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Our Founder and his Vision

Knowledge is the prime wealth among all wealths. In other words, knowledge is the best and important wealth among all wealths. Start your journey to find or explore the knowledge. Our founder and renowned scholar late Padmashri Dr Vellayani Arjunan's vision is to spread quality education to entire community and make it affordable.

Shri. Vellayani Arjunan was born on 10 February 1933 at Vellayani in the erstwhile Kingdom of Travancore. After receiving a Master of Arts degree in Malayalam, he went on to teach Malayalam Language and Literature at Sree Narayana College in Kollam. He later became the first Malayalam lecturer in Aligarh Muslim University, from which he gained his PhD degree in 1964.After leaving Aligarh Muslim University, he was appointed director of the State Institute of Encyclopaedic Publications in Kerala

He was honoured with the Padma Shri award by the nation in 2008. Dr Arjun, who was the first Professor of Malayalam at the Aligarh University and head of the Department of Modern Indian Languages. He supervised 20 research scholars and published more than 100 research papers and articles. He had authored 40 books in different genres including poetry, short story, essays and literary criticism, and his books were prescribed as textbooks in Kerala schools from 1959 onwards.

Degree	Topic	Awarding Institution
D.Litt.	Influence of Sree Narayana Guru on Malayalam Poetry.	Aligarh Muslim University
D.Litt.	A Comparative Study of the Mutual Relations and Uniformity of Hindi and Malayalam Languages.	Agra University
D.Litt.	The influence of Hindi Vocabularies on the South Indian Languages: A Linguistic study.	Jabalpur University
Ph.D.	A Comparative Linguistic Study of Common Vocables of Hindi and Malayalam Languages.	Aligarh Muslim University

Other degrees

Degree	Subject
B.A. Hons	Malayalam Language and Literature
M.A.	Malayalam Language and Literature
M.A.	Hindi Language and Literature
M.A.	Hindi Special
P.G. Diploma	Tamil, Telugu, Kannada

1st ANNIVERSARY

# From the Editor's Desk.....

Congratulations students & Well done Mentors

Dear Students…this amazing accomplishment is just one step on your journey. Your ability to relentlessly search for solutions to problems and find innovative ways to improve the world is the key to this success and many to come. You worked so hard and pushed your abilities to the limit to make this success happen. Congratulations!"

Your **mentor** is someone who has opened up to you, sharing their knowledge and experience to go further in your career or personal life. When someone mentors you, they are doing you a favour which means it's essential that you show your gratitude and appreciation for all of the support and guidance they give to you throughout your relationship.

Mentors are selfless individuals and deserve nothing less than true recognition. A great way to do this is by sending them thank you messages or letters. This shows your appreciation for them helping you and sets the tone for a good relationship. When someone is taking time out of their own life to offer support and guidance, it's important to show you're grateful.
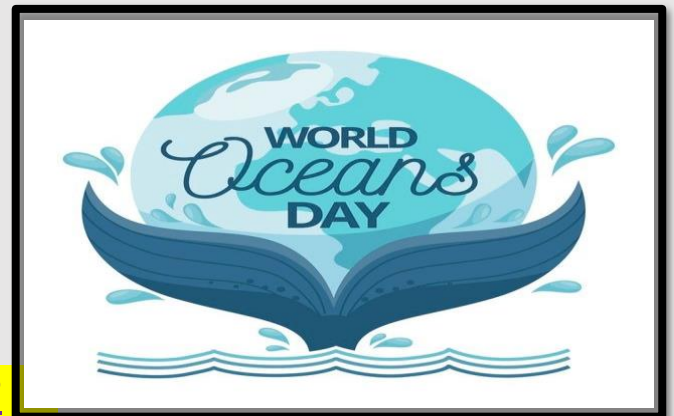
WHAT IS SPECIAL ABOUT THE MONTH OF JUNE ?

JUNE 08 : World Ocean Day, celebrated annually on June 8th, is a global event that aims to raise awareness about the crucial role oceans play in our planet's health and to inspire actions towards their conservation. Established by the United Nations in 2008, World Ocean Day highlights the significance of oceans as the lungs of our planet, providing most of the oxygen we breathe, regulating climate, and supporting a vast array of marine life that sustains human livelihoods. Each year, a specific theme is chosen to focus on particular issues affecting oceans, such as plastic pollution, overfishing, marine biodiversity loss etc. The day sees participation from governments, environmental organizations and individuals worldwide, engaging in activities like beach clean-ups, educational seminars, policy advocacy, and the promotion of sustainable seafood. These efforts aim to protect and restore ocean ecosystems, ensuring their health and productivity for future generations. World Ocean Day also emphasizes the interconnectedness of global ecosystems and the importance of collaborative international efforts in marine conservation. It serves as a reminder that oceans are not just a resource but a vital part of Earth's life support system, urging us to adopt more sustainable practices and policies to mitigate human impacts.

SCIENTISTS AT UCHICAGO CREATE INNOVATIVE "LIVING BIOELECTRONICS"

UChicago scientists have unveiled a groundbreaking invention: "living bioelectronics." This new technology, developed in Professor Bozhi Tian's lab, merges electronics with living cells to create a flexible patch that can monitor and heal skin.

Key Features:
-**Components**: The patch integrates sensors, friendly bacteria, and a gel made from tapioca starch and gelatin.
-**Functionality**: It can sense skin conditions and release anti-inflammatory compounds, showing promise in treating psoriasis-like symptoms in mice.
-**Versatility**: Potential applications include wound healing and possibly creating devices for insulin production or neural interfacing.

Innovations:
-**Bio-integration**: Unlike traditional bioelectronics, which are bulky and rigid, this new device is thin and flexible, minimizing irritation.
-**Living Therapy**: The bacteria in the patch act as a "living drug," continually providing therapeutic benefits without needing refills.
-**Long-term Use**: The device can be stored by freeze-drying and easily reactivated, making it practical for long-term treatments.

Future Prospects:
- Researchers envision expanding this technology to other body parts, potentially aiding in cardiological or neural health.
- The team is working with the Polsky Center for Entrepreneurship and Innovation to bring this invention to market.

Published in *Science* on May 30, 2024, this work represents a significant leap in bioelectronics, with exciting potential for medical applications.

Did You Know ?
A group of flamingos is called a "flamboyance."
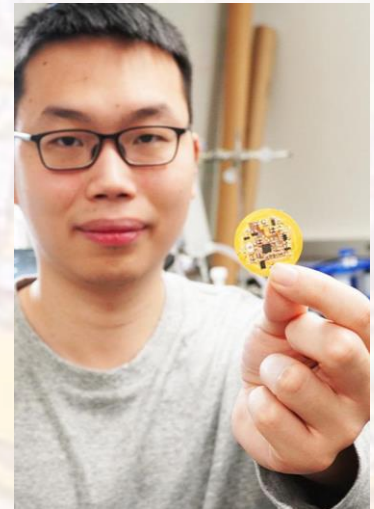
UNVEILING THE THINNEST IPAD PRO: A DEEP DIVE

Apple pushed the boundaries of mobile technology in May 2024 with the release of the new iPad Pro, its thinnest tablet ever. Here's a closer look at what makes this iPad Pro a game-changer:

Thinness with Purpose: Don't be fooled by the svelte profile (5.3mm for 11-inch and a mind-blowing 5.1mm for 13-inch). Apple promises this new iPad Pro retains the build quality users expect. This is likely due to advancements in materials and engineering, making it both light and strong. Whether you're carrying it in a briefcase or backpack, the reduced weight enhances portability.

M4 Chip: Powerhouse Performance: The heart of the new iPad Pro is the M4 chip, Apple's latest and most powerful chip to date. This translates to smooth multitasking, blazing-fast app loading, and the ability to handle demanding creative workflows like video editing or 3D design with ease.

Ultra Retina XDR Display: A Feast for the Eyes: Gone are the days of LCD displays on the iPad Pro. This iteration features a revolutionary "Ultra Retina XDR" display powered by Tandem OLED technology. Imagine deep blacks, incredible brightness, and a wider color gamut for lifelike visuals. This display is perfect for photographers, graphic designers, or anyone who appreciates stunning visuals.

Beyond the Basics: While Apple hasn't released official battery life figures yet, the company is known for optimizing performance without sacrificing usability. Early estimates suggest the new iPad Pro will offer excellent battery life for all-day use. Additionally, the iPad Pro supports the latest Wi-Fi 6E standard for super-fast wireless connectivity and even comes with 5G capabilities for those who need on-the-go access to blazing-fast cellular data.

Apple Pencil Pro Compatibility: The new iPad Pro seamlessly integrates with the second-generation Apple Pencil Pro, offering unparalleled responsiveness and pressure sensitivity for artists and note-takers alike. The Apple Pencil Pro magnetically attaches to the iPad Pro for easy charging and storage.

Noteworthy Investment: The new iPad Pro comes with a premium price tag reflecting its cutting-edge technology and design, ranging from $999 to $2,728. For professionals and creative individuals who demand the best mobile experience, the new iPad Pro could be a worthwhile investment.

All-new pro design. Incredibly portable. The thinnest Apple product ever.
13" iPad Pro — 5.1 mm
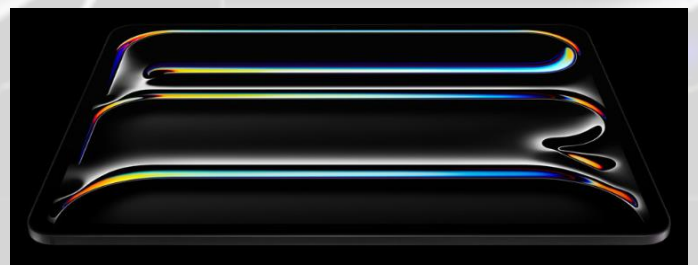
UPCOMING ASTRONOMICAL EVENTS TO WATCH

Perseid Meteor Shower (July 17 - Aug. 24, 2024)

-**Peak Dates**: August 11-12
-**Description**: One of the year's most vibrant meteor showers, with 60 to 100 meteors visible per hour from dark locations.
-**Cause**: Debris from comet 109P/Swift-Tuttle.
-**Viewing Tips**: Best viewed early in the morning until dawn, with the moon about 50% illuminated and setting at midnight.

Partial Lunar Eclipse (Sept. 18, 2024)

-**Date**: Night of September 17-18
-**Visibility**: North and South America, Europe, and Africa.
-**Description**: Part of the moon will pass through Earth's shadow, creating a partial lunar eclipse.
-**Viewing Tips**: No protective eyewear needed, unlike solar eclipses.

Annular Solar Eclipse (Oct. 2, 2024)

-**Date**: October 2
-**Visibility**: Southern Chile, southern Argentina (annular); Pacific Ocean, South America (partial).
-**Description**: Known as the "ring of fire" eclipse, the moon will not completely cover the sun, creating a ring of sunlight.
-**Viewing Tips**: Use eclipse glasses for safe viewing. Best seen from Easter Island, with the eclipse lasting about 7.5 minutes.

Comet Tsuchinshan-ATLAS (Oct. 12-19, 2024)

-**Dates**: October 12-19
-**Visibility**: Expected to be visible to the naked eye.
-**Description**: This comet will pass about 44 million miles from Earth and may provide a bright and vibrant display.
-**Viewing Tips**: Monitor updates for the best viewing times as scientists predict its visibility closer to the event.

Orionid Meteor Shower (Sept. 26 - Nov. 22, 2024)

-**Peak Dates**: October 20-21
-**Description**: Produces around 20 meteors per hour, originating from Halley's Comet.
-**Viewing Tips**: Best viewed from dark locations between midnight and dawn. This year's peak visibility might be affected by a 79% illuminated moon.

Get ready to witness these incredible celestial events and make sure to find dark spots away from city lights for the best viewing experience!

Cows have best friends and can become stressed when they are separated from them.

Bananas are berries, but strawberries aren't.
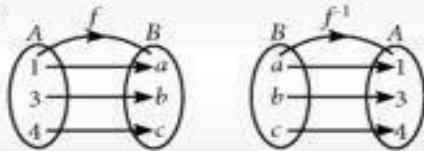
FUNCTIONS

CONCEPT MAP

Class XII

Definition

A relation $f : A \rightarrow B$ a function where every element of set A has only one image in set B.
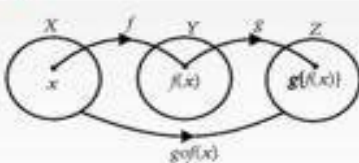
Invertible Functions

Let $f : A \rightarrow B$ be a bijection. Then inverse function is defined as $f^{-1} : B \rightarrow A$ i.e. $f^{-1}(b) = a \Leftrightarrow f(a) = b$.

Arrow diagram :

Composition of Functions

For two functions $f : X \rightarrow Y$ and $g : Y \rightarrow Z$, composition of functions is denoted by gof defined as $gof(x) = g(f(x))\ \forall\ x \in X$.

Properties

- Composition of functions is not commutative, i.e., $fog \neq gof$ (in general).
- Composition of functions is associative i.e., $fo(goh) = (fog)oh$
- Composition of two bijections is also a bijection.

Number of Functions

Let $f : A \rightarrow B$ such that $n(A) = m$, $n(B) = n$.

- The number of functions is n^m.
- The number of one-one functions are $^nP_m = \dfrac{n!}{(n-m)!}$, if $m \le n$.
- The number of onto functions are

$$n^m - \binom{n}{1}(n-1)^m + \binom{n}{2}(n-2)^m - \binom{n}{3}(n-3)^m + ..., \text{ if } m \ge n.$$

- The number of bijections is $n!$, if $m = n$.

Types of Functions

Type	Definition	Representation
One-one (Injective) Function	A function $f : X \rightarrow Y$ is one-one, if different elements of X have different images in Y under f. (i) $n(X) \le n(Y)$ (ii) $f(x_1) = f(x_2) \Rightarrow x_1 = x_2$	
Onto (Surjective) Function	A function $f : X \rightarrow Y$ is onto, if every element of Y is the image of atleast one element of X under f. (i) $n(X) \ge n(Y)$ (ii) Range = Co-domain	
Many-one Function	A function $f : X \rightarrow Y$ is many-one, if two or more than two elements of X have the same image in Y.	
Into Function	A function $f : X \rightarrow Y$ is into, if there exists a single element in Y having no pre-image in X.	
Bijective Function	A function $f : X \rightarrow Y$ is bijective, if it is both one-one and onto i.e., $n(X) = n(Y)$ and Range = Co-domain	

Analysis of Functions by Graphical Method

- If any line parallel to x axis intersects graph of $y = f(x)$ not more than once, then it is one-one.
- If $f'(x)$ is always strictly increasing or decreasing then it is one-one.
- If atleast one line parallel to the x axis intersects more than once or $f'(x) = 0$ over a continuous interval or changes its sign, then it is onto.

CAPACITOR AND CAPACITANCE

BRAIN MAP

CLASS XII

$K = \dfrac{\varepsilon \,(\text{Permitivity of medium})}{\varepsilon_0 \,(\text{Permitivity of free space})}$

Polar dielectric
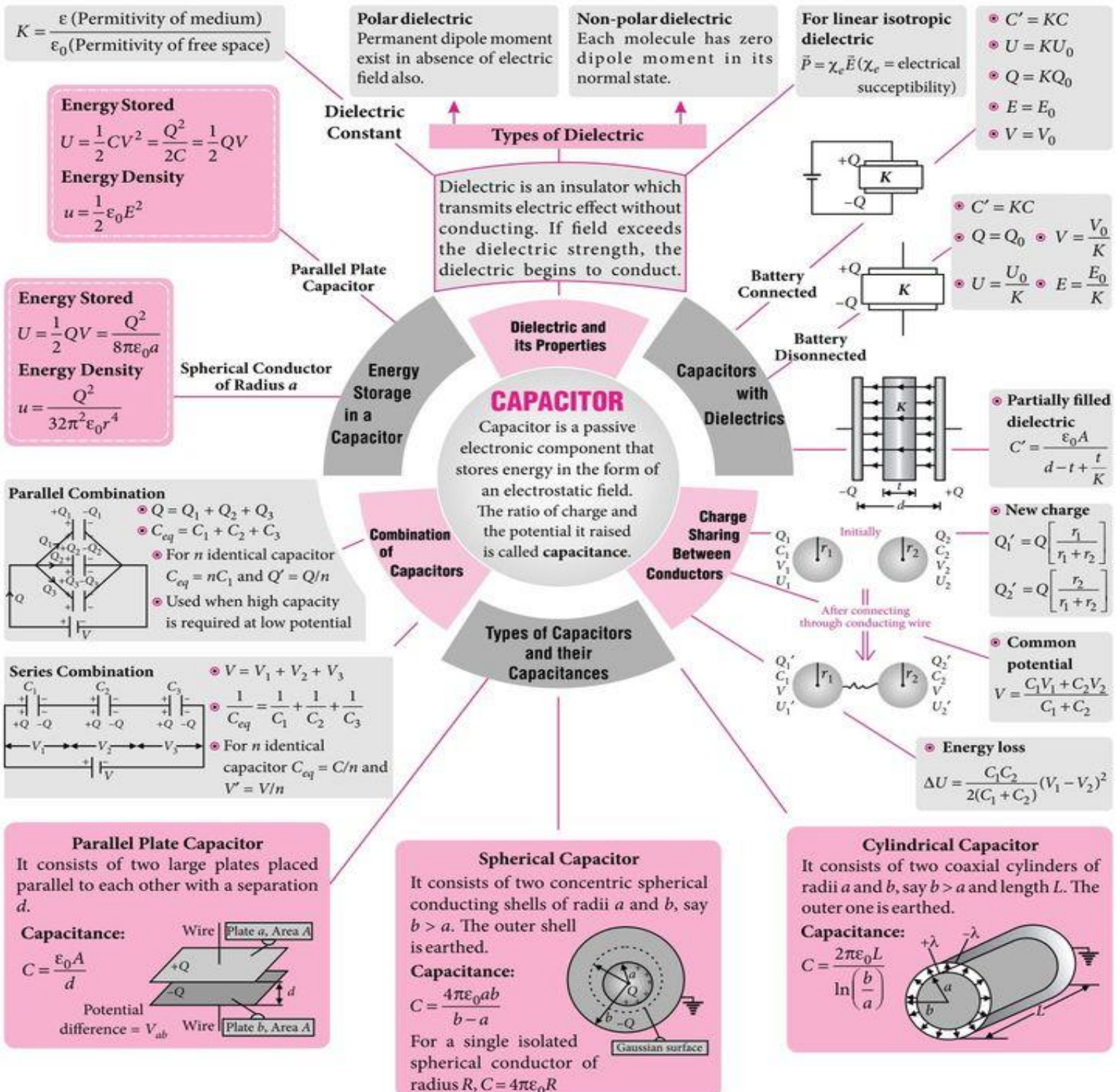Permanent dipole moment exist in absence of electric field also.

Non-polar dielectric
Each molecule has zero dipole moment in its normal state.

For linear isotropic dielectric
$\vec{P} = \chi_e \vec{E}$ (χ_e = electrical succeptibility)

- $C' = KC$
- $U = KU_0$
- $Q = KQ_0$
- $E = E_0$
- $V = V_0$

Dielectric Constant

Types of Dielectric

Energy Stored

$U = \dfrac{1}{2}CV^2 = \dfrac{Q^2}{2C} = \dfrac{1}{2}QV$

Energy Density

$u = \dfrac{1}{2}\varepsilon_0 E^2$

Dielectric is an insulator which transmits electric effect without conducting. If field exceeds the dielectric strength, the dielectric begins to conduct.

Battery Connected

- $C' = KC$
- $Q = Q_0$
- $V = \dfrac{V_0}{K}$
- $U = \dfrac{U_0}{K}$
- $E = \dfrac{E_0}{K}$

Parallel Plate Capacitor

Energy Stored

$U = \dfrac{1}{2}QV = \dfrac{Q^2}{8\pi\varepsilon_0 a}$

Energy Density

$u = \dfrac{Q^2}{32\pi^2\varepsilon_0 r^4}$

Spherical Conductor of Radius a

Battery Disconnected

Energy Storage in a Capacitor

Dielectric and its Properties

Capacitors with Dielectrics

- **Partially filled dielectric**
  $C' = \dfrac{\varepsilon_0 A}{d - t + \dfrac{t}{K}}$

CAPACITOR
Capacitor is a passive electronic component that stores energy in the form of an electrostatic field. The ratio of charge and the potential it raised is called **capacitance**.

Parallel Combination
- $Q = Q_1 + Q_2 + Q_3$
- $C_{eq} = C_1 + C_2 + C_3$
- For n identical capacitor $C_{eq} = nC_1$ and $Q' = Q/n$
- Used when high capacity is required at low potential

Combination of Capacitors

Charge Sharing Between Conductors

- **New charge**
  $Q_1' = Q\left[\dfrac{r_1}{r_1 + r_2}\right]$
  $Q_2' = Q\left[\dfrac{r_2}{r_1 + r_2}\right]$

Series Combination
- $V = V_1 + V_2 + V_3$
- $\dfrac{1}{C_{eq}} = \dfrac{1}{C_1} + \dfrac{1}{C_2} + \dfrac{1}{C_3}$
- For n identical capacitor $C_{eq} = C/n$ and $V' = V/n$

Types of Capacitors and their Capacitances

After connecting through conducting wire

- **Common potential**
  $V = \dfrac{C_1 V_1 + C_2 V_2}{C_1 + C_2}$

- **Energy loss**
  $\Delta U = \dfrac{C_1 C_2}{2(C_1 + C_2)}(V_1 - V_2)^2$

Parallel Plate Capacitor
It consists of two large plates placed parallel to each other with a separation d.

Capacitance:
$C = \dfrac{\varepsilon_0 A}{d}$

Wire | Plate a, Area A

Potential difference = V_{ab} Wire | Plate b, Area A

Spherical Capacitor
It consists of two concentric spherical conducting shells of radii a and b, say $b > a$. The outer shell is earthed.

Capacitance:
$C = \dfrac{4\pi\varepsilon_0 ab}{b - a}$

For a single isolated spherical conductor of radius R, $C = 4\pi\varepsilon_0 R$

Gaussian surface

Cylindrical Capacitor
It consists of two coaxial cylinders of radii a and b, say $b > a$ and length L. The outer one is earthed.

Capacitance:
$C = \dfrac{2\pi\varepsilon_0 L}{\ln\left(\dfrac{b}{a}\right)}$
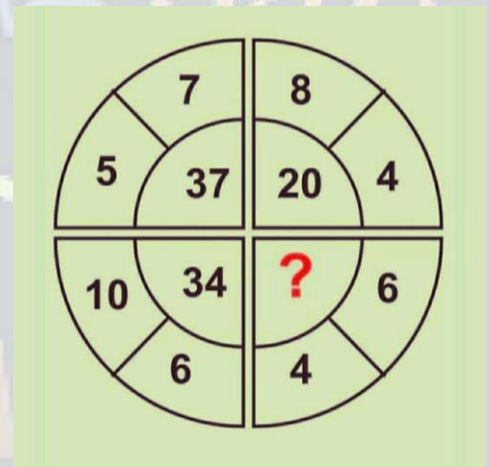
TWIST YOUR MIND

(Answers will be given in the July 2024 digest)

RIDDLLES

1. What has to be given before it can be kept?
2. What can travel around the world while staying in a corner?
3. I'm tall when I'm young, and I'm short when I'm old. What am I?
4. What has a heart that doesn't beat?

PUZZLE

Find the missing number .

Bright Spots: Positive Events from May 2024

- India's economy projected for continued growth (6.4% GDP).
- Renewable energy advancements in efficiency and affordability.
- Progress on climate change with COP28 talks focusing on renewables and reducing fossil fuels.
- IPL 2024 concludes with KKR winning, exceptional player performances, and awards for Kohli (most runs), Patel (most wickets), and Narine (MVP).
- OpenAI makes ChatGPT-4o's advanced tools available to users in free tier
- Clinical trials for gene therapies targeting specific diseases showed promising results, offering hope for future treatments.

word of the month

Petrichor : a pleasant smell that frequently accompanies the first rain after a long period of warm, dry weather

MAY ANSWERS
RIDDLES : 1. BREATH 2. A MAP 3. AN EGG
PUZZLE : 25

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The Mentors website launched , please log onto **www.thementors.co.in**

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JUNE 2023

The mentors Digest

Use Energy wisely for a Sustainable world........

The mentors monthly magazine

JULY 2023

The mentors Digest

The mentors monthly magazine

X GRADE

NANDINI SREE VIDYA SARVALA

SCIENCE -98/100
SOCIAL - 96/100
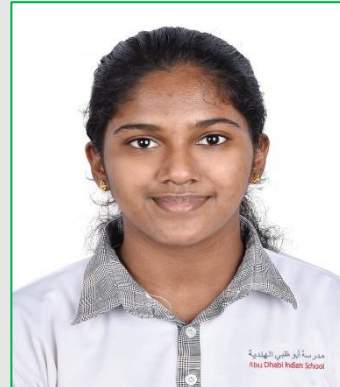

ADNAN

SOCIAL - 95/100

AKAITAB GIRI

SOCIAL - 95/100

JEET KOCHAR

SOCIAL - 94/100

CONGRATULATIONS TOPPERS

BHAVYA KRISHNA

SOCIAL - 95/100

ANWITHA

SOCIAL - 94/100

ASHERA

SCIENCE- 95/100

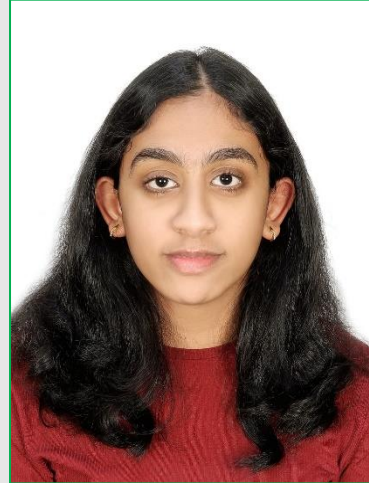

RISHIKA RAJEEVAN MAROLI

ENGLISH - 98/100

X GRADE

MARIA BOBBY

SOCIAL 94/100
SCIENCE - 94/100

AYAZ MOHAMMED

SOCIAL 94/100

GOWRI DINESH
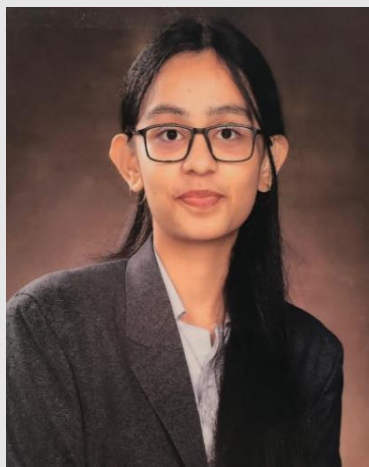
SOCIAL - 94/100

ADWIT TRIPATHI

SCIENCE 98/100

CONGRATULATIONS TOPPERS

EVA AIRRA LIJAN

SCIENCE 97/100

SIDDHI PATIL

SCIENCE - 97/100

AKASH

SCIENCE - 96/100

KAPILAN SELVARASU

SCIENCE - 94/100

X GRADE

EVELYN MIRIA JOHN	SHWETHA S	CHARVI	ALWAIN ALEX
ENGLISH -95/100	ENGLISH -94/100	SOCIAL-94/100	SCIENCE -96/100

CONGRATULATIONS TOPPERS

XII GRADE

PARTH VERMA

MATHS - 94/100

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SOCIAL - 96/100

ADNAN
SOCIAL - 95/100

AKAITAB GIRI
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JEET KOCHAR
SOCIAL - 94/100

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SOCIAL - 95/100

ANWITHA
SOCIAL - 94/100

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RISHIKA RAJEEVAN MAROLI
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SCIENCE - 94/100

AYAZ MOHAMMED
SOCIAL 94/100

GOWRI DINESH
SOCIAL - 94/100

ADWIT TRIPATHI
SCIENCE 98/100

CONGRATULATIONS TOPPERS

EVA AIRRA LIJAN
SCIENCE 97/100

SIDDHI PATIL
SCIENCE - 97/100

AKASH
SCIENCE - 96/100

KAPILAN SELVARASU
SCIENCE - 94/100

Congratulations!

Congratulations!

Thank You for being an amazing Mentor.

EVELYN MIRIA JOHN
ENGLISH -95/100

SHWETHA S
ENGLISH -94/100

CHARVI
SOCIAL-94/100

ALWAIN ALEX
SCIENCE -96/100

CONGRATULATIONS TOPPERS

XII GRADE

PARTH VERMA
MATHS - 94/100

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Affordable Quality education …….

By understanding the need of aspiring students, India's renowned Industrial & Academic experts Mr. Manoj PL (Refining Specialist, Academician and founder Director Epinox Prompt Consulting Engineering Ltd), Ms. Chitra Jayasankar (Educational advisor, Tagore Educational trust) are there to bridge the gap of ensuring quality education for the students. We have formulated an online platform for providing significantly exceeding educational experience through online tuitions (classes 6-12), IAS bridge programs and finishing school for fresh engineers and other professionals. We will ensure excellent learning experience to students and 100% satisfaction level to parents.

Interested parents who are willing to associate with this concept are requested to contact

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GRADE - 12	Mathematics & Physics

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