

The mentors Digest



MAY 2024

ISSUE NO:12



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

Dear Students & future leaders,

School is tough these days - students have so much homework, activities, sports and more. It is easy to get stuck in a rut rather quickly or to feel like you are not succeeding. Students need all the support they can get. Read more about the importance of a **positive attitude** for students.



It is one of the best things everyone can do to help our students boost their happiness and build more positivity into their lives. The good news is this isn't difficult or complicated. There are a few things you can do to add more positive experiences and fun into your life. The wonderful thing about positivity is that it doesn't just affect one area of your life. It affects every area.

Positivity makes it easier to achieve your goals. That's because when you're in a positive frame of mind, you can make better decisions. You can look ahead and plot a course, rather than just reacting to the setbacks you encounter. You don't get stuck with negative self-talk.

WHAT IS SPECIAL ABOUT THE MONTH OF MAY ?

MAY 12 : Mother's Day is a heartfelt celebration dedicated to honoring and appreciating mothers and mother figures around the world. Celebrated on the second Sunday of May in many countries, it's a day that holds significant emotional value as it recognizes the immense love, care, and sacrifices that mothers make for their children and families. One of the key aspects of Mother's Day is expressing gratitude. The gestures may vary, but the underlying sentiment remains the same: acknowledging the invaluable role mothers play in our lives. Communities, schools, and organizations often organize events and activities to honor mothers. These gatherings not only celebrate individual mothers but also emphasize the importance of motherhood as a whole. It encourages us to cherish memories and moments shared with our mothers and to recognize their lasting impact on our lives. In a broader context, Mother's Day is also an opportunity to advocate for issues that affect mothers and families. It raises awareness about maternal health, gender equality, and other important social and political issues. By highlighting these concerns, Mother's Day becomes a platform for promoting positive change and supporting the well-being of mothers worldwide.



The mentors **Digest**

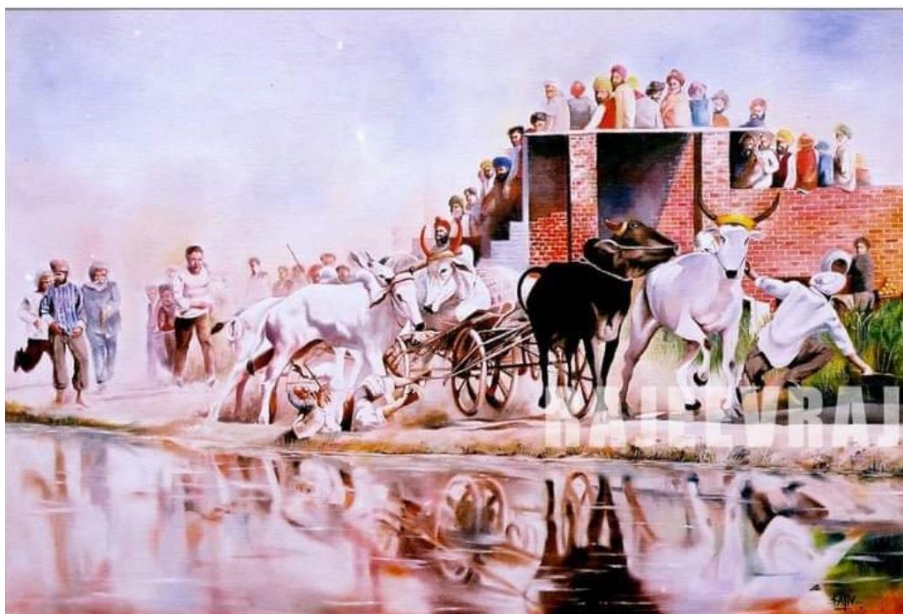


Magic of painting -

Meet Mr. Rajeev Raj, Assistant Manager, Kochi Refinery, BPCL, describing something in paint which gives a different feeling than reality, yet paradoxically enhances the viewer's experience of the world. Good artists turn their own work into something beautiful. They use it to fuel their creativity and make the work that resonates with others. Anyone can be an artist, but you can recognize a great artist by how their work makes others feel.



Learning to work with people from other disciplines can make you a better communicator, decision maker and critical thinker. Experiences that combine Engineering and the Arts bring a new dimension to your studies and set you up for success in the workplace and in society. Let Rajeev inspire the new generation to nurture the gifted talents along with their studies.





CHECKMATE: INDIA'S RISING CHESS PHENOMS TRIUMPH IN TORONTO'S FIDE CANDIDATES TOURNAMENT

In the heart of Toronto, a gripping saga unfolded as India's chess virtuosos showcased their mettle at the prestigious FIDE Candidates tournament. With the chess world's spotlight focused on them, the quartet of Gukesh, Praggnanandhaa, Gujrathi, and Anand not only displayed their extraordinary skill but also symbolized India's burgeoning dominance in the sport.

At just 17, Gukesh emerged as a force to be reckoned with, clinching victory in the tournament and etching his name in history as the youngest-ever Candidates winner. His triumph shattered records and served as a testament to India's rapid ascent in the global chess arena. Gukesh's meteoric rise from a seven-year-old chess enthusiast witnessing Magnus Carlsen's victory over Vishwanathan Anand in 2013 to becoming the youngest contender for the world chess throne exemplifies the dawn of a new era in the game.

Meanwhile, Praggnanandhaa, with his remarkable youth career, continues to captivate audiences worldwide. From becoming the youngest international master in chess history at the age of 10 to securing the Grandmaster title at 12, his journey is nothing short of extraordinary. Although his performance in the Candidates tournament may have been modest, his potential as the future face of chess remains undeniable.

In contrast, Gujrathi brings a wealth of experience to the table. While not as young as his counterparts, his skill and consistency have solidified his position among India's top chess players. Victories over formidable opponents like Hikaru Nakamura and Alireza Firouzja attest to his prowess on the board. Gujrathi's journey from a promising talent to a respected contender underscores the evolution of Indian chess on the global stage. As these chess prodigies continue to make waves, their success signifies more than just individual achievement—it represents a collective triumph for Indian chess. With each move, they redefine the narrative of the game, inspiring a new generation of players and solidifying India's status as a powerhouse in the world of chess. As the world watches in awe, India's chess dynasty takes its rightful place on the global stage, poised to leave an indelible mark on the sport for generations to come.



Did You Know ?
A group of frogs is called an army.

The sentence "The quick brown fox jumps over a lazy dog" uses every letter of the alphabet.



NAVIGATING UNCERTAINTY: STRATEGIES FOR INNER PEACE AND WELLNESS

In times of uncertainty, managing emotions can be challenging, but there are effective strategies to foster feelings of peace and wellness. Acknowledging that uncertainty is a natural part of life and learning to accept it can help ease anxiety. Normalizing the discomfort of not knowing outcomes can empower individuals to cultivate inner calm amidst uncertainty.

Developing a mindset that emphasizes present security rather than future certainty is key. Practicing affirmations like "I am safe today" can counteract catastrophic thinking and promote a sense of stability. Additionally, challenging negative thoughts by considering alternative, more hopeful outcomes can shift perspective and reduce worry.

When facing multiple stressors simultaneously, prioritizing thoughts that offer security in each moment can be beneficial. Focusing on what is within one's control and taking proactive steps to improve current circumstances can alleviate anxiety. Reflecting on personal contributions to distressing situations and deriving meaning from experiences can also foster emotional resilience and promote a sense of empowerment.

Ultimately, embracing the reality of uncertainty while actively cultivating a sense of personal well-being in the present moment is key to navigating life's challenges. By choosing thoughts that promote security and adopting resilience-building habits, individuals can effectively cope with uncertainty and maintain emotional stability.

UNVEILING CREATIVITY: INSIGHTS FROM BRAIN RESEARCH AND PRACTICAL TECHNIQUES

Exploring the complexities of creativity, inspired by Rick Rubin's "The Creative Act: A Way of Being," led to a journey through the brain's role in creative thought processes. From a cognitive perspective, research highlights the involvement of multiple brain regions, including the executive control network, default mode network, and salience network, in facilitating divergent and convergent thinking essential for creativity. Practical strategies to enhance creative thinking reveal intriguing insights, with daily meditation emerging as a powerful tool supported by studies demonstrating its positive impact on divergent thinking. Additionally, engaging in activities like reading aloud, arithmetic calculations, and neurofeedback training shows promise in boosting creative skills by stimulating cognitive processes and enhancing brain function. In the quest to nurture creative thinking, individuals are encouraged to explore these techniques, each offering a unique pathway to unlocking creativity and embarking on an exciting journey of self-discovery.



CHILEAN ANGEL SHARK: A TRIUMPH IN MARINE CONSERVATION

In a serendipitous turn of events, artisanal fishermen off the coast of Chile inadvertently captured a significant marine find: two *Squatina armata*, commonly known as Chilean angel sharks. These elusive creatures, initially described in 1887 but subsequently lost to scientific knowledge due to incomplete data, have resurfaced, providing researchers with a rare opportunity to study and understand them better. The recent discovery, detailed in a study published in the *European Journal of Taxonomy*, marks a pivotal moment in marine conservation and biodiversity rediscovery.

The historical narrative of the Chilean angel shark is one of mystery and intrigue. Described over a century ago by a researcher who provided only scant measurements, the species remained elusive, with occasional sightings offering tantalizing glimpses but failing to provide comprehensive data. The recent capture of these sharks by fishermen, followed by their delivery to the National Museum of Natural History in Santiago, Chile, has reignited scientific interest and excitement.

Detailed examination of the captured specimens has unveiled fascinating insights into the morphology and behavior of the Chilean angel shark. Measuring just over three feet in length with flattened bodies reminiscent of rays, these sharks possess a distinctive feature: enlarged dorsal thorns

adorning their heads and backs. These unique characteristics, along with their nocturnal ambush predation behavior, underscore the importance of understanding and conserving these enigmatic creatures.

Despite their rediscovery, the Chilean angel shark faces significant threats to its survival. Classified as "critically endangered" by the International Union for Conservation of Nature Red List, these sharks are imperiled by coastal development, habitat degradation, and overfishing. The study emphasizes the urgency of conservation efforts to protect these elusive creatures and their fragile habitats.

Furthermore, the rediscovery of the Chilean angel shark holds broader implications for marine conservation and biodiversity preservation. By studying and understanding this species, researchers can inform better conservation practices not only for the Chilean angel shark but also for other angel shark species along the Pacific coast of America. This newfound knowledge highlights the interconnectedness of marine ecosystems and the importance of safeguarding biodiversity for future generations.





MATHEMATICS CHAPTER OF THE MONTH:

CONCEPT MAP


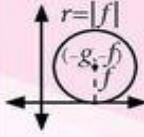
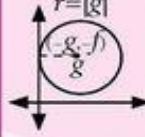
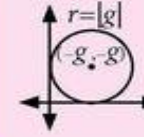
CIRCLES

Class XI

- A circle is defined as locus of all such points in plane which remains at constant distance from a given fixed point. Fixed point is called centre and the fixed distance (distance from centre to each point of locus) is called radius of the circle.
- The second degree equation $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$ represents the equation of circle, if $a = b$, $h = 0$ and

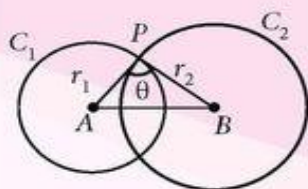
$$\Delta = \begin{vmatrix} a & h & g \\ h & b & f \\ g & f & c \end{vmatrix} \neq 0 \text{ and } g^2 + f^2 - ac > 0$$

- General equation of circle is given by $x^2 + y^2 + 2gx + 2fy + c = 0$ with centre $(C) \equiv (-g, -f)$ and radius $(r) = \sqrt{g^2 + f^2 - c}$
- $(x - \alpha)^2 + (y - \beta)^2 = a^2$ with centre $(C) = (\alpha, \beta)$ and radius $(r) = a$

Simplest	Touching x-axis	Touching y-axis	Touching both x & y-axis
			

If the two circles C_1 and C_2 given by $x^2 + y^2 + 2g_1x + 2f_1y + c_1 = 0$ and $x^2 + y^2 + 2g_2x + 2f_2y + c_2 = 0$ respectively intersect at a point P and PA, PB are the tangents at P , then the angle between the tangents at P (i.e. $\angle BPA$) is the angle of intersection of the two circles given by

$$\cos \theta = \frac{r_1^2 + r_2^2 - (AB)^2}{2r_1r_2}$$



Orthogonal Circles

Two Circles are orthogonal if $\theta = 90^\circ$

i.e., $r_1^2 + r_2^2 - (AB)^2 = 0$
or $2g_1g_2 + 2f_1f_2 = c_1 + c_2$

Definition

Equation

Diametric Form:

$(x - x_1)(x - x_2) + (y - y_1)(y - y_2)$ where (x_1, y_1) and (x_2, y_2) are end points of diameter.

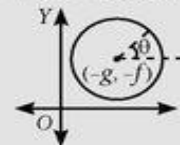
Parametric Form:

$x^2 + y^2 + 2gx + 2fy + c = 0$ can be represented as

$$x = -g + r \cos \theta$$

$$y = -f + r \sin \theta$$

$$r = \sqrt{g^2 + f^2 - c}$$



CIRCLES

Different Forms

Important Results

- Let $S = x^2 + y^2 + 2gx + 2fy + c$
 $S_1 = x_1^2 + y_1^2 + 2gx_1 + 2fy_1 + c$ and $T = xx_1 + yy_1 + g(x + x_1) + f(y + y_1) + c$
 - Equation of chord of the circle $S = 0$ whose mid-point is (x_1, y_1) is $T = S_1$.
 - Length of intercept made by the circle $S = 0$ with x -axis is $2\sqrt{g^2 - c}$.
 - Equation of tangent to the circle $S = 0$ is given by $T = 0$.
 - Length of intercept made by the circle $S = 0$ with y -axis is $2\sqrt{f^2 - c}$.
 - Length of tangent from a point (x_1, y_1) to the circle $S = 0$ is given by $\sqrt{S_1}$.
 - The equation of radical axis of two circles $S_1 = 0, S_2 = 0$ in which the coefficient of x^2, y^2 are same is the equation of the line $S_1 - S_2 = 0$.
- Line $y = mx + c$ will touch the circle $x^2 + y^2 = a^2$ if $c^2 = a^2(1 + m^2)$.
- Equation of director circle of the circle $x^2 + y^2 = a^2$ is the circle whose radius is $\sqrt{2}$ times the radius of the original circle.



SCIENCE CHAPTER OF THE MONTH:

CONCEPT MAP

THE *p*-BLOCK ELEMENTS (Group 13)



Group 13 is the first group to span the dividing line between metals and non-metals and its chemistry is more diverse than that of groups 1 and 2.

Atomic and Physical Properties

- Elements : B, Al, Ga, In, Tl
- Electronic configuration : [Noble gas] $ns^2 np^1$
- Oxidation States : +1 and +3
- Metallic Character : $\underbrace{B}_\text{Metalloid} \quad \underbrace{Al, Ga, In, Tl}_\text{Metals}$
- Atomic radii, ionic radii, density and stability of +1 oxidation state: Generally increase down the group however, the atomic radius of Ga is lower than that of Al.
- Boiling points and stability of +3 oxidation state: Decrease down the group.
- Electronegativity: First decreases from B to Al then increases from Al to Ga and then decreases marginally down the group.
- Melting points: Decrease from B to Ga and then increase.
- Ionisation energy: $B > Tl > Ga > Al > In$
- Lewis acids: $BCl_3, AlCl_3$ etc. behave as Lewis acids due to incomplete octet.
- Complex formation: Due to small size, high charge density and availability of vacant *d*-orbitals.

Chemical Properties

- Reactivity towards air :
 - $\text{> } 4E + 3O_2 \xrightarrow{\Delta} 2E_2O_3$ ($E = \text{Group 13 elements}$)
 - $\underbrace{B_2O_3}_\text{Acidic} \quad \underbrace{Al_2O_3}_\text{Amphoteric} \quad \underbrace{Ga_2O_3}_\text{Amphoteric} \quad \underbrace{In_2O_3}_\text{Basic} \quad \underbrace{Tl_2O}_\text{Basic}$
 - $\text{> } 2E + N_2 \xrightarrow{\Delta} 2EN$ (Except Ga, In, Tl)
- Reactivity towards acids:
 - $\text{> } B$ reacts only with strong oxidising acids at high temperature.
 - $B + 3HNO_3 \xrightarrow[\Delta]{\text{conc. } H_2SO_4} H_3BO_3 + 3NO_2$
 - $\text{> } \text{All other elements react with both, non-oxidising and oxidising acids liberating } H_2 \text{ gas.}$
 - $\text{> } Al$ becomes passive with conc. HNO_3 due to the formation of a thin protective layer of its oxide (Al_2O_3) on the surface of the metal which prevents it from further action.
- Reactivity towards alkalis :
 - $\text{> } 2B + 6KOH \xrightarrow{773 K} 2K_2BO_3 + 3H_2$
 - $\text{> } 2E + 2NaOH + 6H_2O \rightarrow 2Na^+ [E(OH)_4]^- + 3H_2$ ($E = Al, Ga$)
- Reactivity towards halogens :
 - $\text{> } 2E + 3X_2 \rightarrow 2EX_3$ (Except TlI_3) ($X = F, Cl, Br, I$)

Anomalous Behaviour of Boron

- Difference in behaviour of B is due to small size, high ionisation energy and absence of *d*-orbitals.
- B is extremely hard having high m.pt and b.pt.
- B shows maximum covalency of 4 while rest of the elements show maximum covalency of 6.
- B exhibits allotropy.
- B forms only covalent compounds.

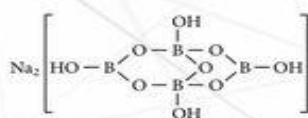
GROUP 13: THE BORON FAMILY

Important Compounds of Boron

Borax

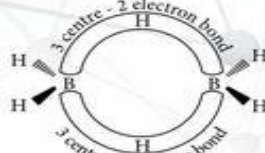
$(Na_2[B_4O_5(OH)_4] \cdot 8H_2O)$

- Preparation :
 - $\text{> } Ca_2B_6O_{11} + 2Na_2CO_3 \xrightarrow{\Delta} Na_2B_4O_7 + 2NaBO_2 + 2CaCO_3$
 - $\text{> } 4H_3BO_3 + Na_2CO_3 \rightarrow Na_2B_4O_7 + 6H_2O + CO_2$
- Properties:
 - $\text{> } \text{White crystalline solid.}$
 - $\text{> } Na_2B_4O_7 + 7H_2O \rightarrow 2NaOH + 4H_3BO_3$
 - $\text{> } Na_2B_4O_7 \cdot 10H_2O \xrightarrow{\Delta} Na_2B_4O_7 \xrightarrow{\Delta} 2NaBO_2 + B_2O_3$
 - Sodium metaborate Borax bead



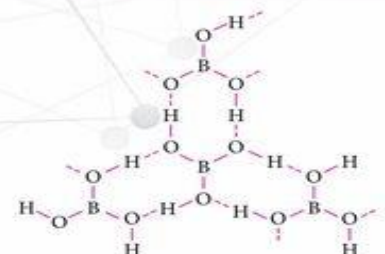
Diborane (B_2H_6)

- Preparation :
 - $\text{> } \text{Laboratory method: } 2NaBH_4 + I_2 \xrightarrow{\text{Diglyme}} B_2H_6 + 2NaI + H_2$
 - $\text{> } \text{Industrial method: } 2BF_3 + 6NaH \xrightarrow{450 K} B_2H_6 + 6NaF$
- Properties :
 - $\text{> } \text{Colourless, highly toxic gas.}$
 - $\text{> } B_2H_6 + 3O_2 \rightarrow B_2O_3 + 3H_2O$
 - $\text{> } B_2H_6 + 6H_2O \rightarrow 2B(OH)_3 + 6H_2$
 - $\text{> } 3B_2H_6 + 6NH_3 \rightarrow 3[BH_2(NH_3)_2]^+ [BH_4]^- \xrightarrow{\Delta} 2B_3N_3H_6 + 12H_2$
 - Borazine
- Structure :
 - $\text{> } \text{Four bonds: 2 centre-2 electron type}$
 - $\text{> } \text{Two bonds: 3 centre-2 electron type (banana bonds)}$



Orthoboric acid (H_3BO_3)

- Preparation :
 - $\text{> } Na_2B_4O_7 + 2HCl + 5H_2O \rightarrow 2NaCl + 4H_3BO_3$
- Properties :
 - $\text{> } \text{White crystalline solid with a soapy touch.}$
 - $\text{> } \text{Planar } BO_3^{2-} \text{ units joined by H-bonds to form layer structure of boric acid.}$
 - $\text{> } \text{Monobasic acid: } B(OH)_3 + 2H_2O \rightarrow [B(OH)_4]^- + H_3O^+$
 - $H_3BO_3 \xrightarrow{370 K} HBO_2 + H_2O$
 - Metaboric acid
 - $4HBO_2 \xrightarrow[410 K]{-H_2O} H_2B_4O_7 \xrightarrow[\text{Red heat}]{\text{Red heat}} 2B_2O_3 + H_2O$
 - Tetraboric acid Boron trioxide





TWIST YOUR MIND

(Answers will be given in the June 2024 digest)

RIDDLES

1. I'm light as a feather, yet the strongest person can't hold me for much longer than a few minutes. What am I ?
2. What has cities but no houses, forests but no trees, and rivers but no water ?
3. What has to be broken before you can use it?

PUZZLE

Find the missing number .

		30	
	36	?	
12			35
	4	49	
		14	

Bright Spots: Positive Events from April 2024

- Lok Sabha Election has started with the completion of phase 1 and phase 2.
- Breakthrough battery tech promises scalable storage for solar and wind energy.
- Successful gene therapy trials offer hope for once-incurable diseases.
- Major corporation shifts towards sustainability, investing in renewables.
- Bipartisan legislation brings relief, showcasing unity in governance.
- Record-low unemployment signals robust economic growth.
- Resilient community rallies together, inspiring unity in adversity.
- India's T20 World Cup 2024 Squad announced.

**word
of the
month**

Aurora : The dawn or a natural light display in the sky, often seen in polar regions.

APRIL ANSWERS

RIDDLES: 1.ECHO 2.SPONGE 3.SEVEN

PUZZLE : 3

The mentors Digest



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

New Online Courses

Welcome To The Mentors

Largest Online Courses Available Here.

[Read More](#)

Course Categories



→ SCHOOLING

→ ENGINEERING

→ FINISHING
SCHOOLS

→ CONSULTANCY

→ IAS BRIDGE
PROGRAM

CLASSES



CLASS 10

CBSE online tuitions with special emphasis on Board exams

[Read More →](#)



CLASS 12

CBSE online tuitions with special emphasis on Board exams

[Read More →](#)

MAGAZINES

JUNE 2023



JULY 2023



The mentors Digest



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

Online TUTION

Registration for admission started - 2024-25

Quality education with Very affordable fees

GRADE -8	Mathematics
GRADE - 9	Science , Social Science & Maths
GRADE - 10	English ,Science, Social Science & Maths
GRADE - 11	Physics ,Chemistry ,Biology ,Maths&Computer
GRADE - 12	Mathematics , Physics & Chemistry

CALL OR WHATSAPP ON **+918075999747**(Course Coordinator)

Disclaimer: The news published is directly picked up from the website and newspapers. The views expressed need not be those of The mentors