Aakash

Medical | IIT-JEE | Foundations

KNOWLEDGE BYTES

NOVEMBER 2024

CLASS 10

Aakash

Medical | IIT-JEE | Foundations

Edition: 2024-25

PREFACE

What is Knowledge Bytes ?

Knowledge Bytes is a collection of riddles, interesting facts, mnemonics and puzzles that will make your learning fun and engaging.

We want you to be delighted about studying. Knowledge Bytes helps you to know more about the subject in a fun, motivating and educational way and helps to implement what you learn in a creative way.

Benefits

Saves Time

Develops Learning Skills

Stimulates Interest

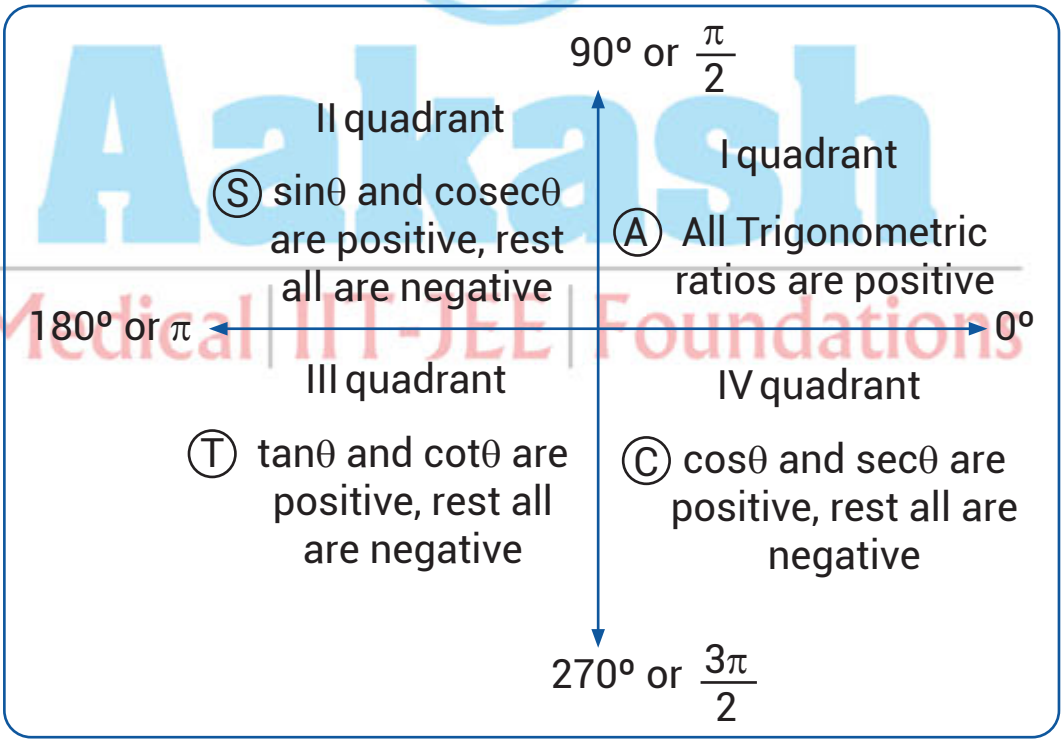
Leads to Increased Comprehension

EXPLORE

Trigonometry Formulas and Short Tricks

Reduction formula and quadrant system

If the angles are given in any of the four quadrants, then the angle can be reduced to the equivalent angle in first quadrant by changing signs and trigonometric ratios :



You can remember the signs of trigonometric ratios by moving anticlockwise direction from I quadrant to IV quadrant by using "**A**fter **S**chool **T**o **C**ollege".

Using quadrant system, we can find the values of trigonometric ratios for larger angles.

- Express the given larger angle into $90°n \pm \alpha$ and find out the quadrant in which given angle lies.
- If n is even, trigonometric ratio will remain same.
- If n is odd, then sin, sec and tan are respectively converted to cos, cosec and cot.

Q. Find the value of
(i) $\sin 660°$ (ii) $\tan 930°$

Sol : (i) $\sin(660°)$

$= \sin(90° \times 7 + 30°)$ Here n = 7 (odd)

$= -\cos 30°$ [660° lies in IV quadrant where $\sin\theta$ is negative]

$= -\frac{\sqrt{3}}{2}$

(ii) $\tan(930°)$ Here n = 10 (Even)

$\tan(90° \times 10 + 30°)$ 930° lies in III quadrant where $\tan\theta$ is positive.

$= \tan 30°$

$= \frac{1}{\sqrt{3}}$

NOTE :

$\sin(-\theta) = -\sin\theta$, $\cos(-\theta) = \cos\theta$

$\tan(-\theta) = -\tan\theta$, $\sec(-\theta) = \sec\theta$

$\cot(-\theta) = -\cot\theta$, $\operatorname{cosec}(-\theta) = -\operatorname{cosec}\theta$

Ex : $\tan(-750°)$

$= -\tan 750°$

$= -\tan(90° \times 8 + 30°)$ Here n = 7 (odd)

$= -\tan 30°$ 750° lies in I quadrant [where $\tan\theta$ is positive]

$= -\frac{1}{\sqrt{3}}$

Identities related to sum and difference of two angles :

- ☑ $\sin(A + B) = \sin A\cos B + \cos A\sin B$
- ☑ $\sin(A - B) = \sin A\cos B - \cos A\sin B$
- ☑ $\cos(A + B) = \cos A\cos B - \sin A\sin B$
- ☑ $\cos(A - B) = \cos A\cos B + \sin A\sin B$
- ☑ $\tan(A + B) = \frac{\tan A + \tan B}{1 - \tan A \tan B}$
- ☑ $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$

Ex. sin75°

Sol : $\sin 75°$

$= \sin(45° + 30°)$

$= \sin 45° \cos 30° + \cos 45° \sin 30°$

$= \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \cdot \frac{1}{2} = \frac{\sqrt{3} + 1}{2\sqrt{2}}$

$\therefore \sin 75° = \frac{\sqrt{3} + 1}{2\sqrt{2}}$

Q. (i) $\sin 15° = ?$ (ii) $\cos 75° = ?$

Ans : (i) $\frac{\sqrt{3}-1}{2\sqrt{2}}$ (ii) $\frac{\sqrt{3}-1}{2\sqrt{2}}$

Useful points to remember :

(i) $\tan 1° . \tan 2° . \tan 3° \ldots\ldots \tan 89° = 1$

(ii) $\cot 1° . \cot 2° . \cot 3° \ldots\ldots \cot 89° = 1$

(iii) $\cos 1° . \cos 2° . \cos 3° \ldots\ldots \cos 90° = 0$

(iv) $\sin 1° . \sin 2° . \sin 3° \ldots\ldots \sin 180° = 0$

Trigonometric Identities :

(i) $\sin^2\theta + \cos^2\theta = 1$
or $\sin^2\theta = 1 - \cos^2\theta$
or $\cos^2\theta = 1 - \sin^2\theta$

(ii) $1 + \tan^2\theta = \sec^2\theta$
or $\sec^2\theta - \tan^2\theta = 1$

(iii) $1 + \cot^2\theta = \operatorname{cosec}^2\theta$
or $\operatorname{cosec}^2\theta - \cot^2\theta = 1$

Maximum and minimum value of $(a\sin\theta + b\cos\theta)$ are respectively $\sqrt{a^2 + b^2}$ and $-\sqrt{a^2 + b^2}$

Ex: Maximum value of $(3\sin\theta + 4\cos\theta)$

$= \sqrt{3^2 + 4^2} = \sqrt{9 + 16} = \sqrt{25} = 5$

Q1. Find the minimum value of $2\sin\theta + \cos\theta$

If $\sec\theta + \tan\theta = x$

then, $\sec\theta = \frac{x^2 + 1}{2x}$

then, $\tan\theta = \frac{x^2 - 1}{2x}$

Q2. If $\sec\theta + \tan\theta = 4$, then what is the value of $\sec\theta$?

EXERCISE

1. A hydrogen-filled balloon flying at a constant height of $3800\sqrt{3}$ m was drifted by wind. Its angles of elevation from a fixed point on a ground at 10th and 15th minutes were found to be 60° and 45° respectively. The wind speed (in whole numbers) during the last five minutes, approximately, is equal to

(a) 7 km./hr. (b) 11 km./hr.

(c) 26 km./hr. (d) 33 km./hr.

2. If θ lies in $\left(\pi, \frac{3\pi}{2}\right)$, then the value of $4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + \sqrt{4\sin^4\theta + \sin^2 2\theta}$ is

(a) 2 (b) 4

(c) 3 (d) 1

3. A pole stands vertically inside a triangular park ΔABC. If the angles of elevation of the top of the pole from each corner is same, then the foot of the pole is at the

(a) Centroid of ΔABC (b) Circumcentre of ΔABC

(c) Incentre of ΔABC (d) Orthocentre of ΔABC

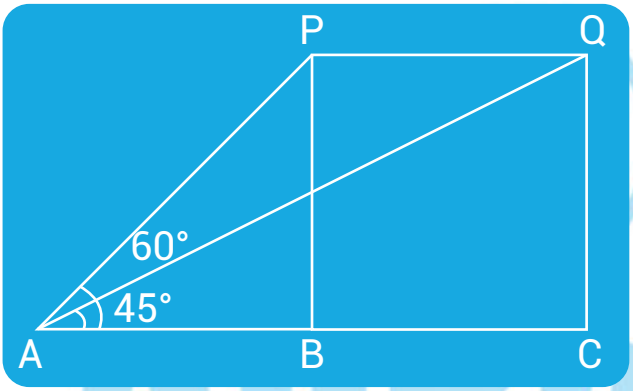
Answers

1. $\sqrt{5}$

2. $\sec\theta = \frac{4^2 + 1}{2 \times 4} = \frac{17}{8}$

Answers (EXERCISE)

1. (d)



If height of balloon = $3800\sqrt{3}$ m, then

$\tan 60° = \frac{BP}{AB}$

$\Rightarrow \sqrt{3} = \frac{3800\sqrt{3}}{AB}$

$\Rightarrow$ AB = 3800 m

$\tan 45° = \frac{CQ}{AC}$

$\Rightarrow 1 = \frac{3800\sqrt{3}}{AC}$

$\Rightarrow$ AC = $3800\sqrt{3}$ m

$\therefore$ PQ = AC – AB

$= (3800\sqrt{3} - 3800)$

$= 3800 \times 0.732$

$= 2782$ m (Approximately)

Required speed

$= \left(\frac{2782}{(5/60) \times 1000}\right)$ km/hr.

$= 33.3$ km/hr. (Approximately)

2. (a) $4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + \sqrt{4\sin^4\theta + (2\sin\theta\cos\theta)^2}$ $(\because \sin2\theta = 2\sin\theta\cos\theta)$

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + \sqrt{4\sin^4\theta + 4\sin^2\theta\cos^2\theta}$

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + \sqrt{4\sin^2\theta(\sin^2\theta + \cos^2\theta)}$

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + \sqrt{4\sin^2\theta}$ $(\because \sin^2\theta + \cos^2\theta = 1)$

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) + |2\sin\theta|$ θ lies in $\left(\pi, \frac{3\pi}{2}\right)$

So, $\sin\theta$ is $-$ve

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) - 2\sin\theta$

$= 4\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) - 2 - 2\sin\theta + 2$

$= 2\left[2\cos^2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) - 1\right] - 2\sin\theta + 2$

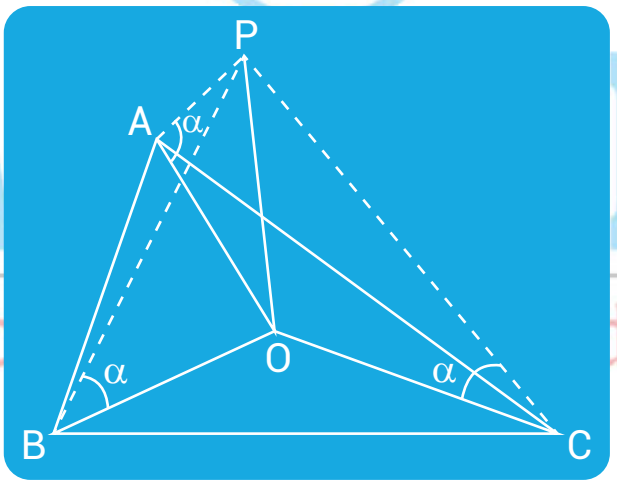
$= 2\cos 2\left(\frac{\pi}{4} - \frac{\theta}{2}\right) - 2\sin\theta + 2$ $\left[\cos 2\theta = \cos^2\theta - \sin^2\theta = 2\cos^2\theta - 1\right]$

$= 2\cos\left(\frac{\pi}{2} - \theta\right) - 2\sin\theta + 2$

$= 2\sin\theta - 2\sin\theta + 2$

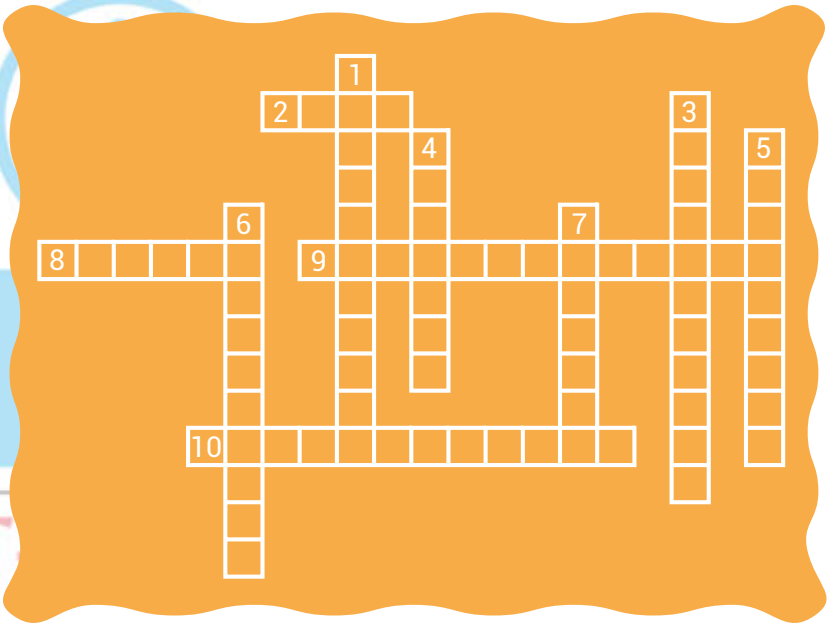
$= 2$

3. (b) Let the pole be OP, O being the base. Since the pole OP has same angles of elevation from A, B and C so OA = OB = OC. Hence, O is the circumcentre of ΔABC.



Sources of Energy

Crossword



Across

2. The most abundant fuel used in South Africa to generate electricity.
8. The ability to do work.
9. The gas released when coal is burnt.
10. The type of energy source will be used up.

Down

1. A nuclear fuel has this disadvantage.
3. Fuels that were made from living matter many years ago.
4. The name of the nuclear power station near Cape Town.
5. This type of energy source will not be used up.
6. An energy source making use of falling water.
7. Wood and animal dung are examples of this energy source.

FACTS About Renewable Energy

1. Just one wind turbine can generate enough electricity to power 1400 homes.
2. Renewable energy creates 5 times more jobs than fossil fuels.
3. Solar power isn't just a daytime deal. Power from the Sun's rays can be stored in salt and used at night too. A power plant in spain soaks up sun by day and pumps out 7 hours of power to the surrounding area by night.
4. Solar power may account for the world's main source of power by 2050.
5. 25% of the EU's population live in areas suitable for Geothermal district heating using heat pumps.

Latest Developments

Light in Diagnosis, Therapy and Surgery

Light and optical techniques have made profound impacts on modern medicine, with numerous lasers and optical devices being currently used in clinical practice to assess health and treat disease.

One such field is radiation oncology. Radiation oncology is unique in that it is the only specialty that makes its own medicine. Radiation treatments delivered by machines essentially come in one of two forms photons or protons.

Photons are a higher energy version of the same X-rays used for diagnostic imaging. These high energy X-rays can be pointed at a part of the body where a cancer is located and through a series of interaction inside of the body, they break the DNA inside the cancer cell. As a result, the cancer cell dies.

Proton therapy is called heavy ion therapy. It essentially kills cancer in the same way but it uses charged particles directly rather than X-rays to kill cancer.

How Everyone Uses Physics Concepts Every Day ?

Studying physics may sound overwhelming, but students are more than likely already very familiar with many of the concepts. Combatting a negative or frustrated attitude starts with giving students the examples and ideas that will help them to feel both interested and excited to learn about the "how" and "why" behind them.

1. Heat – Stove

Heat is energy that transfers from a warmer substance to a colder one. When you use a stove, the coil, flame, or cooktop transfers heat energy to the pot or pan that is set on top of it. Then, the heat from the pot or pan is transferred to the food inside.

Other fun examples of the use of heat:

- ☑ Roasting melty s'mores over a fire
- ☑ Ironing flat the wrinkles out of a shirt
- ☑ Wet clothes are dried with the hot air of the dryer

2. Sound – Headphones

Small speakers in your headphones use electricity and moving magnets to create sound waves. The sound waves that come from the speaker bounce off your eardrums, which your brain interprets as music. Sound waves that you hear, whether they come from another person or a speaker, bounce off objects and move through the air and into your ears. Your brain uses the waves to interpret where a sound is coming from and how loud it is.

Other fun examples of sound:

- ☑ A dog barking in the distance
- ☑ A creaking door on the other side of the room
- ☑ Tapping a pen on your desk

3. Gravity – Ballpoint Pen

At the tip of a ballpoint pen is a ball that rolls as you push down to write on a piece of paper. There is ink inside the pen that sits on top of the ball. Gravity pulls the ink down towards the paper, and the ball rolls in the ink as you write, taking a controlled amount from inside the pen to the paper surface as it turns. If you were to remove the ball that holds back the ink, gravity would pull all the ink down and onto the paper in a puddle.

Other fun examples of gravity:

- ☑ You can jump over a puddle but gravity pulls you back down
- ☑ Lake water is held in the right place by gravity's pull
- ☑ Football players punt the ball and gravity pulls it down for the other team to catch

4. Inertia – Seat Belt

When your body is moving, it takes a more powerful force to cause it to stop moving. In your car, your body is moving as quickly as the car is driving. Your seatbelt, holding you tightly to your seat, is the strong force that prevents your body from continuing to move when you hit the brakes. Without the seatbelt, a sudden stop can send you out of your seat.

Other fun examples of inertia:

- ☑ A swing has inertia towards the sky, but gravity is the stronger force that pulls it back to the ground
- ☑ You throw a bowling ball and the pins are knocked over because they are not strong enough to stop its inertia
- ☑ A falling tree will squash anything in its way until it hits the ground (or a stronger object like a house)

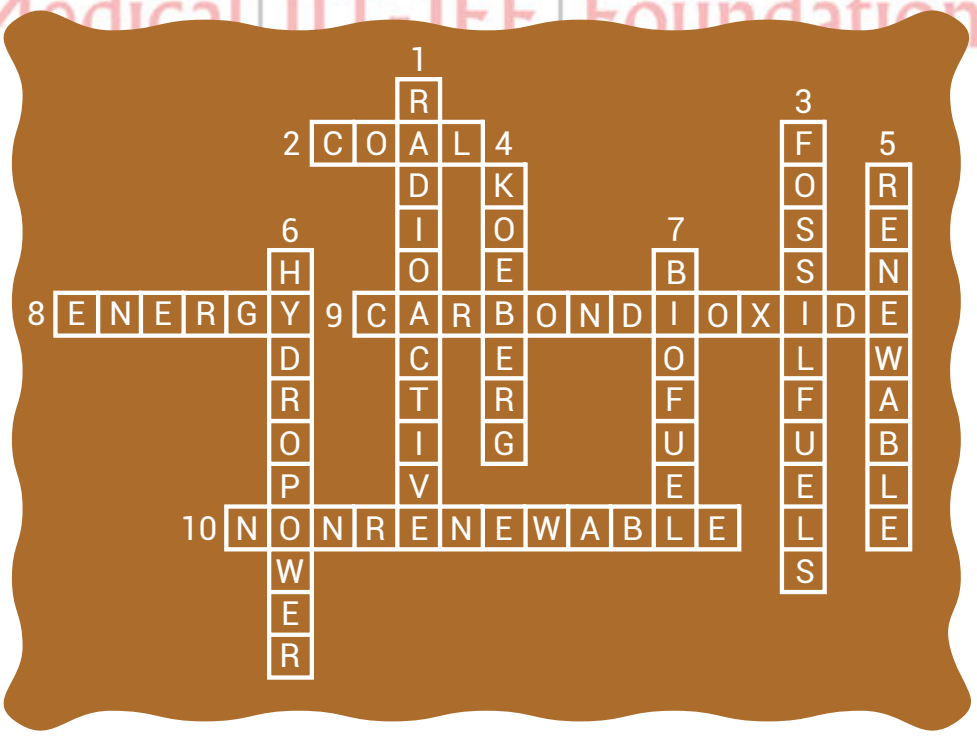
5. Electricity – Batteries

Anything with a battery in it stores electrical energy. The car stores electrical energy in its battery that is used to start the engine and to run the electrical components of the car like the radio. The engine uses combustion to create electrical energy that is stored in the battery to be used when it's needed.

More fun examples of electricity:

- ☑ Twinkle lights used as decoration pass electricity from an outlet or battery through the wire to light all the little bulbs attached to it.
- ☑ A toaster uses electricity to create heat in the coils that toast your bread.
- ☑ An alarm clock needs a constant stream of electricity to show the correct time. When the power goes out, the alarm clock can't do its job.

Answer (Crossword)



Carbon and Its Compounds, Periodic Classification of Elements

Facts about The Periodic Table and Its Elements

- Technetium was the first artificially produced element.
- Dmitri Ivanovich Mendeleev was very fond of card games. He wrote the atomic weight of each element on a separate index card and sorted them as in solitaire. Elements with similar properties formed a "suit" that he placed in columns ordered by ascending atomic weight.
- Einsteinium is named after Albert Einstein, while germanium, americium, and gallium were named after the places in which they were discovered. Uranium was named shortly after the discovery of Uranus.
- Beyond the edge: Elements with atomic number higher than 92 do not exist naturally, but they can be created by bombarding elements with other elements.
- The element Astatine (At) is the rarest naturally occurring element on the earth with atomic number 85.
- In 2016, four newly discovered elements were given their official name and position in the Modern Periodic Table. The International Union of Pure and Applied Chemistry (IUPAC) approved their name and position as Nihonium (113), Moscovium (115), Tennessine (117) and Oganesson (118). These elements were named either after their places of discovery or their creator. For example, three of the elements were named after the location of their scientist's institutions: Tennessine (Tennessee), Nihonium (Japan), and Moscovium (Moscow). The fourth element Oganesson was named after Yuri Oganessian, a nuclear physics professor at the Joint Institute for Nuclear Research, Moscow.

Trick to Find Atomic Number

For s-Block ⟶ Group 1 and 2

P1
+2
P2
+8
P3
+8
P4
+18
P5
+18
P6
+32
P7

E.g.: In Group 1

P1 H ⟶ Z = 1
P2 Li ⟶ Z = 3 (+2)
P3 Na ⟶ Z = 11 (+8)
P4 K ⟶ Z = 19 (+8)

For p-Block ⟶ Group 13, 14, 15, 16, 17 and 18

P1
+8
P2
+8
P3
+18
P4
+18
P5
+32
P6
+32
P7

E.g.: In Group 18

P1 He ⟶ Z = 2
P2 Ne ⟶ Z = 10 (+8)
P3 Ar ⟶ Z = 18 (+8)
P4 Kr ⟶ Z = 36 (+18)

5 FACTS About Carbon

1. IT'S THE "DUCT TAPE OF LIFE."

It's in every living thing, and in quite a few dead ones. "Water may be the solvent of the universe , but carbon is the duct tape of life."

2. IT'S ONE OF THE MOST ABUNDANT ELEMENTS IN THE UNIVERSE.

It is the fourth most abundant element in the universe after hydrogen, helium, and oxygen, and 15th in the Earth's crust.

3. IT'S NAMED AFTER COAL.

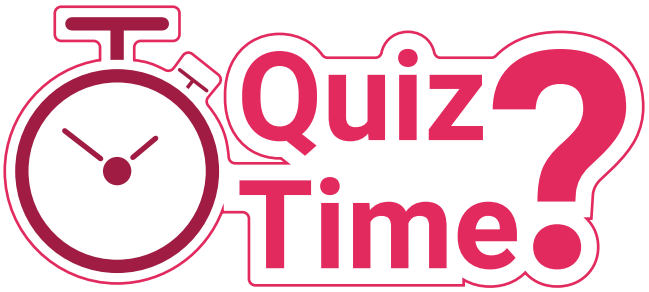
While humans have known carbon as coal and—after burning—soot for thousands of years, it was Antoine Lavoisier who, in 1772, showed that it was in fact a unique chemical entity.

4. IT LOVES TO BOND.

It can form four bonds, which it does with many other elements, forming thousands of compounds, some of which we use daily. (Plastics! Drugs! Gasoline!)

5. TOO MUCH OF IT IS CHANGING OUR WORLD.

Carbon dioxide (CO_2) is an important part of a gaseous blanket that is wrapped around our planet, making it warm enough to sustain life. But burning fossil fuels—which are built on a carbon backbone—releases more carbon dioxide, which is directly linked to global warming.



1. The majority of elements in the Modern Periodic Table are

A Non-metals
B Metals
C Metalloids
D Noble gases

2. The horizontal rows of the Modern Periodic Table are known as

A Groups
B Blocks
C Periods
D Sub-groups

3. Upto which element, the Law of Octaves was found applicable?

A Copper
B Calcium
C Cobalt
D Cadmium

4. When Mendeleev started his work, the total number of elements known was

A 63
B 65
C 62
D 64

5. An atom of an element has the electronic configuration 2,8,2. The element belongs to

A 4^{th} group
B 6^{th} group
C 3^{rd} group
D 2^{nd} group

Match the Column:

	Source From Which Name of An Element is Derived		Name of the Element
1.	The Greek word helios means – the sun	a.	Curium
2.	German word "kobalt" which means "goblin".	b.	Thorium
3.	In mythological concept- Thor is the God of Thunder	c.	Sodium
4.	An element discovered in California	d.	Potassium
5.	In the honour of Marie and Pierre Curie	e.	Helium
6.	From the Latin name Kalium	f.	Cobalt
7.	From the Latin name Natrium	g.	Californium

Answer (Quiz Time)

1. (B) 2. (C) 3. (B) 4. (A) 5. (D)

Answer (Match the following)

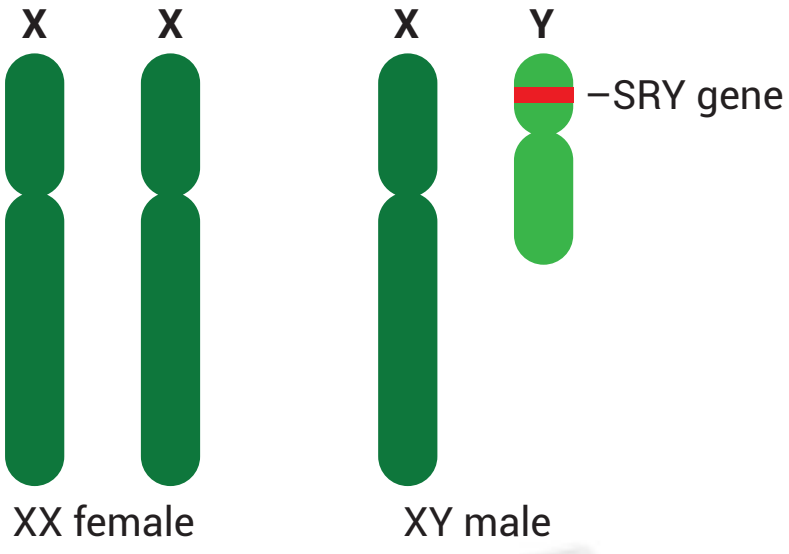
1. e 2. f 3. b 4. g 5. a

6. d 7. c

Quick Interesting Fact

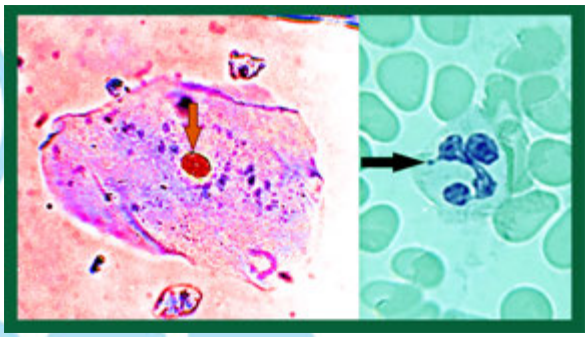
The 'Sex-determining Region Y' (Sry) is a gene found on Y chromosomes that results into the development of male phenotypes, for example testes. The Sry gene, located on the short arm of the Y-chromosome, initiates male embryonic development. The Sry gene produces a single Sry protein which is also known as the testis-determining factor (TDF) - a protein that initiates male development in humans, placental mammals, and marsupials.

Researchers have linked mutations in the Sry gene to forms of sex reversal. One example is Swyer syndrome. People with Swyer syndrome have typical female external genitalia. The uterus and fallopian tubes are normally-formed, but the gonads (ovaries or testes) are not functional.



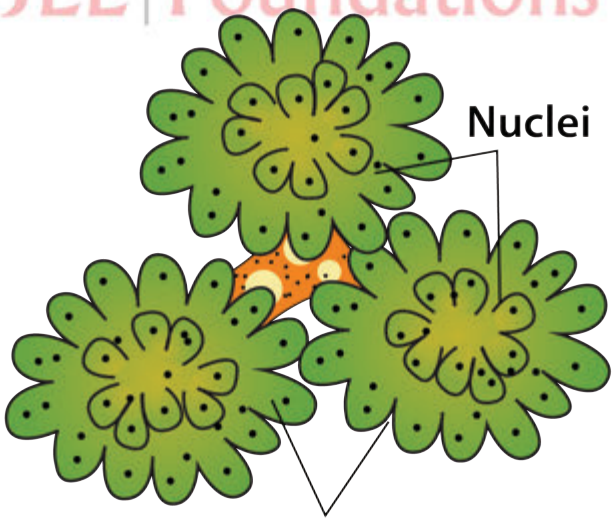
Have you ever thought about the Imbalance in X chromosome in males and females?

In females, there are two copies of X chromosomes whereas in males there is a single copy. So, to maintain this imbalance there is phenomenon called dosage compensation seen in females where one of the X chromosome undergoes inactivation (commonly called barr bodies) which can be seen like a pin head structure attached to a cell with the help of microscope. Appearance of barr body is clearly visible in a neutrophil.



Plasmotomy – Another form of asexual reproduction !

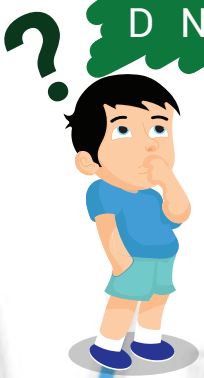
In some multinucleated protozoans like *Opalina* and *Pelomyxa*, the organism divides into numerous multinucleated daughter cells without nuclear division and then each daughter cell regains the original number of nuclei through nuclear division.



Individual multinucleated daughters

Let us check how rich is your evolution vocabulary:

Z F J N O I T A I D A R E V I T P A D A J Q R V
W B A N J F V O B U N O I T C N I T X E N S S K
N S Z O S R A U J O A U L K U H D C K L O E W N
O L P I B D R F E J H B F D X R E E P Z I R N O
I O J T I W I A Q P B S L T O H O K A G T U U I
T X N U O B A K U H I X A F B C A I S Y U T E T
A P B L G F T Q P X E M B R Y O L O G Y L C G U
L G D O E Y I A Z N Y U R O Y T H M H K O U I L
U C H V O W O D R O C E R L I S S O F I V R T O
P P H E G X N C E B U U X E O E K G I P E T D V
O K X O R O O F L J U E Y B P J A Y R H U S Y E
P N H C A D O L C P C S F D P O U U E A N S M T
Q I G B P P A L E O N T O L O G Y R S A V U L N
J T H S H E P Z G H E H K G F B Z N O L B O I E
V X P G Y Q J S M K O F I T N E S S H P K G T G
H S V I C H A R L E S D A R W I N W D S Q O A R
S E R U T C U R T S S U O G O L O M O H P L D E
N S P P H E U V R F C I V J G V V U H B R A T V
Z N Q Z N N O I T A T P A D A X H W P W W N L N
O Q W D G T N M A F E H Q M K E J F U V A A P O
V D I V E R G E N T E V O L U T I O N I S K U C
V E S T I G I A L S T R U C T U R E S R R T L O
C J Q A R T I F I C I A L S E L E C T I O N W U
D N X N A T U R A L S E L E C T I O N R S Y B L



Heredity and Evolution

1. KAMCRAL
2. EECITNG FTDIR
3. LUMOSHGOOO NORGAS
4. NSOEABT
5. TENGLAOPYOAL

Re-arrange the letter to find the correct terms by using the hints given below.

1. He gave the theory of inheritance of acquired character.
2. Change in gene frequency by chance in a small population.
3. Body structures of different organisms that have same origin but different function.
4. He coined the term genetics.
5. Study of fossils is called.

Match the following according to the description and then arrange them in correct sequential order:

a.	***Homo neanderthalensis* :** Lived from about 400,000 to 40,000 years ago, the closest extinct relative to Homo sapiens. It was shorter, more muscular than modern humans, and large noses to help with cold air. Neanderthals had a human-like face and lived in shelters such as caves.	i.	
b.	***Homo habilis* :** One of the earliest known ancestors in our own genus (Homo), known as "handy man", existed from 2.4 million to 1.4 million years ago. One of the first species to create stone tools; it had ape-like features like long arms and face and it also possessed a large brain case and small teeth, known to have used tools.	ii.	
c.	***Homo erectus* :** Lived 1.89 million to 143,000 years ago. It had human-like body proportions, ate a significant amount of meat as well as plants and developed a progressively larger brain and brain case. It had ability to run and walk long distances, which allowed them.	iii.	
d.	***Homo sapiens* :** Modern humans evolved around 200,000 years ago evolved larger brains and lighter bodies over their evolutionary history. Human faces have also changed over time to have less pronounced jaws and brow lines, smaller teeth and smaller jaws.	iv.	

e.	***Australopithecus afarensis*** **:** Known colloquially as "Lucy," dwelled between 3.85 and 2.95 million years ago. They had an ape-like face, a larger brain than a chimp's but smaller than a modern human's, and small canines.	v.	

Answer (Evolution Vocabulary)

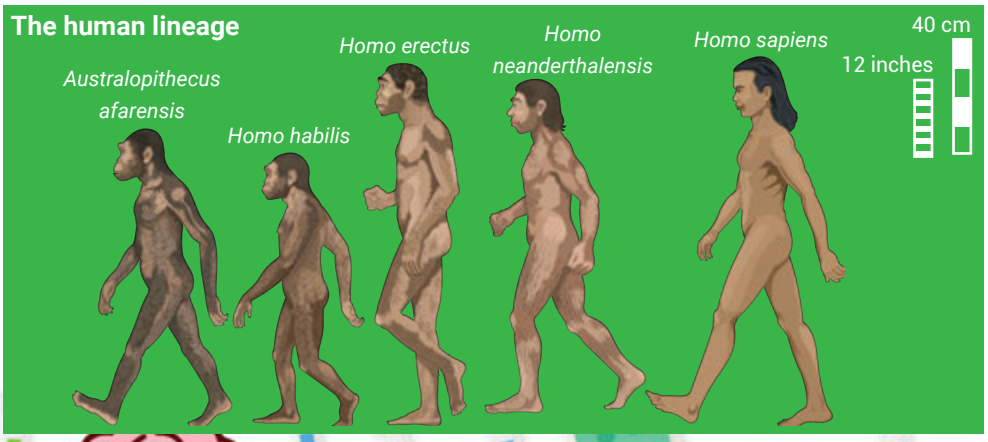
Adaptation	Adaptive radiation	Analogous structures	Artificial selection
Biogeography	Charles Darwin	Co-evolution	Convergent evolution
Divergent evolution	Embryology	Evolution	Extinction
Fitness	Fossil record	Homologous structures	Natural selection
Paleontology	Population	Variation	Vestigial structures

Answer (Heredity and Evolution)

Answer : 1. Lamarck 2. Genetic drift 3. Homologous organs
4. Bateson 5. Palaentology

Answer (Match the following)

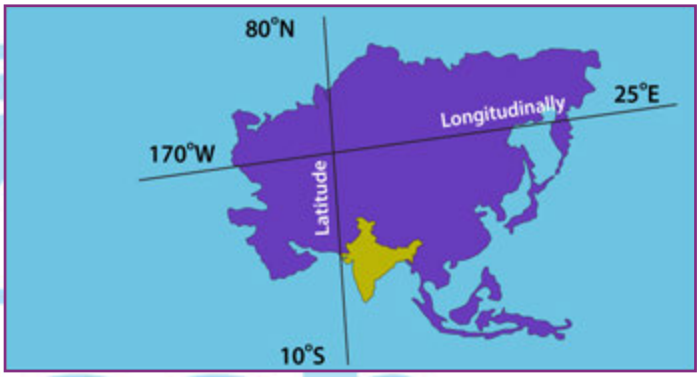
a – iii
b – i
c – v
d – iv
e – ii



Asia : The Largest Continent

Asia : Latitude and Longitude

- The Asian continent extends between the latitudes 10°S to 80°N and lies mostly in the Northern Hemisphere. Asia lies almost in the Eastern Hemisphere between the longitudes 25°E and 170°W.



- It occupies almost 1/3rd of the total area of the earth.

Asian Nations:

Asia is divided into various regions:

1. South Asia
2. South East Asia
3. West / South west Asia
4. East Asia
5. Central Asia
6. North Asia

South Asian Nations

They includes:

1. Afghanistan
2. Bhutan
3. Bangladesh
4. India
5. Maldives
6. Nepal
7. Pakistan
8. Sri Lanka

All the South Asian Nations are the members of South Asian Association for Regional Cooperation (SAARC).

South East Asian Nations

These nations include:

1. Myanmar
2. Laos
3. Thailand
4. Cambodia
5. Vietnam
6. Singapore
7. Malaysia
8. Indonesia
9. Brunei
10. Philippines
11. Timor-Leste (Observer status)

Central Asian Nations

The central asian nations includes:

1. Turkmenistan
2. Uzbekistan
3. Tajikistan
4. Kyrgyzstan
5. Kazakhstan

West Asian Countries

These nations include:

1. Turkey
2. Syria
3. Lebanon
4. Israel
5. Jordan
6. Saudi Arabia
7. Iraq
8. Yemen
9. Oman
10. United Arab Emirates(UAE)
11. Kuwait
12. Qatar
13. Georgia
14. Armenia
15. Azerbaijan
16. Cyprus
17. Baharin

East Asian Nations

These nations includes:

1. China
2. Japan
3. Mongolia
4. North Korea
5. South Korea
6. Japan

- Asia is separated from Europe by Ural Mountains, Ural River, Caspian Sea, Caucasus mountains and the Black Sea.

Asia is known as the continent of extremes and the continent of contrast. Why?

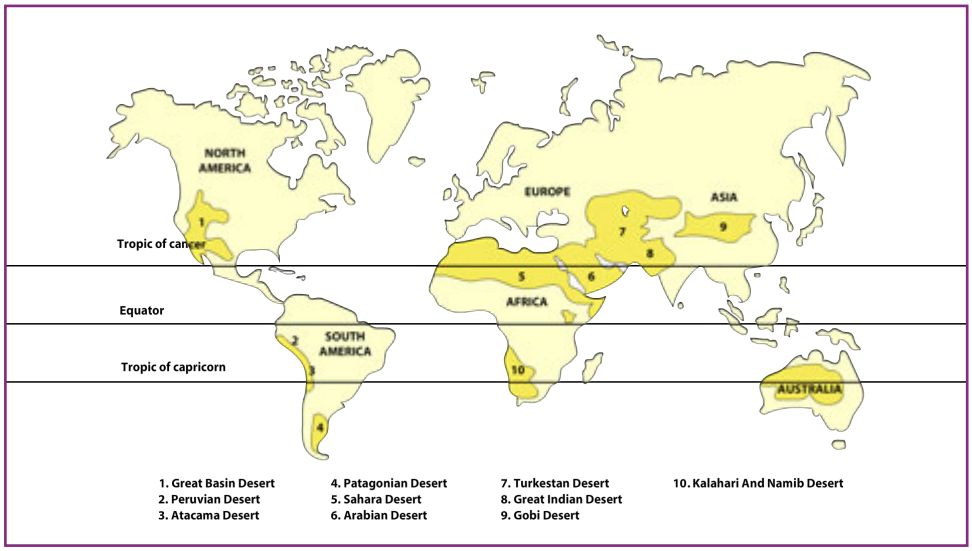
1. The highest peak on earth is found in Asia that is Mount Everest (8848.86 m above sea level).

2. The lowest point is the Dead Sea which is 427m below sea level.

3. The coldest habituated place is Verkhoyansk which is having the average temperature -52°C.

4. The hottest habituated place is Jacobabad, Pakistan which is having the highest temperature in summer as 52°C.

5. Mawsynram is the wettest place on the earth having the average rainfall of above 400cm.



6. Most of the world's deserts are located in Asia:
   1. Arabian desert (Saudi Arabia)
   2. Turkestan desert (Turkmenistan)
   3. Great Indian desert (India)
   4. Gobi desert (Mongolia)

Tenses

Choose the correct tense form to fill in the blank.

1. He did not _____ part in the debate.

(A) took (B) taken

(C) take (D) takes

2. He _____ not taken anything till then.

(A) have (B) has

(C) had (D) did

3. Has he not _____ to school for many days?

(A) coming (B) came

(C) come (D) been coming

4. Her train _____ at 8.35 a.m. tomorrow.

(A) arrives (B) is arriving

(C) will be arriving (D) arrive

5. The light went out while I _____.

(A) reading (B) were reading

(C) am reading (D) was reading

6. The father with his two sons _____ to witness the match.

(A) is going (B) was going

(C) are going (D) were going

7. Scoring well in Mathematics _____ in getting first division.

(A) help (B) will be help

(C) helps (D) helped

8. She _____ awake for a while now to finish her project at the earliest.

(A) was (B) had been

(C) has been (D) was being

9. Had the bell _____ before you reached home?

(A) ring (B) rang

(C) rung (D) has rung

10. One hardly _____ what to do.

(A) knew (B) know

(C) knows (D) known

Answers

1. (C)	**2.** (C)	**3.** (D)	**4.** (A)	**5.** (D)
6. (A)	**7.** (C)	**8.** (C)	**9.** (C)	**10.** (C)

Number - Alphabet Test and Calendar

1 Shortcut method for alphanumeric pattern :-

P 3 + % 7 F * 1 @ ? 2 3 A 5 # 9 – Q ©

Which element will be 6th to the left of 5th to the left of 12th to the right of 15th element from the right end?

Steps to solve :-

- What is written at the end?

From the (right) end

Use '–' for every (right)

&

'+' for every (left)

From the (left) end

Use '–' for every (left)

&

'+' for every (right)

So, 15 – 12 + 5 + 6 = 14

- 14^{th} element from which end?

Left **OR** **Right**

Check the end of the question

Right End **Left End**

14^{th} element from the (right) end

14^{th} element from the (left) end

Hence 'F' is 14^{th} element from right end.

Try This 1

a 5 7 ÷ h © * 2 1 c $ 8 k 3 @ 5 e = Δ 6 □

In the above sequence which element will be 2^{nd} to the right of 7^{th} to the left of 5^{th} to the right of 15^{th} element from the left end?

2 Zeller's rule : Find the day of the given date quickly.

$$d = K + [(13M - 1)/5] + D + [D/4] + [C/4] - 2C$$

- d ⟶ Number of the odd days remain
- K ⟶ Day of the month given
- M ⟶ Month (Starting March = 1, April = 2, ... January = 11 and February = 12)
- D ⟶ Last two digits of the year
- C ⟶ First two digits of the year
- [ ] ⟶ Take only the integral value and ignore the value after decimal.
- Last step ⟶ Divide the value of d by 7 and use the remainder as the code of the day of the week.

Example : *What will be the day on 14th December 2021?*

Sol : $d = 14 + [(13 \times 10 - 1)/5] + 21 + \left[\frac{21}{4}\right] + \left[\frac{20}{4}\right] - 2 \times 20$

$= 14 + \left[\frac{129}{5}\right] + 21 + \left[\frac{21}{4}\right] + \left[\frac{20}{4}\right] - 40$

$= 14 + [25.8] + 21 + [5.25] + [5] - 40$

$= 14 + 25 + 21 + 5 + 5 - 40$

$$7\overline{)30}\,(4$$
$$\underline{28}$$
$$2 \longleftarrow \text{Remainder}$$
$$\downarrow$$
Tuesday

What was the day of the week on 15th August 2010?

Answers

Try This-1

@

Try This - 2

Sunday

THE FIRST WOMAN TO WIN A NOBEL PRIZE

Happy Birthday

Marie Curie

Born - 7 Nov 1867
Died - 4 July 1934

Marie Curie was born on November 7, 1867 in warsow, capital of Poland. She died in 1934 from Leukemia in Paris.

- She studied physical at the Sorbonne, in Paris.
- She was the discover of Polonium and Radium.

Marie Curie is famous for her work on radioactivity. She was the first woman to win a Nobel Prize, the only woman to win in two fields, and the only person to win in multiple sciences. She was also the first woman to become a professor at the University of Paris.

NSEs
National Standard Examinations
2023-24 Result

Aakash

1430 Students Scored Above MAS

344 Students Qualified for *INO-2024

(Group A & B)
34+30
NSEA*

156
NSEB*

72
NSEC*

23
NSEP*

29
NSEJS*

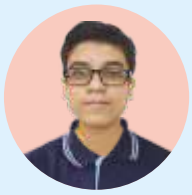
Our Toppers from Classroom Programs

Diptanshu Sharma
NSEB | NSEC | NSEP

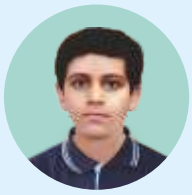
Priyanshu Sarkar
NSEB | NSEC | NSEP

Mridul Garg
NSEB | NSEC | NSEP

Zaman Husain
NSEA | NSEC | NSEP



Shubhradeep Paul
NSEA | NSEC | NSEP



Samvit Shandilya
NSEA | NSEC | NSEP

Ujjwal Singh
NSEA | NSEC | NSEP

Krishna S S Vuppala
NSEA | NSEC | NSEP

Utkarsh Awadhiya
NSEA | NSEB

V Koushik Raghavan
NSEA | NSEB

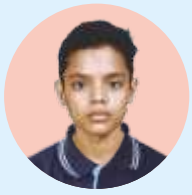
Om Amrit Mohanty
NSEB | NSEC

Aditya Dagwar
NSEB | NSEC

Aadesh Nichat
NSEB | NSEC

Harsh Raj
NSEB | NSEC

Rishi S Shukla
NSEC | NSEP



Keshaw Ranjan
NSEA | NSEC

Piyush Dhakar
NSEJS

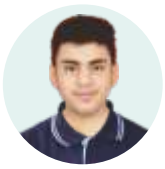
Sushant Agarwal
NSEJS

and many more...

* NSEA- National Standard Examination in Astronomy | NSEB- National Standard Examination in Biology | NSEC-National Standard Examination in Chemistry
NSEP- National Standard Examination in Physics | NESJS- National Standard Examination in Junior Science | INO-Indian National Olympiad

Our Top Performers

39
INO* Qualified Students for OCSCs/IMOTC APMO-2023


Lakshya Sharma
Qualified INBO


V Koushik Raghavan
Qualified INJSO


Anoop Singh
Qualified INPhO


Amritanshu Singh
Qualified INAO


Souptik Das
Qualified INChO


Harsh Raj
Qualified INBO


Mohit Shekher Shukla
Qualified INJSO


Aakash Gupta
Qualified INChO


Mridul Manya Anand
Qualified INBO

and many more...

Our Top Performers

108
Classroom Students
Qualified in RMO* 2023


Sahil Rai
4 Year Classroom


Zaman Hussain
2 Year Classroom


Samvit Shandilya
2 Year Classroom


Arnav Jindal
4 Year Classroom


Adithyan K
2 Year Classroom


Rishi S Shukla
2 Year Classroom


Deekshant Sharma
2 Year Classroom


Rujul Garg
2 Year Classroom


Aayush Agarwal
3 Year Classroom

and many more...

Our Top Performers

698
Classroom Students
Qualified in IOQM* 2023


Madhav Manu
Class XII


Zaman Hussain
Class XII


Gautham P A
Class XII

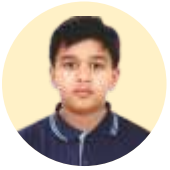

Samvit Shandilya
Class XI


Sahil Rai
Class XI


Arnav Jindal
Class XI


Rujul Garg
Class XI


Mohit S Shukla
Class X


Atiksh Jain
Class X

and many more...

*RMO -Regional Mathematical Olympiad | **IOQM -** Indian Olympiad Qualifier in Mathematics
INOs - Indian National Olympiads | **OCSCs** - Orientation cum Selection Camps
IMOTC - International Mathematical Olympiad Training Camp | **APMO -** Asian Pacific Mathematics Olympiad