.

Modern Threats to pH Balance

Unfortunately, modern living challenges our natural balance. External factors such as:

(1) Air pollutants (like sulfur and nitrogen oxides)

(2) Pesticide-laden food

(3) Highly processed diets can all increase bodily acidity.

Over time, this can lead to inflammation, poor digestion, fatigue, and skin problems, making pH management more crucial than ever.

Alkalized Water:

A Supportive SolutionOne promising intervention is alkalized water, typically with a pH of 9.5. This water helps neutralize

internal acidity, promoting better hydration and cellular function. It also exhibits microcluster properties, allowing it to penetrate cells more efficiently, enhance nutrient delivery, and boost oxygen transport.

From a dermatological perspective, the impact of water pH is striking. During my clinical trials at GCS Hospital, we treated patients with fungal skin infections such as ringworm using pH 2.5 water. The results were remarkable—patients showed visible improvements within days, highlighting how water's pH can directly influence skin health and pathogen resistance.

A Call to Recognize Water's Power

Water is not just a thirst quencher—it is a life-sustaining force and a powerful tool for disease prevention and health optimization. From maintaining pH balance to healing skin conditions, its role is profound and far-reaching. As I advance in my dermatology journey, I urge everyone to recognize the transformative power of water—especially structured and pH-optimized water—in promoting long-term well-being.

Let us embrace this natural miracle—one mindful sip at a time—and build a healthier future for ourselves and generations to come.

IV Saline: The First Step Toward Stabilizing and Saving Lives.

What Is Saline Water ?

Saline water is a sterile solution of sodium chloride (common salt) in water, typically 0.9% NaCl, which closely mimics the salt concentration in our blood — this is called normal saline.

Reasons for Giving Saline First:

1. Hydration

Most patients arrive dehydrated, especially if they have fever, vomiting, diarrhea, or haven't eaten/drunk water for hours. Saline quickly restores fluid balance.

2. Stabilizing Blood Pressure

In cases of low blood pressure (hypotension) or shock, saline

helps increase blood volume, which in turn helps restore normal blood pressure and circulation.

3. Maintaining Electrolyte Balance

Saline provides essential electrolytes like sodium and chloride, which help in:

* Nerve signal transmission
* Muscle function
* pH balance Cell function

4. Vehicle for Medications

Saline acts as a carrier for intravenous drugs, antibiotics, or pain relievers. It ensures that medicines are delivered safely and effectively into the bloodstream.

5. Restoring pH Balance

Illness can disturb the body's acid–base balance. Saline supports buffering systems that bring the pH back to normal.

Doctors give saline water first because it is a safe, fast, and effective way to stabilize the body, support vital functions, and prepare the patient for further treatment.

Do you know ?

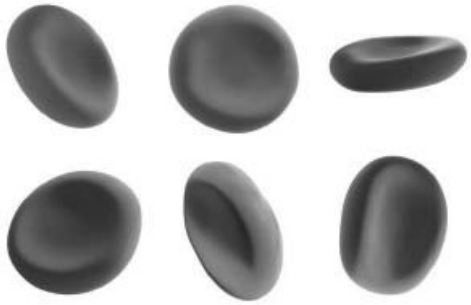
* The Dead Sea has a much higher salinity (30–35%) than the oceans, making it so salty that people can float effortlessly.

** Average salinity of seawater: 35 parts per thousand (ppt) or 3.5%.

*** This means 1 liter of seawater contains about 35 grams of dissolved salts.

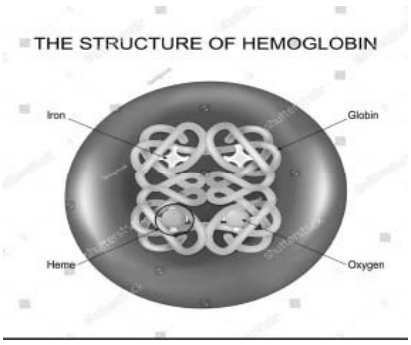
Hemoglobin

Hemoglobin, which is present in red blood cells (erythrocytes), plays a crucial role in transporting oxygen from the lungs to various tissues and organs in the body. Hemoglobin contains iron, allowing it to bind with oxygen and facilitate its delivery throughout the circulatory system. Additionally, red blood cells lack a cell nucleus to maximize space for hemoglobin, and their disc-shaped and concave structure enhances their efficiency.



After delivering oxygen to the cells, hemoglobin acts as a magnet for carbon dioxide, a waste product of cellular metabolism. The red blood cells transport carbon dioxide back to the lungs, where it is expelled from the body during exhalation.

The production of red blood cells occurs continuously in the bone marrow, which is found in various bones throughout the body. The lifespan of a red blood cell is approximately 120 days before it is replaced. The abundance of erythrocytes, or red blood cells, in the blood is a vital aspect of maintaining overall health.

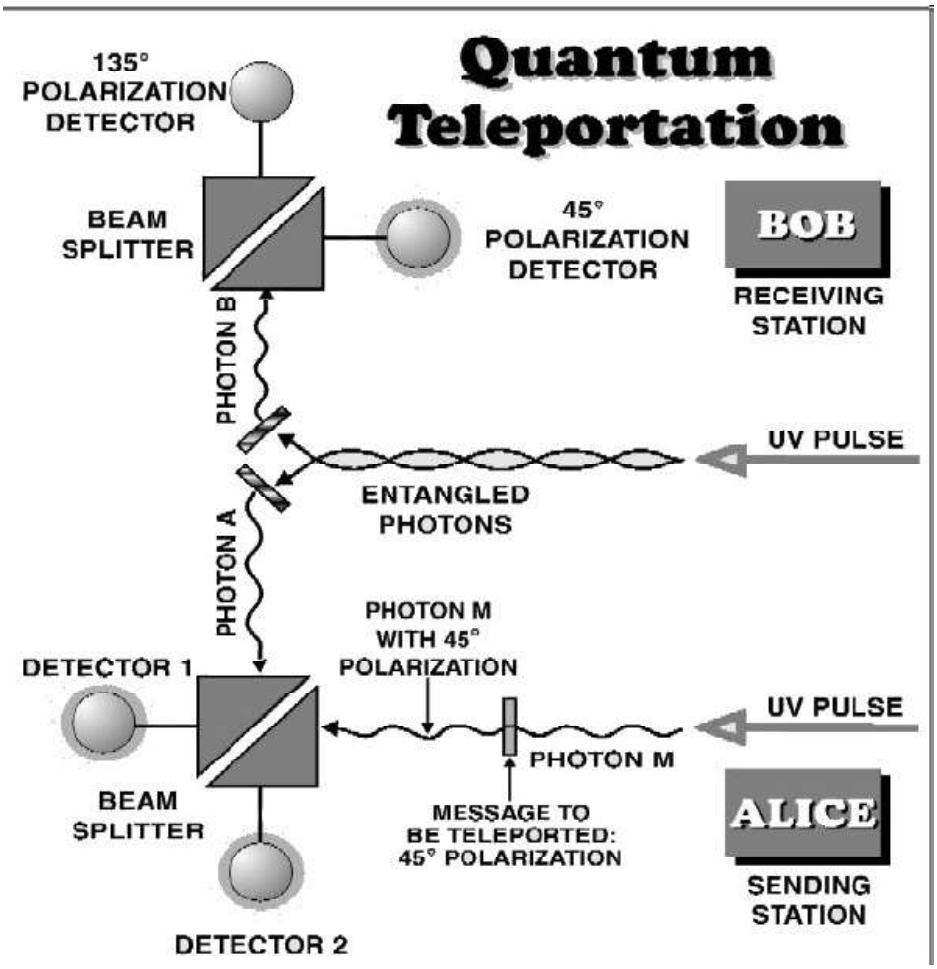


Furthermore, the statement regarding the use of a complete blood cell (CBC) test to check the number of red blood cells in the blood is accurate.

This test is commonly employed to detect conditions such as anemia, dehydration, malnutrition, and leukemia. Erythrocytes indeed constitute more than nine-tenths of the blood, emphasizing their significance in oxygen transport.

The terms erythrocyte and RBC are both used interchangeably to refer to red blood cells.

What is Quantum Teleportation



Quantum teleportation is the process of transferring the quantum state of a particle (like a photon or electron) from one location to another, without physically moving the particle itself. This is done using a phenomenon called quantum entanglement.

In simple terms, if two particles are entangled, changing one instantly affects the other, even if they're far apart. Scientists use this property to teleport information about a quantum state from one particle to another.

Has It Been Done

Yes. Scientists have successfully teleported quantum states:

* Over fiber-optic cables,

* Across cities,

* And even between Earth and satellites in space.

But remember — this is the teleportation of information, not matter or humans.

Human Teleportation Possible?

Currently, no. To teleport a human being, you'd need to know and transmit the exact quantum state of trillions of atoms — which is far beyond our current technology. Also, there are deep philosophical and ethical questions about identity and consciousness.

Quantum teleportation is real — but it transfers quantum information, not objects.

It has important applications in quantum computing and quantum communication.

Human teleportation remains science fiction — for now.

Labs working on Quantum Research

(1) MIT – Massachusetts Institute of Technology (USA)

Conducts research on quantum repeaters, quantum state transfer, and quantum cryptography.

Collaborates with Harvard and other institutions on quantum network nodes.

(2) IBM Quantum Research

Though focused on quantum computing, IBM explores quantum teleportation protocols within its quantum processors.

Public access to quantum computers through the IBM Quantum Experience platform.

(**3) University of Geneva (Switzerland)**

Known for long-distance quantum teleportation over optical fiber (over 100 km).

Active in quantum key distribution (QKD) and quantum network security.

(4) Caltech (USA)

Researchers here are exploring quantum networks and entanglement distribution for teleportation over distances.

Collaborates with NASA and Fermilab.

(**5) Fermilab + Argonne National Laboratory (USA)**

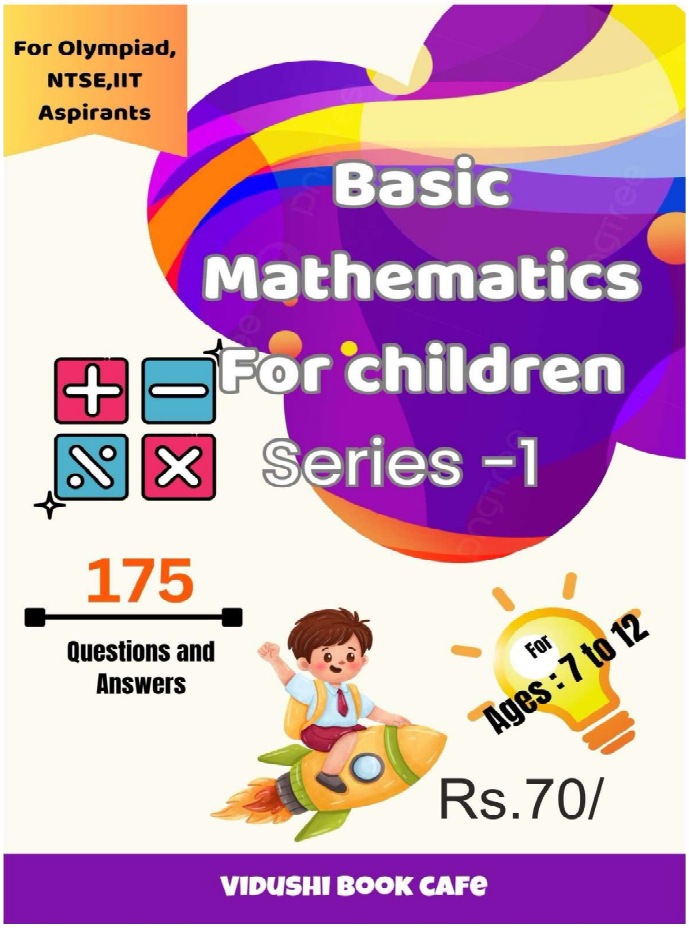
In December 2020, demonstrated quantum teleportation across 44 km of fiber, with high fidelity.

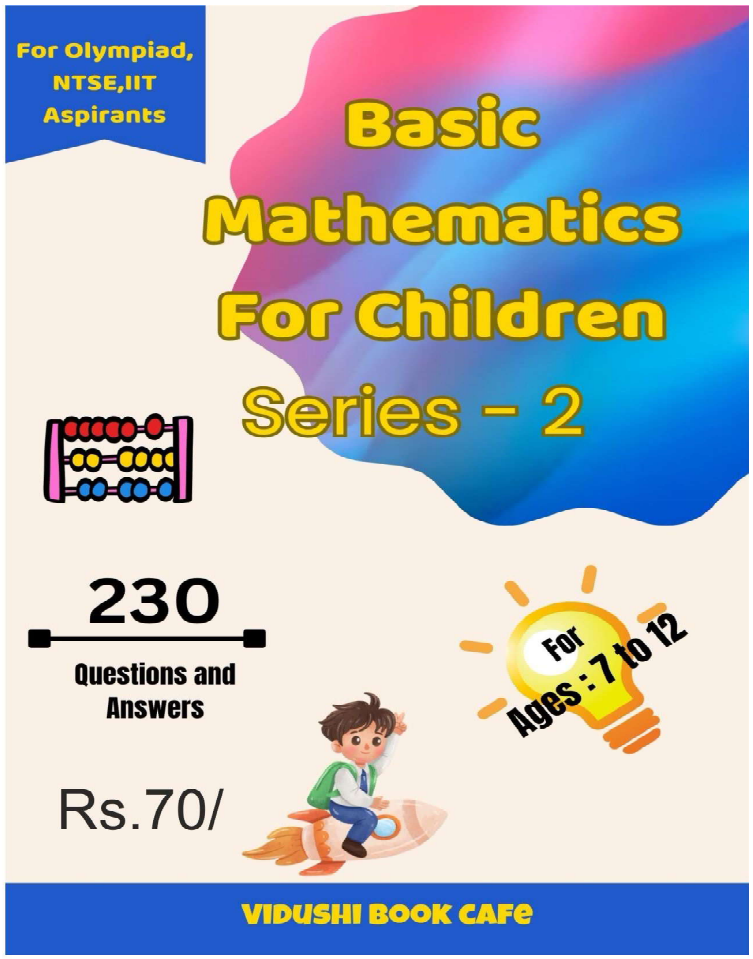
Part of the Chicago Quantum Exchange, pushing for a U.S. quantum internet.

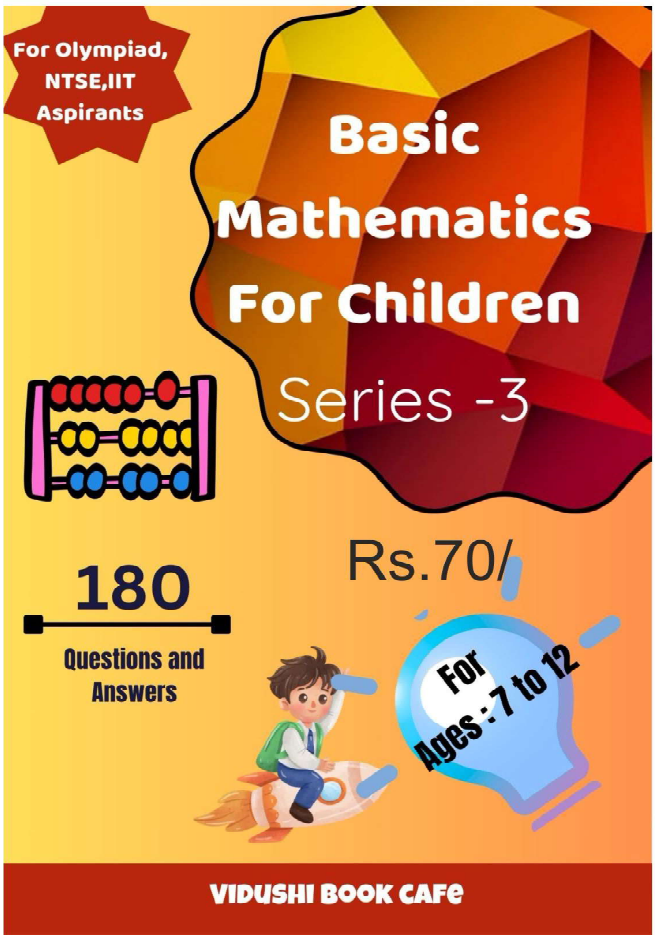
(**6) NTT Research (Japan/USA)**

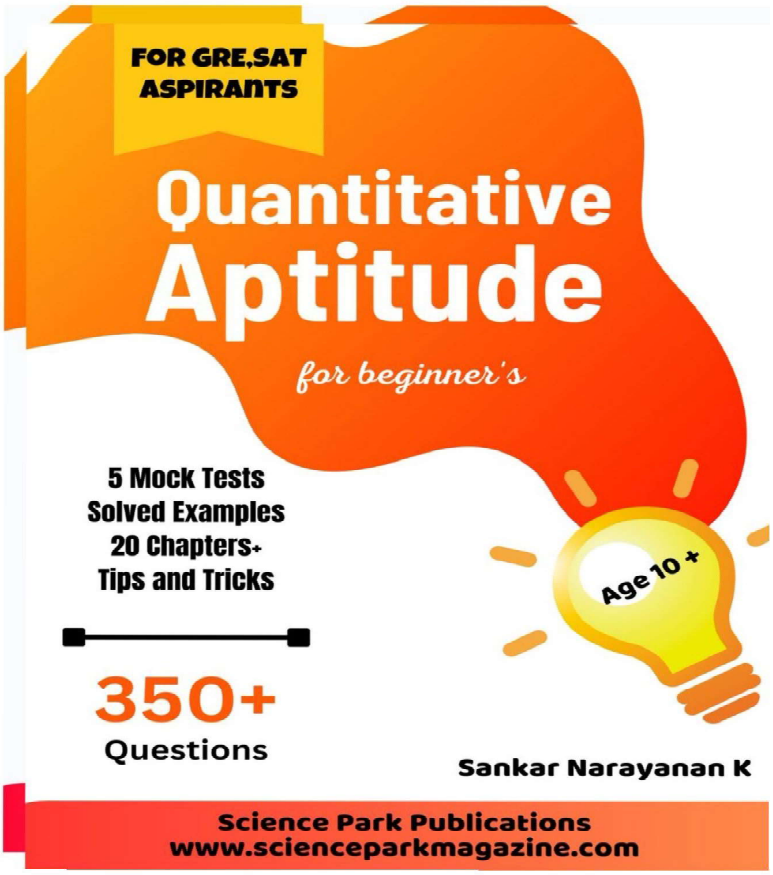
Works on quantum teleportation via photon entanglement.

Developing photonic quantum networks and quantum cryptographic systems.


For Olympiad, NTSE,IIT Aspirants
Basic Mathematics For children
Series -1
175
Questions and Answers
For Ages : 7 to 12
Rs.70/
VIDUSHI BOOK CAFE


For Olympiad, NTSE,IIT Aspirants
Basic Mathematics For Children
Series - 2
230
Questions and Answers
For Ages : 7 to 12
Rs.70/
VIDUSHI BOOK CAFE


For Olympiad, NTSE,IIT Aspirants
Basic Mathematics For Children
Series -3
Rs.70/
180
Questions and Answers
For Ages : 7 to 12
VIDUSHI BOOK CAFE


FOR GRE,SAT ASPIRANTS
Quantitative Aptitude
for beginner's
5 Mock Tests
Solved Examples
20 Chapters+
Tips and Tricks
350+
Questions
Age 10 +
Sankar Narayanan K
Science Park Publications
www.scienceparkmagazine.com