

The mentors **Digest**



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The mentors monthly magazine

time to change the way



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





From the Editors Desk



“It is based on the 2019 eponymous non-fiction book by Anurag Pathak about Manoj Kumar Sharma, who overcame extreme poverty to become an Indian Police Service officer. Story is based on a real incident which depicts the power of self motivation in student’s life

Dear Students & future leaders,
#RESTART self motivation
Self-motivation induces energy and self-confidence to remain committed to your vision, your goals, and your ambitions in life. Setbacks, challenges, and failures will not affect a self-motivated person. **12th Fail** is a 2023 Indian Hindi-language biographical drama film directed, produced and written by Vidhu Vinod Chopra.



WHAT IS SPECIAL ABOUT THE MONTH OF MARCH ?

MARCH 22: World Water Day, observed annually on March 22nd, holds immense importance as it serves to raise global awareness about the critical issues surrounding freshwater. This day serves as a platform to recognize the interconnected nature of water-related challenges with broader global issues. It highlights how water scarcity and pollution impact ecosystems, biodiversity, and overall planetary health. Additionally, the day draws attention to innovative solutions and technologies that can contribute to sustainable water management. It encourages the implementation of water-efficient practices in agriculture, industry, and daily life to alleviate pressure on water resources. The event sparks discussions on the role of corporate responsibility in water stewardship and the importance of considering the social and cultural aspects of water management. World Water Day, therefore, goes beyond awareness-raising to inspire practical actions and policies that safeguard this precious resource for current and future generations, fostering a collective commitment to responsible water usage and conservation. As climate change intensifies, the focus on water resilience becomes even more critical, with discussions on adapting to changing precipitation patterns and mitigating the risks of extreme weather events. By integrating water considerations into broader sustainable development conversations, this day contributes to building resilient communities and fostering a holistic approach to environmental stewardship.



NEURALINK'S GROUNDBREAKING BRAIN IMPLANT: A LEAP FORWARD, BUT TRANSPARENCY LAGS BEHIND

Elon Musk's Neuralink has made headlines yet again as the company's first human trial subject demonstrates remarkable control over a computer mouse using only their thoughts. This significant achievement marks a step forward in the field of brain-computer interfaces (BCIs), but concerns about transparency surround the venture.

Musk's announcement in a recent audio conversation hinted at the success of the implant, dubbed "Telepathy" by the company. However, the lack of detailed information about the study has left some researchers frustrated. Despite Neuralink's previous updates on receiving FDA approval and initiating recruitment, the specifics of the trial remain largely undisclosed.

The implant, with its innovative features such as wireless connectivity and high electrode density, promises advancements in BCI technology. While Neuralink's approach differs from other companies working on similar devices, questions linger about the long-term implications and potential risks associated with brain manipulation.



Critics argue that Neuralink's limited transparency poses ethical concerns, especially considering reports of adverse effects in animal testing. Bioethicists stress the importance of comprehensive peer review and public disclosure to ensure the safety and well-being of participants.

Moreover, the public's perception of brain implants remains a crucial factor. Misinformation and fears of brain manipulation highlight the need for clear communication regarding the capabilities and limitations of BCIs. While Neuralink's achievements are commendable, addressing these concerns and fostering transparency are essential for building public trust and acceptance of this groundbreaking technology.

As Neuralink continues its research and development, balancing innovation with transparency will be paramount. Open dialogue, peer-reviewed studies, and adherence to ethical standards are vital for navigating the complex landscape of brain implants and shaping a future where humanity and technology coexist harmoniously.





BREAKING RECORDS IN FUSION ENERGY: A STEP CLOSER TO LIMITLESS CLEAN POWER

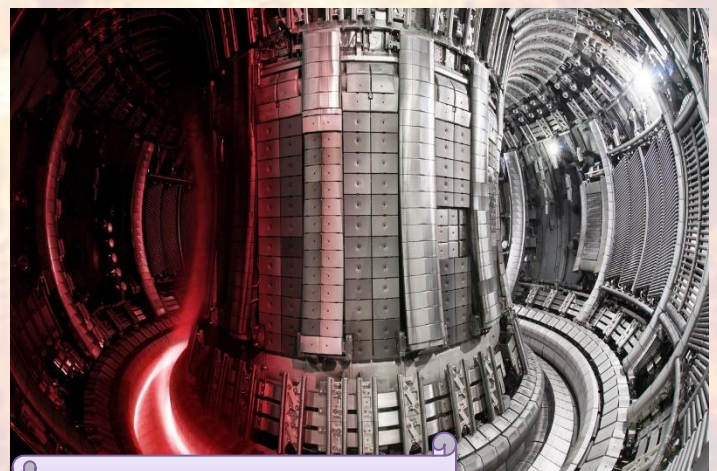
Scientists in Oxford have achieved a groundbreaking feat in nuclear fusion, setting a new record for sustained fusion energy using the Joint European Torus (JET) tokamak. This achievement, heralded as a significant advancement in clean energy technology, holds the promise of a future where fusion could provide vast amounts of energy while emitting zero carbon.

The experiment involved generating an impressive 69 megajoules of fusion energy for five seconds, utilizing a minuscule amount of fuel. By harnessing the same process that powers the sun – fusion of hydrogen variants deuterium and tritium – the team achieved temperatures of 150 million degrees Celsius, enabling the atoms to fuse and release immense heat.

The success of this experiment bodes well for future fusion projects like ITER and DEMO, which aim to further develop fusion energy technology. Despite the immense potential of fusion energy in combating climate change, challenges remain, including the need for substantial investment, engineering advancements, and skilled workforce development.

While fusion energy holds promise for the future, it's clear that immediate action is required to address the urgent climate crisis. With the world surpassing the 1.5-degree Celsius warming threshold, the need

for a rapid transition away from fossil fuels is more pressing than ever. Achieving net-zero emissions by 2050 is crucial to avoiding catastrophic climate impacts, highlighting the importance of continued research and investment in clean energy technologies like nuclear fusion.



Did You Know ?
A Cricket's Chirps Can Tell
You The Temperature.

Earth's rotation is
changing speed.



LENOVO'S TRANSPARENT LAPTOP: A GLIMPSE INTO A SCI-FI FUTURE

Lenovo wows tech enthusiasts once again with its latest innovation showcased at Mobile World Congress in Barcelona: the ThinkBook Transparent Display Laptop. This futuristic concept features a 17.3-inch MicroLED display that can become up to 55% transparent, offering a unique peek-through experience.

While the concept of transparent screens has long captivated sci-fi enthusiasts, Lenovo aims to explore practical applications, particularly in the realm of digital art. The laptop's transparent display could enable artists to sketch while viewing their surroundings, blurring the lines between reality and virtual creation.

Despite its innovative design, challenges remain, including resolution limitations and the transition from a touch-sensitive flat keyboard to a drawing tablet interface. Additionally, Lenovo's integration of AI for object recognition adds a novel but potentially niche feature to the device.

While the ThinkBook Transparent Display Laptop is currently a prototype, Lenovo's executives express confidence in its future development. As the company continues to refine its technologies, they hope to spark a public conversation about the device's potential applications, paving the way for its eventual commercialization.

In the meantime, Lenovo's transparent laptop stands as a testament to cutting-edge design and innovation, offering a glimpse into the possibilities of tomorrow's technology.





MATHEMATICS CHAPTER OF THE MONTH:

PROBABILITY

CONCEPT MAP

Class XII

Multiplication

- $P(A \cap B) = P(A) \cdot P(B | A) = P(B) \cdot P(A | B)$, provided $P(A) \neq 0, P(B) \neq 0$ i.e. $P(AB) = P(A) \cdot P(B | A) = P(B) \cdot P(A | B)$, provided $P(A) \neq 0, P(B) \neq 0$

Total Probability

- $P(A) = P(E_1)P(A | E_1) + P(E_2)P(A | E_2) + \dots + P(E_n)P(A | E_n)$ where, $E_1, E_2, E_3, \dots, E_n$ are mutually exclusive and exhaustive events.

Bayes'

- $P(E_i | A) = \frac{P(E_i)P(A | E_i)}{\sum P(E_i)P(A | E_i)}$, where $i = 1, 2, 3, \dots, n$, where, $E_1, E_2, E_3, \dots, E_n$ are mutually exclusive and exhaustive events.

Theorems

Independent Events

Occurrence or non-occurrence of one does not affect the occurrence of the other i.e.,

$$P(A | B) = P(A) \text{ provided } P(B) \neq 0,$$

$$P(B | A) = P(B) \text{ provided } P(A) \neq 0$$

[For n events, $P(A_1 \cap A_2 \cap \dots \cap A_n) = P(A_1) \cdot P(A_2) \dots P(A_n)$]

Bernoulli's Trials

Trials of a random experiment are called Bernoulli's trials if

- they are finite in number.
- they are independent of each other.
- each trial has exactly two outcomes i.e., success or failure.
- the probability of success or failure remains same in each trial.

PROBABILITY

Random Variables and its Probability Distributions

- A real valued function, whose domain is the sample space of a random experiment. Generally, it is denoted by X .
- Let real numbers x_1, x_2, \dots, x_n are the possible values of a random variable X and p_1, p_2, \dots, p_n are the corresponding probabilities to each value of the random variable X . Then the probability distribution is

$X:$	x_1	x_2	\dots	x_n
$P(X):$	p_1	p_2	\dots	p_n
- $P(x_k)$ i.e., $P(X = x_k)$ lies between 0 and 1 for $k = 1, 2, \dots, n$.
- $\sum_{i=1}^n p_i = 1$

Conditional Probability

- Probability of occurrence of an event A , given that B has already occurred. i.e., $P(A|B) = P(A \cap B) / P(B)$

Properties

- $0 \leq P(A|B) \leq 1$
- $P((A \cup B)|F) = P(A|F) + P(B|F) - P((A \cap B)|F)$, where $P(F) \neq 0 = P(A|F) + P(B|F)$ (if A & B are disjoint)
- $P(A'|B) = 1 - P(A|B)$

Binomial Distribution

$P(X = r) = {}^n C_r p^r q^{n-r}$, where $r = 0, 1, 2, \dots, n$, where p and q are probabilities of success and failure respectively.

Mean

- $\bar{X} = np$

Variance

- $\sigma^2 = npq$

Variance & Standard Deviation

- $\text{Var}(X) = \sigma^2 = \sum_{i=1}^n p_i x_i^2 - \left(\sum_{i=1}^n p_i x_i \right)^2$
- or $\text{Var}(X) = E(X^2) - \{E(X)\}^2$
- Standard deviation (σ) = $\sqrt{\text{Var}(X)}$

Standard Deviation

- $\sigma = \sqrt{npq}$

Mean

- $\bar{X} = E(X) = \mu = p_1 x_1 + p_2 x_2 + \dots + p_n x_n$
- $= \sum_{i=1}^n p_i x_i$



SCIENCE CHAPTER OF THE MONTH:

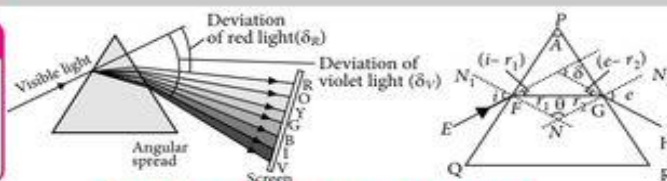
RAY OPTICS AND OPTICAL INSTRUMENTS

BRAIN MAP

CLASS XII

APPLICATIONS OF TIR

- Fiber optics communication
- Medical endoscopy
- Periscope (Using prism)
- Sparkling of diamond



REFRACTION THROUGH PRISM

Relation between μ and δ_m

$$\mu = \frac{\sin \frac{A + \delta_m}{2}}{\sin \frac{A}{2}} \quad \left\{ \begin{array}{l} \text{where,} \\ \delta_m = \text{angle of minimum deviation} \\ A = \text{angle of prism} \end{array} \right.$$

or $\delta = (\mu - 1)A$ (Prism of small angle)

Angular dispersion

$$= \delta_V - \delta_R = (\mu_V - \mu_R)A$$

Dispersive power,

$$\omega = \frac{\delta_V - \delta_R}{\delta} = \frac{\mu_V - \mu_R}{\mu - 1}$$

Mean deviation, $\delta = \frac{\delta_V + \delta_R}{2}$

POWER OF LENSES

Power of lens: $P = \frac{1}{f}$ (in m)

Combination of lenses:

Power: $P = P_1 + P_2 - dP_1P_2$
(d = small separation between the lenses)

For $d = 0$ (lenses in contact)

Power: $P = P_1 + P_2 + P_3 + \dots$

TOTAL INTERNAL REFLECTION

TIR conditions

- Light must travel from denser to rarer.
- Incident angle $i >$ critical angle i_c

Relation between μ and i_c : $\mu = \frac{1}{\sin i_c}$

REFRACTION OF LIGHT

Snell's law: When light travels from medium a to medium b , ${}^a\mu_b = \frac{\mu_b}{\mu_a} = \frac{\sin i}{\sin r}$

Refractive index,

$$\mu = \frac{\text{velocity of light in vacuum}}{\text{velocity of light in medium}} = \frac{c}{v}$$

Real and apparent depth $\mu = \frac{\text{real depth}(x)}{\text{apparent depth}(y)}$

THIN SPHERICAL LENS

Thin lens formula: $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

Magnification: $m = \frac{v}{u} = \frac{h_i}{h_o}$

REFRACTION BY SPHERICAL SURFACE

Relation between object distance (u), image distance (v) and refractive index (μ)

$$\frac{\mu_{\text{denser}}}{v} - \frac{\mu_{\text{rarer}}}{u} = \frac{\mu_{\text{denser}} - \mu_{\text{rarer}}}{R} \quad (\text{Holds for any curved spherical surface.})$$

Lens maker's formula

$$\frac{1}{f} = (\mu - 1) \left[\frac{1}{R_1} - \frac{1}{R_2} \right]$$

REFLECTION OF LIGHT

According to the laws of reflection, $\angle i = \angle r$

If a plane mirror is rotated by an angle θ , the reflected rays rotate by an angle 2θ .

SIMPLE MICROSCOPE

Magnifying power

For final image is formed at D (least distance) $M = 1 + \frac{D}{f}$

For final image formed at infinity

$$M = \frac{D}{f}$$

REFLECTING TELESCOPE

Magnifying power

$$M = \frac{f_o}{f_e} = \frac{R/2}{f_e}$$

RAY OPTICS

OPTICAL INSTRUMENTS

TELESCOPE

Astronomical telescope

For final image formed at D (least distance) $M = \frac{f_o}{f_e} \left(1 + \frac{f_e}{D} \right)$

In normal adjustment, image formed at infinity $M = f_o / f_e$

REFLECTION BY SPHERICAL MIRRORS

Mirror formula, $\frac{1}{u} + \frac{1}{v} = \frac{1}{f} = \frac{2}{R}$

Magnification, $m = -\frac{v}{u} = \frac{h_i}{h_o}$

COMPOUND MICROSCOPE

Magnifying power, $M = m_o \times m_e$

For final image formed at D (least distance) $M = \frac{L}{f_o} \left(1 + \frac{D}{f_e} \right)$

For final image formed at infinity

$$M = \frac{L}{f_o} \cdot \frac{D}{f_e}$$

TERRESTRIAL TELESCOPE

For normal adjustment $M = \frac{f_o}{f_e}$

Distance between objective and eyepiece $d = f_o + 4f + f_e$



TWIST YOUR MIND

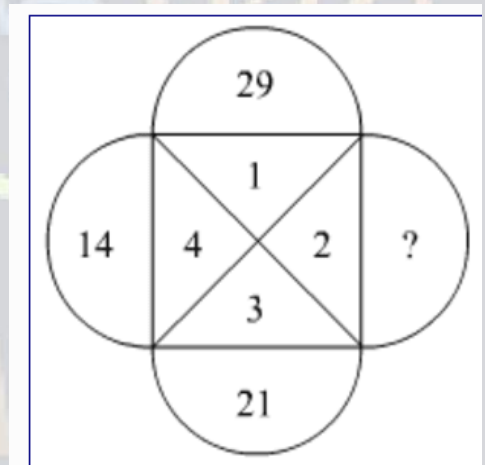
(Answers will be given in the April 2024 digest)

RIDDLES

1. The more of this there is, the less you see. What is it?
2. What has many keys but can't open a single lock?
3. Tom was asked to paint the apartment number on plates for 100 apartments which means he will have to paint numbers 1 through 100. How many times will he paint the number 8?

PUZZLE

Find the missing number .



Bright Spots: Positive Events from February 2024

Science:

- Habitable Exoplanet: Potential for life discovered nearby.
- Fusion Energy Breakthrough: Clean and sustainable energy future gets closer.

•Medicine:

- Ongoing advancements: Fighting disease and improving health outcomes.

•Global:

- Climate Action: Efforts continue despite ongoing challenges.
- Humanitarian Work: Addressing global issues and offering hope.

•Community:

- Local initiatives: Making positive impacts in various areas.

word
of the
month

Ephemeral : Lasting for a very short time.

FEBRUARY ANSWERS

RIDDLES: 1. SWIMS 2. All the cars took a right turn .

PUZZLE : 17 , the sum of opposite digits

The mentors Digest



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ABOUT US

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 - 11	Physics ,Chemistry ,Biology ,Maths&Computer
GRADE - 12	Mathematics , Physics & Chemistry

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