



# Aakash

Medical | IIT-JEE | Foundations

# KNOWLEDGE BYTES

JANUARY 2026

CLASS 9





# Aakash

## Medical | IIT-JEE | Foundations

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**Edition: 2025-26**

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# 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

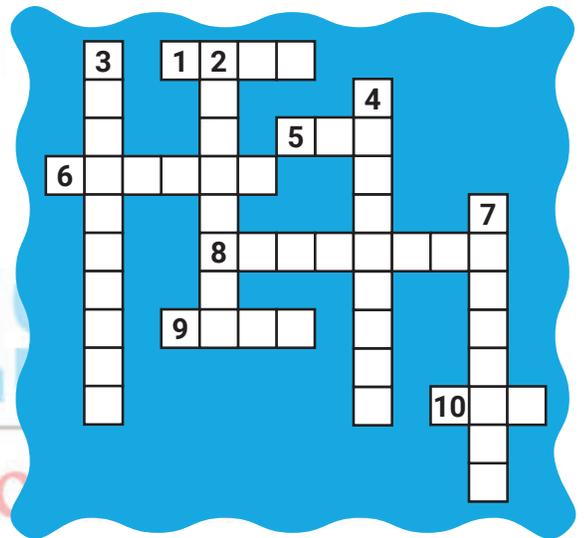
- |                                    |       |
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# Co-ordinate Geometry

## Crossword

### ACROSS

- 1 The coordinate axes divide the Cartesian plane into \_\_\_\_\_ quadrants. [4]
- 5 The Cartesian plane consists of \_\_\_\_\_ axes. [3]
- 6 Point of intersection of x-axis and y-axis is called \_\_\_\_\_. [6]
- 8 The x-coordinate is also called \_\_\_\_\_. [8]
- 9 The y-coordinate of every point on x-axis is \_\_\_\_\_. [4]
- 10 Distance formula is valid for \_\_\_\_\_ quadrants. [3]



### DOWN

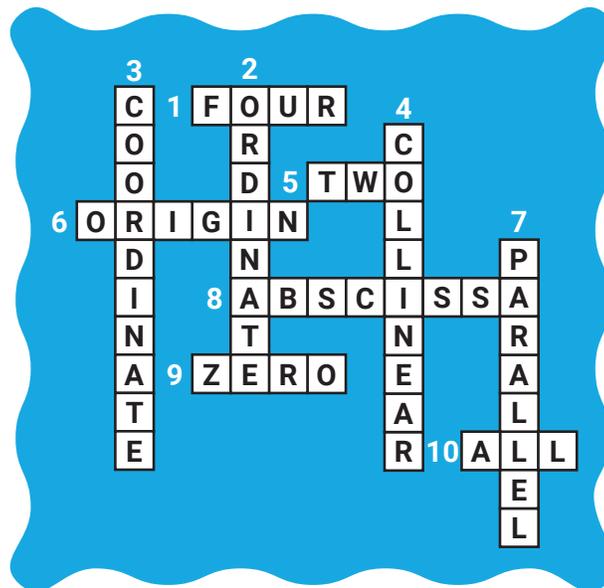
- 2 The y-coordinate is also called \_\_\_\_\_. [8]
- 3 The \_\_\_\_\_ axes divide the plane into four quadrants. [10]
- 4 Three points A, B and C are such that  $AB + BC = AC$ , then these points are \_\_\_\_\_. [9]
- 7 Parallelogram is a quadrilateral in which each pair of opposite sides are \_\_\_\_\_. [8]

## Quiz Time

- 1 Find the distance between  $(a, b)$  and  $(-a, -b)$ .
- 2 Point of intersection of x-axis and y-axis is called
  - (a) Origin
  - (b) Abscissa
  - (c) Ordinate
  - (d) Axes
- 3  $(2a, 4a)$ ,  $(2a, 6a)$  and  $(2a + \sqrt{3}a, 5a)$  are vertices of a/an
  - (a) Isosceles triangle
  - (b) Equilateral triangle
  - (c) Scalene triangle
  - (d) Isosceles right triangle
- 4 Find the distance between  $A(at_1^2, 2at_1)$  and  $B(at_2^2, 2at_2)$  if  $t_1 t_2 = -1$ .
- 5 Find the distance between mid-point of line segment AB with  $A(2, -7)$   $B(9, -2)$  and the point  $C(5, -6)$ .

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## Answer (Crossword)



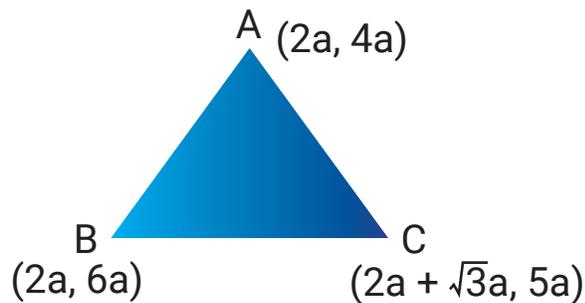
## Answer (Quiz Time)

1 Distance formula =  $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

$$= \sqrt{(-a - a)^2 + (-b - b)^2}$$
$$= \sqrt{(-2a)^2 + (-2b)^2}$$
$$= \sqrt{4a^2 + 4b^2}$$
$$= \sqrt{4(a^2 + b^2)}$$
$$= 2\sqrt{a^2 + b^2}$$

2 (a) Origin

3 (b) Equilateral triangle



$$AB = \sqrt{(2a - 2a)^2 + (6a - 4a)^2} = \sqrt{(2a)^2} = 2a$$

$$BC = \sqrt{(2a + \sqrt{3}a - 2a)^2 + (5a - 6a)^2} = \sqrt{3a^2 + a^2} = 2a$$

$$AC = \sqrt{(2a + \sqrt{3}a - 2a)^2 + (5a - 4a)^2} = \sqrt{3a^2 + a^2} = 2a$$

$$\Rightarrow AB = BC = AC$$

So, ABC is an equilateral triangle.

$$\begin{aligned}
\text{4 Distance between two points} &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\
&= \sqrt{(at_2^2 - at_1^2)^2 + (2at_2 - 2at_1)^2} \\
&= \sqrt{a^2(t_2^2 - t_1^2)^2 + 4a^2(t_2 - t_1)^2} \\
&= \sqrt{a^2(t_2 - t_1)^2 (t_2 + t_1)^2 + 4a^2(t_2 - t_1)^2} \\
&= a(t_2 - t_1) \sqrt{t_1^2 + t_2^2 + 2t_1t_2 + 4} \\
&= a(t_2 - t_1) \sqrt{t_1^2 + t_2^2 - 2 + 4} \quad (\because t_1t_2 = -1) \\
&= a(t_2 - t_1) \sqrt{t_1^2 + t_2^2 + 2 \times 1} \\
&= a(t_2 - t_1) \sqrt{t_1^2 + t_2^2 + 2 \times (-t_1t_2)} \quad (\because 1 = -t_1t_2) \\
&= a(t_2 - t_1) \sqrt{t_1^2 + t_2^2 - 2t_1t_2} \\
&= a(t_2 - t_1) \sqrt{(t_2 - t_1)^2} \\
&= a(t_2 - t_1)^2 = a(t_1 - t_2)^2
\end{aligned}$$



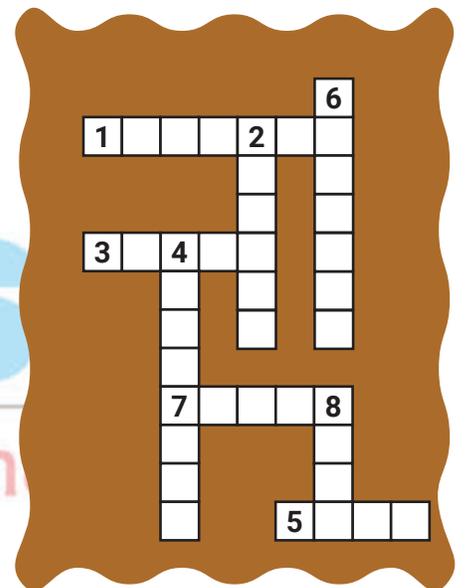


# Force and Laws of Motion

## Crossword

### ACROSS

- 1 The product of force and time is called \_\_\_\_\_.
- 3 A push or a pull on an object is called \_\_\_\_\_.
- 5 A body is said to be under balanced forces, when the resultant force acting on the body is \_\_\_\_\_.
- 7 Recoil velocity of gun is an example of Newton's \_\_\_\_\_ law.



### DOWN

- 2 The product of mass and velocity is called \_\_\_\_\_ momentum.
- 4 To every action there is an equal and opposite \_\_\_\_\_.
- 6 \_\_\_\_\_ force is always pulling in nature.
- 8 The CGS unit of force is \_\_\_\_\_.



## Scientific Contribution

### Isaac Newton



Sir Isaac Newton's three laws of motion describe the motion of bodies and how they interact. While Newton's law may seem obvious to us today, more than three centuries ago they were considered revolutionary.

Newton developed the three laws of motion which form the basic principles of modern physics. His work in optics included the study of white light and the discovery of the colour spectrum.

## Newton's law and its real life applications

### Newton's first law of motion

According to this law, a body at rest or in uniform motion will continue to be in the state of rest or uniform motion unless it is compelled by an unbalanced external force to change its state of rest or uniform motion.

### Real life application

- An athlete runs for a certain distance before taking a long jump.
- A person sitting / standing on a bus falls back when the bus suddenly starts moving forward.
- The carpet is beaten with a stick to remove the dust particles.



## Newton's second law of motion

The acceleration produced in the body by the action of a force acting on it is directly proportional to the force and inversely proportional to the mass of the body.

Mathematically,  $F = ma$ ,  
where,  $F =$  force,  $m =$  mass of the body.  
 $a =$  acceleration

In other words, Newton's second law of motion can be stated as: The rate of change of linear momentum is equal to the force applied to the body and the change in momentum always takes place in the direction of the force.

### Real life application

- A cricket player lowers his hands while catching a ball.
- A person falling on a cemented floor gets injured, but a person falling on a heap of sand does not get injured.

## Newton's third law of motion

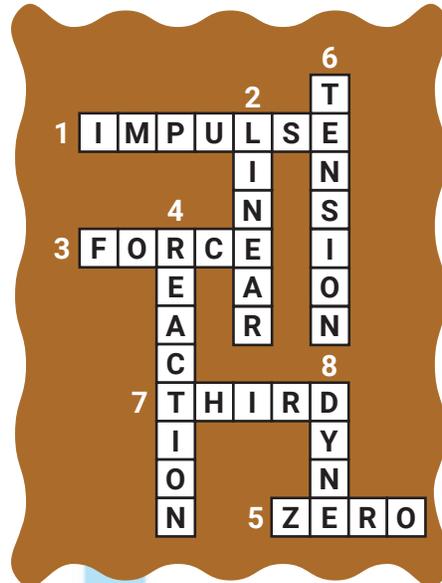
For every action, there is an equal and opposite reaction (Law of action and reaction)

### Real life application

- Gun gives a jerk to shoulder of the gunman on firing a bullet from it.
- Boatman pushes the river bank with a bamboo pole to take his boat into the river.



## Answer (Crossword)



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# Matter in Our Surroundings

## St. Elmo's Fire



St. Elmo's fire is a persistent blue glow that occasionally appears near pointy objects during storms. It is a luminous plasma discharge from a pointed object. That is why it usually emanates from the nose of a plane or the mast of a ship.

St. Elmo's Fire was named by sailors of old time. They couldn't understand what caused the glow around their ship that looked like a sort of divine fire and named it after St. Erasmus, also known as St. Elmo. He is the patron saint of sailors. The appearance of the mysterious glow was said to be a good omen of the saint watching over the crew, though it may be scary.

The glow and subsequent discharge typically occur when a plane or ship comes near a thunderstorm or volcanic activity. It can also occur on the tops of buildings and electrical towers.

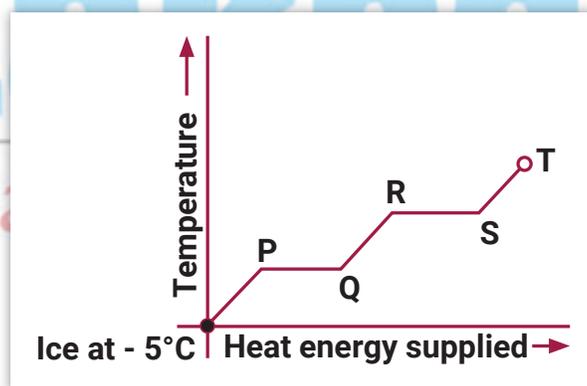


## Scientific Explanation Behind the St. Elmo's Fire

When the electrical field around a pointed object builds a sufficient charge, it ionizes the air around it and turns it into plasma. The blue/violet colour is the result of nitrogen and oxygen, which make up the majority of the atmosphere. Although the glow and discharge bursts can sometimes make a hiss or buzz, St. Elmo's Fire itself is completely harmless.

### Quiz Time

Consider the given graph.



- 1 State of matter represented by the portion PQ of the graph
- 2 State of matter represented by the portion RS of the graph
- 3 Temperature at portion PQ of the graph
- 4 Temperature at portion RS of the graph
- 5 The heat supplied during portion RS of the graph.

# Match the following

Match the following images with the corresponding phenomenon

(a)	Evaporation	•	•		(i)
(b)	Condensation	•	•		(ii)
(c)	Osmosis	•	•		(iii)
(d)	Melting	•	•		(iv)
(e)	Boiling	•	•		(v)
(f)	Surface Tension	•	•		(vi)
(g)	Diffusion	•	•		(vii)
(h)	Fluidity	•	•		(viii)



## Answer (Quiz Time)

1 Solid + Liquid (Ice + Water)

2 Liquid + Gas (Water + Vapour)

3 0 degree Celsius  
(melting point)

4 100 degree Celsius  
(boiling Point)

5 Latent heat of vaporisation

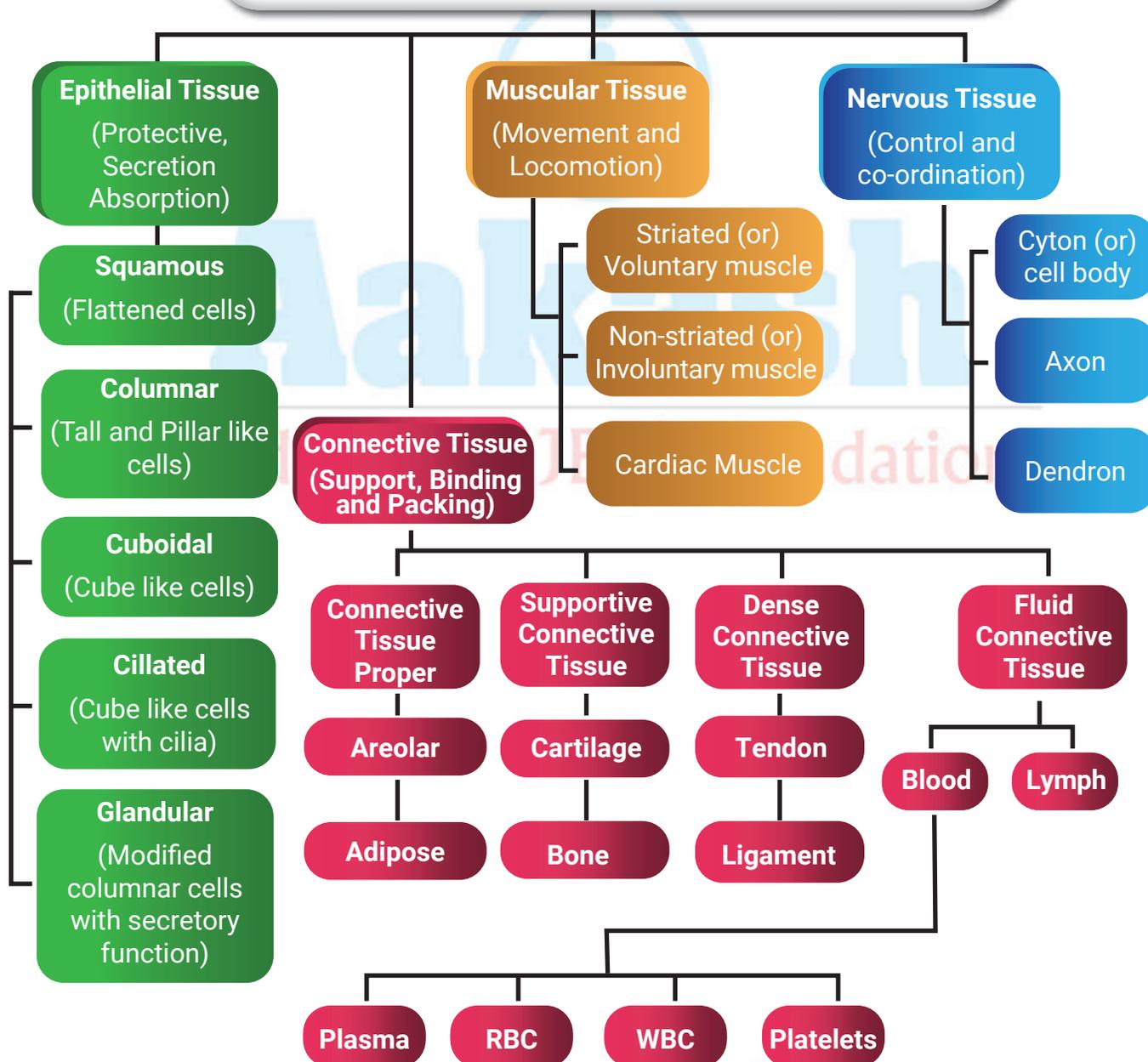
## Answer (Match the following)

(a)	→	(v)
(b)	→	(iv)
(c)	→	(vi)
(d)	→	(i)
(e)	→	(vii)
(f)	→	(viii)
(g)	→	(iii)
(h)	→	(ii)

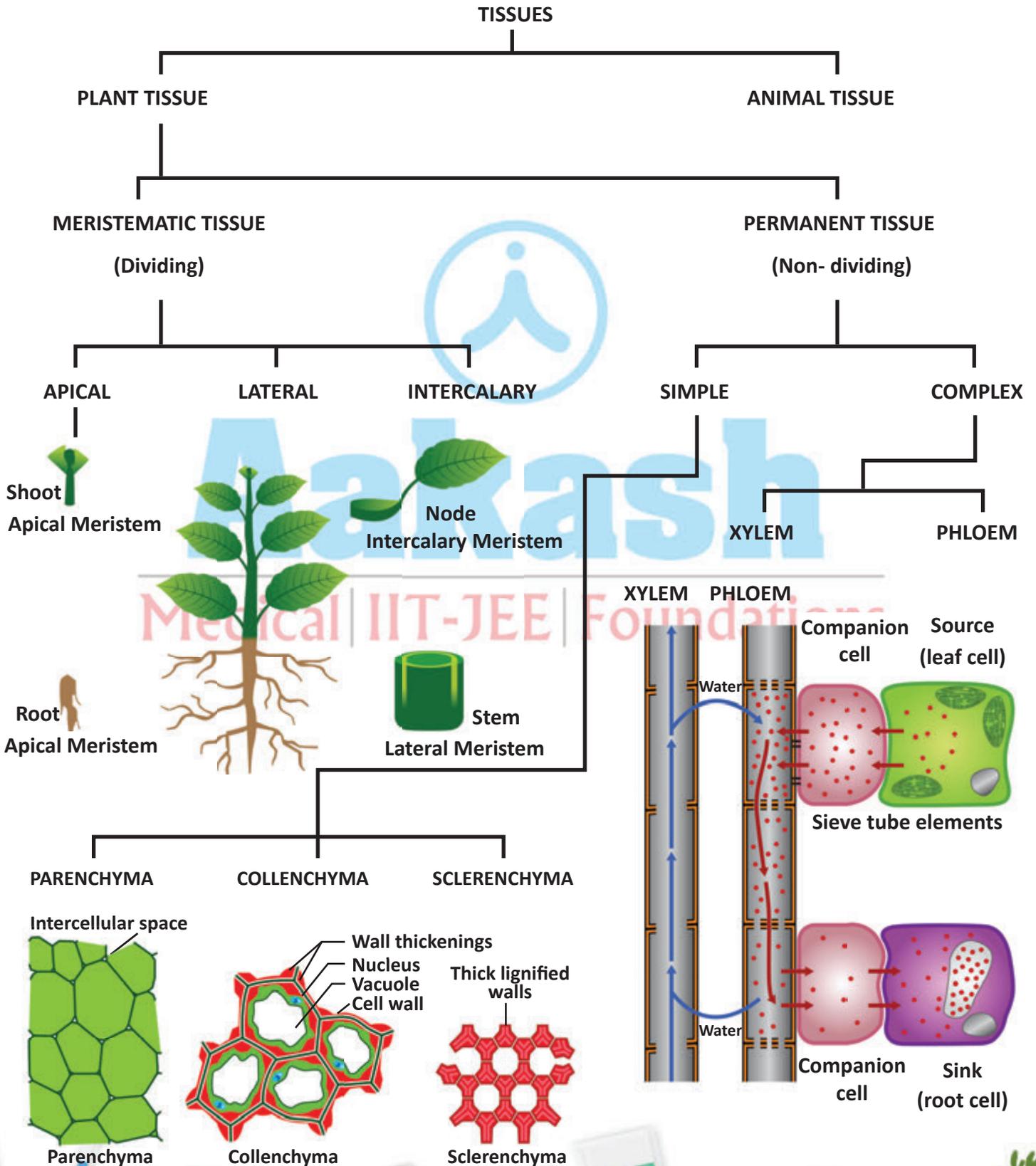


# Tissues

## Classification of Animal Tissues



# Concept Map



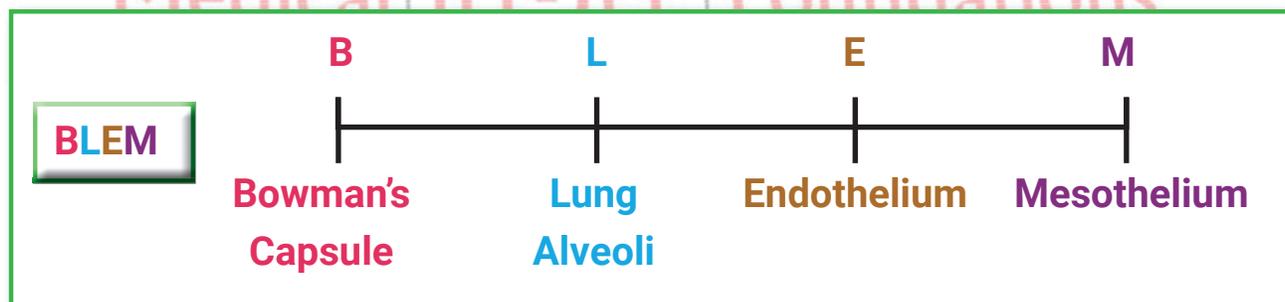


## Interesting Facts About Tissues

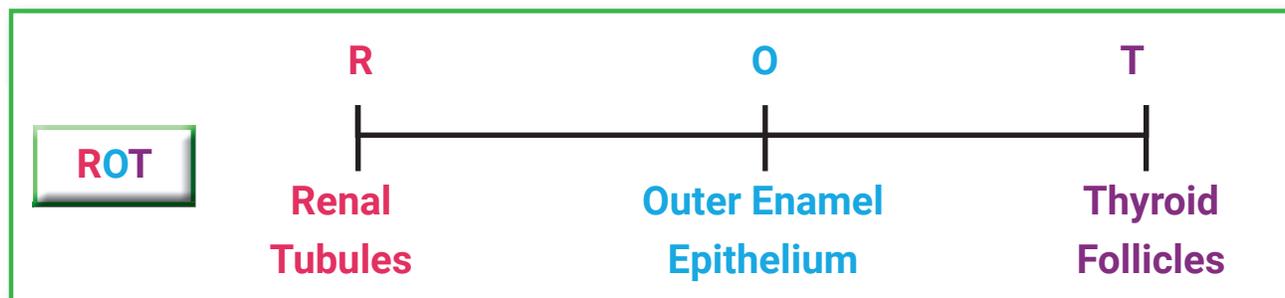
- 1 Ciliated epithelium helps in removing dust particles and germs from the air you breathe in.
- 2 Epithelial tissue make our skin waterproof, as they are filled with keratin protein.
- 3 A new born baby has around one cup of blood in his body.
- 4 If we put all neurons in our body in a line, it will be around 6000 miles long.
- 5 In every 7 years you have a new skeleton, as the collagen in bone constantly replenishes itself.

## Mnemonics about Tissues

### Simple Squamous



### Simple Cuboidal



## Answer (Riddles)

1 A P P L I C A T I O N S

2 P A R E N C H Y M A

3 E P I D E R M I S

4 G U A R D C E L L S

5 C O R K

6 X Y L E M

7 S C L E R E N C H Y M A



# Natural Vegetation and Wildlife

## India State of Forest Report (ISFR) 2019

According to this report, the forest cover in India is 21.67 per cent.

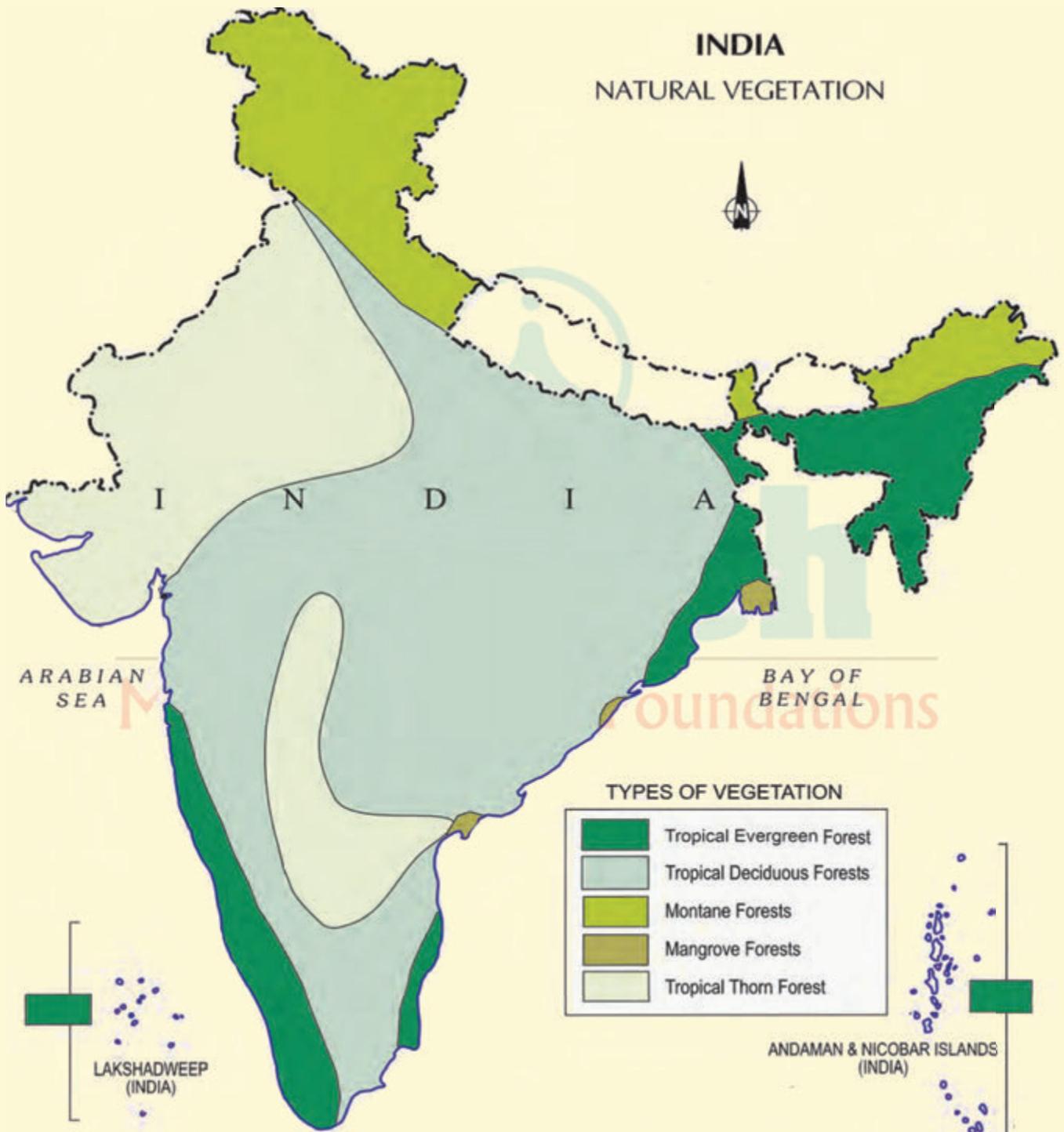
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### Forest Cover

- Madhya Pradesh has the largest area under permanent forests, constituting 75 per cent of its total forest area.
- All North-Eastern states and parts of Gujarat have a very high percentage of their forests as unclassified forests managed by local communities.



# INDIA NATURAL VEGETATION



# Steps taken to protect the flora and fauna of the country

## Wildlife (Protection) Act 1972

Protection of wildlife by controlling poaching, smuggling and illegal trade.



## Specialized Projects

- Project Tiger - 1973
- Project Crocodile - 1975
- Project Rhinoceros - 1987
- Project Elephant - 1988

## Establishment of Protected Areas

- Biosphere Reserves
- National Parks
- Wildlife Sanctuaries
- Bird Sanctuaries
- Community Reserves





# Articles

Articles are of two types

1. Indefinite a / an

2. Definite the

1 \_\_\_\_\_ man who is wearing a black shirt is my father. My mother is \_\_\_\_\_ doctor.

- (a) A, the (b) The, a  
(c) The, the (d) A, a

2 She asked her mother for \_\_\_\_\_ money to buy a laptop.

- (a) a (b) an  
(c) the (d) no article

3 \_\_\_\_\_ car is ready now. You can visit the showroom to collect it.

- (a) A (b) An  
(c) The (d) No article

4 Mount Everest is \_\_\_\_\_ highest mountain in \_\_\_\_\_ world.

- (a) the, the (b) X (No Article), X (No Article)  
(c) the, X (No Article) (d) X (No Article), a

5 Everyone has to write business letters of some sort; and may have to face some problem in writing \_\_\_\_\_ important letters.

- (a) a (b) an  
(c) the (d) no article

**6** All of \_\_\_\_\_ sudden \_\_\_\_\_ sky became too dark, as if it was covered with \_\_\_\_\_ thick cloud.

(a) the, a, the

(b) the, the, the

(c) a, the, a

(d) a, a, the

**7** \_\_\_\_\_ grey car belongs to my father.

(a) A

(b) An

(c) The

(d) No article

**8** Such \_\_\_\_\_ girl is not fit for \_\_\_\_\_ role.

(a) X (No article), a

(b) a, a

(c) the, X (No article)

(d) a, the

**9** There is \_\_\_\_\_ index at \_\_\_\_\_ end of the book.

(a) the, the

(b) an, the

(c) an, a

(d) the, a

**10** \_\_\_\_\_ seal is \_\_\_\_\_ excellent swimmer.

(a) A, the

(b) The, an

(c) X (No article), an

(d) The, the

## Answer

**1** (b) The, a

**2** (c) the

**3** (c) The

**4** (a) the, the

**5** (c) the

**6** (c) a, the, a

**7** (c) The

**8** (d) a, the

**9** (b) an, the

**10** (b) The, an

# Number and Alphabet Test

## Quiz Time

A \* 5 9 I N & E @ # U 1 &

**1** How many vowels in the above arrangement are immediately preceded by a symbol?

- (a) One                      (b) Two                      (c) Three  
(d) Four

**2** Which is the second element to the left of the sixth element from the right end ?

- (a) &                      (b) @                      (c) N  
(d) E

435 224 786 823 902

**3** When all the digits in each of the given numbers are arranged in ascending order, which number becomes the highest?

- (a) 435                      (b) 224                      (c) 786  
(d) 823

@ 1 8 H L I 6 K \* & ? U E

- 4** How many such consonants are there in the series which are immediately followed by a symbol and preceded by a number?
- (a) One                      (b) Two                      (c) Three  
(d) None

1 5 8 4 2 1 5 2 3 4 5 6 7 8 9 5 1 4 1 5 6 8 7 4

- 5** Which of the following is ninth to the left of twenty first from the left end in the above arrangement?
- (a) 7                      (b) 5                      (c) 6  
(d) 8

1 5 8 4 2 1 5 2 3 4 5 6 7 8 9 5 1 4 1 5 6 8 7 4

- 6** How many such 1's are there in the above arrangement each of which is immediately followed by a perfect square?
- (a) None                      (b) One                      (c) Two  
(d) Three

1 5 8 4 2 1 5 2 3 4 5 6 1 4 7 6 2 8 9 5 6 4 1 5 6

- 7** How many such 4's are there in the above arrangement each of which is immediately preceded by a digit which has a numerical value more than four?
- (a) None                      (b) One                      (c) Two  
(d) Three

**8** The Next alphabetical pair is

ZA BY XC DW ?

(a) VF

(b) EU

(c) UE

(d) VE

**9** If the digits in the number 79246358 are arranged in descending order from left to right, what will be the difference between the digits which are third from the right and second from the left in the new arrangement?

(a) 1

(b) 2

(c) 3

(d) 4

**10** The positions of how many letters will remain the same if each of the letter in the word DETRIMENT is rearranged in the alphabetical order from left to right?

(a) None

(b) One

(c) Two

(d) Three



## Answer (Quiz Time)

- 1 (b) Two  
"E" is preceded by "&" and "U" is preceded by "#"
- 2 (c) N  
Sixth element from the right end is E and second to its left is N
- 3 (c) 786
- 4 (a) One  
K, is followed by "\*" and preceded by "6"
- 5 (c) 6
- 6 (b) One
- 7 (c) Two
- 8 (d) VE
- 9 (d) 4
- 10 (d) Three



*Happy Birthday*

# Stephen Hawking

“ The greatest enemy of knowledge is not **IGNORANCE**, it is the **ILLUSION** of knowledge. ”



Born - 8 Jan 1942  
Died - 14 Mar 2018

Stephen Hawking was born in Oxford, England on January 8, 1942. He grew up in a highly educated family. Both of his parents had attended Oxford University and his father, Frank, was a medical researcher.

*Hawking's contributions to physics earned him many exceptional honours. In 1974 the Royal Society elected him one of its youngest fellows. He became professor of gravitational physics at Cambridge in 1977, and in 1979 he was appointed to Cambridge's Lucasian professorship of mathematics, a post once held by Isaac Newton.*

NEET 2025 Wasn't Easy. Our Results Say Otherwise.

## 5 AAKASHIANS IN TOP 10 AIR NEET(UG) 2025



## OUR NATIONAL TOPPERS IN NEET (UG) 2025



Our Problem *Solvers* shine bright in **JEE (Advanced) 2025**

### Our Top 100 AIR



# Aakashians Create History in International Olympiads

(Classroom Program Students)



**Dhruv Advani**

**IBO 2023**



**Gold Medalists**

**34<sup>th</sup> International Biology Olympiad**



**Rohit Panda**



**Chirag Falor**



**International Olympiad on Astronomy & Astrophysics**



**Dhiren Bhardwaj**



**32<sup>nd</sup> International Biology Olympiad**



**Anshul**



**32<sup>nd</sup> International Biology Olympiad**



**Amritansh Nigam**



**33<sup>rd</sup> International Biology Olympiad**



**Prachi Jindal**



**33<sup>rd</sup> International Biology Olympiad**



**Tanishka Kabra**



**54<sup>th</sup> International Chemistry Olympiad**

**1484 Students Scored Above MAS**

**420**

Classroom Students  
Qualified in  
NSEs\* 2024-25

(Group A & B)

**49**  
NSEA\*

(Group A & B)

**229**  
NSEB\*

(Group A & B)

**70**  
NSEC\*

(Group A & B)

**38**  
NSEP\*

**34**  
NSEJS\*

**Aakashians Qualified for INO-2025**



**Krishna Agrawal**  
NSEA | NSEP | NSEC



**Mohit Shekher Shukla**  
NSEA | NSEP | NSEC



**Utkarsh Awadhya**  
NSEB | NSEP | NSEC



**Rupayan Pal**  
NSEC | NSEP | NSEP



**Devansh Garg**  
NSEJS



**Aaron Thakkar**  
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 | NSEJS-National Standard Examination in Junior Science | INO-Indian National Olympiad

## Aakashians Qualified for RMO 2024

899

Classroom Students

Qualified  
in IOQM  
2024



Joish Achyuta  
Class - VIII



Dhanush Damu  
Class - IX



Arnav Singh  
Class - X



Pranit Goel  
Class - XI



Aayush Agarwal  
Class - XII

and many more...

## Aakashians Qualified for INMO 2025

161

Classroom Students

Qualified  
in RMO 2024-25



Kotha D Reddy  
Reg. No. 00006657265



Abhipraya Verma  
Reg. No. 00010407513



Aditya Singh  
Reg. No. 00012631688



Rujul Garg  
Reg. No. 00005153903



Mohit Shekher Shukla  
Reg. No. 00006093814

and many more...

## Aakashians Qualified for OCSC/IMOTC-2025

25

Classroom Students

Qualified  
in INOs 2025



Pranit Goel  
Qualified INMO



Harshit Singh  
Qualified INJSO



Subhrojit Paul  
Qualified INBO



Mohit Shekher Shukla  
Qualified INChO



Rujul Garg  
Qualified INPhO



Aditya Singh  
Qualified INAO Jr

and many more...

## Aakashians Qualified for Merit Certificate

1019

Classroom Students

Qualified  
in IMO (Level-I)  
2023-24



Intl.  
Rank  
1

Prisha Miglani  
Class - IX



Intl.  
Rank  
2

Sushant Agarwal  
Class - X



Intl.  
Rank  
4

Ekaashar Gupta  
Class - IX



Intl.  
Rank  
7

Harshit Singh  
Class - VIII

438

Classroom Students

Qualified  
in IMO (Level-II)  
2024

and many more...

## Aakashians Qualified for Merit Certificate

4902

Classroom Students

Qualified  
in NSO (Level-I)  
2024-25



Intl.  
Rank  
2

Meghav Ladani  
Class - X



Intl.  
Rank  
2

Anubhab Manna  
Class - VIII



Intl.  
Rank  
3

Arnav Gupta  
Class - IX



Intl.  
Rank  
7

Parshti Bajpai  
Class - IX



Intl.  
Rank  
10

Shreya  
Class - VIII

and many more...