FOUNDATION & OLYMPIAD

CLASS-V
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INTRODUCTION

In daily life, the importance of measurement is well known. When we have to bring fruits, vegetables etc. from the market then the seller measures their quantity using beam balance and we have to pay him accordingly. The tailor needs exact measurement of our body to stitch our dresses. We always have an approximation that how much time will be spent on a journey for our convenience. Thus we can conclude that measurement is an essential part of everyday life.

1.1 NEED TO MEASURE DISTANCE

The role of measurement in our day to day life is very important. Without actual measurement you can not do your work in an effective manner. Measurement is necessary in everyday life. We buy or sell anything from the market; shopkeeper sells his items such as sugar, rice or anything by measurement of their mass. A worker is paid for the time (days) he devotes to his duty. When a person is sick, the doctor measures his temperature. The use of measurement not only makes life easy for all of us but also helps us to save time, effort and money.
1.2 WHAT IS MEASUREMENT
Measurement means the comparison of two quantities.

Look at the two lines given in the figure. Can you tell which line is longer?
Now measure both the lines with the help of a scale, and find the answer.
Measurement is the process which determines as to how many times a given physical quantity is in relation to the unit of that quantity. The result of measurement is not complete unless we specify both the number and the unit involved in it.

1.3 NEED OF STANDARD UNIT
In ancient times, body units such as cubits, hand span, foot length space of a footstep, and width of four fingers etc. were commonly used. But as you know, body parts vary from person to person. Therefore no one could be sure that their measurement of the same thing would be equal. Hence people recognised the need for a single accurate, world wide measurement system.

1.4 SOME STANDARD UNITS OF MEASUREMENT
For accurate measurement we need some standard representation of every physical quantity. A standard unit is a standard measure that has some definite and convenient quantity in it, so that it remains the same whenever, by whoever and wherever.

<table>
<thead>
<tr>
<th>Physical Quantity</th>
<th>SI Units</th>
<th>Symbol for unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length</td>
<td>Metre</td>
<td>m</td>
</tr>
<tr>
<td>Mass</td>
<td>Kilogram</td>
<td>kg</td>
</tr>
<tr>
<td>Time</td>
<td>Second</td>
<td>S</td>
</tr>
<tr>
<td>Temperature</td>
<td>kelvin</td>
<td>K</td>
</tr>
<tr>
<td>Electric current</td>
<td>ampere</td>
<td>A</td>
</tr>
</tbody>
</table>

In our country, the National Physical Laboratory (NPL) at New Delhi is responsible for maintaining the national standards for all SI units.
Some other systems are:
1. F.P.S. system (foot, pound, second)
2. C.G.S. system (Centimetre, gram, second)
3. M.K.S. (Metre, kilogram, second)

1.5 INTRODUCTION OF MOTION
We live in a world of motion. Motion is one of the most important aspects of our daily life. Every day, we observe things which are either stationary or moving. Animals move in many ways, vehicles move around us, birds fly, tortoises crawl. The earth and other planets also move in set pattern. On the other hand, chairs tablets, your book, house, school, mountains, plants, trees are found stationary and are not in motion. Such things are said to be at rest.

Rest: When a body remains in one position for a long time, it is said to be at rest. For example, the chairs of the dining table are at rest unless and until they are moved, and the flower vase, table, and the blackboard in the class room are all at the position of rest.
Motion: The act, process or state of the change in place or position of a body with respect to time and relative to the observer is said to be motion. For example the blades of a rotating fan, the hands of a working wall clock, a moving car, a spinning top and satellites are all in motion.

1.6 TYPES OF MOTION

(a) Translatory: Translatory motion is that in which all the particles of a body move through the same distance in the same time.
Example: An apple falling down from a tree, the rolling of the ball, the path of cricket ball after hitting a bat etc. There are two main types of translatory motion.
(i) Rectilinear Motion: Movement of an object along a straight line is called rectilinear motion or linear motion. For example, a child slipping down a slide, a car moving on a straight road, an apple falling down from a tree.
(ii) Curvilinear motion: Movement of an object along a curved line is said to be curvilinear motion. For example, motion of cyclist around a circular path.

(b) Circular Motion: Circular motion is the motion of an object that moves at a fixed distance from a fixed point. Here, all objects rotate in circular motion. So, circular motion is motion in which the body traverses a circular path. The hands of a clock, a merry-go-round, the blades of a fan, the wheel of a moving vehicle, satellites, a spinning top, are all good examples of circular motion.

(c) Periodic Motion: Periodic motion is motion that repeats itself at regular intervals of time. For example, the pendulum of a wall clock moves at regular intervals, the bells in a church, a bouncing ball, a vibrating string and a swinging cradle are all in periodic motion.
Ask yourself

To find the thickness of one-rupee coin.
Material required 20 coins of one-rupee, a metre scale.

**Method:** Prepare a stack of 20 similar coins. Measure the thickness of this stack by using a scale as shown in figure alongside.
Divide the thickness of the stack by the number of coins, you will get the thickness of one coin

**Formula:** Thickness of one coin = \( \frac{\text{Total thickness of number of coins}}{\text{Total number of coins}} \)

Add to Your Knowledge

### Units of Length

<table>
<thead>
<tr>
<th>10 millimeters (mm)</th>
<th>1 centimetre (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 centimeters (cm)</td>
<td>1 metre (m)</td>
</tr>
<tr>
<td>1000 meters (m)</td>
<td>1 kilometre (km)</td>
</tr>
<tr>
<td>10 decimeters (dm)</td>
<td>1 metre (m)</td>
</tr>
</tbody>
</table>

### Units of Mass

<table>
<thead>
<tr>
<th>100 milligrams (mg)</th>
<th>1 gram (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 grams (g)</td>
<td>1 kilogram (kg)</td>
</tr>
<tr>
<td>100 kilograms = 1 quintal</td>
<td></td>
</tr>
<tr>
<td>10 quintal = 1 metric ton</td>
<td></td>
</tr>
</tbody>
</table>

### Units of Time

<table>
<thead>
<tr>
<th>60 seconds</th>
<th>1 minute</th>
<th>10 years</th>
<th>1 decade</th>
</tr>
</thead>
<tbody>
<tr>
<td>60 minutes</td>
<td>1 hour</td>
<td>10 decades</td>
<td>1 century</td>
</tr>
<tr>
<td>24 hours</td>
<td>1 day</td>
<td>100 years</td>
<td>1 century</td>
</tr>
<tr>
<td>365 days</td>
<td>1 year</td>
<td>10 centuries</td>
<td>1000 years (1 millennium)</td>
</tr>
</tbody>
</table>

Summary

- In every walk of life, measurement has a very important role to play.
- The SI unit for length is metre, mass is kilogram, and time is second.
- Some instruments used for measuring lengths include ruler, measuring tape, vernier caliper, and micrometer.
- Length and distance are interconnected. When the length is of a greater magnitude it is called distance.
- When the position of a body does not change with time, with respect to its surroundings, the body is said to be at rest.
- An object is said to be in motion if it changes its position with respect to the stationary objects.
- If a body moves as a whole such that every part of the body moves through the same distance in a given time, it has translatory motion.
MOTION & MEASUREMENT :

SECTION - A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS :

1. The SI unit of time is
   (A) day.    (B) hour.    (C) second.    (D) minute.

2. Blood flows through our veins and arteries in
   (A) fast motion.    (B) slow motion.    (C) rotatory motion.    (D) periodic motion.

3. The S.I unit of length is
   (A) centimetre.    (B) foot.    (C) metre.    (D) kilometre.

4. One centimeter is equal to
   (A) 10 km.    (B) 0.00001 km.    (C) 0.01 km.    (D) 0.001 km.

5. To measure the girth of a tree one may use
   (A) measuring tape    (B) beam balance    (C) balance wheel    (D) spring balance

6. Meter is equal to
   (A) 10 mm    (B) 100 mm    (C) 1000 mm    (D) 0.1 mm

7. Ten kilometres is equal to
   (A) 1000 centimetres.    (B) 10000 centimetres.    (C) 100000 centimetres
   (D) 1000000 centimetres.

8. Standard unit of measurement was created by
   (A) Indians.    (B) Romans.    (C) Italians.    (D) French.

9. When the position of the object changes with respect to surrounding with the passage of time
   (A) Rest    (B) Motion    (C) Both (A) and (B)    (D) None of these

10. The S.I. unit of mass is
    (A) kilogram.    (B) centigram    (C) milligram    (D) tonne.

FILL IN THE BLANKS

1. Length and distance are ________________.

2. The idea of _____________ is very important in our day-to-day living.

3. Different types of _____________ could be developed after the invention of the wheel.

4. The _____________ motion may be divided into rectilinear and curvilinear motion.

5. The movement of a pendulum may be termed as _____________ motion.
TRUE / FALSE
1. Rectilinear motion means movement on a curved path.
2. During circular motion there is no need for a fixed point.
3. It is possible for a single body to have a number of motions at the same time.
4. Before the invention of the wheel, humans never travelled from one place to another.

MATCH THE COLUMN

<table>
<thead>
<tr>
<th>Column-1</th>
<th>Column-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Measurement</td>
<td>a. ruler.</td>
</tr>
<tr>
<td>2. Length</td>
<td>b. divider.</td>
</tr>
<tr>
<td>3. Curved line</td>
<td>c. odometer.</td>
</tr>
<tr>
<td>4. Distance</td>
<td>d. development of different types of vehicle.</td>
</tr>
<tr>
<td>5. Invention of wheels</td>
<td>e. comparing a physical quantity with a standard one.</td>
</tr>
</tbody>
</table>

SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE
1. Write two examples for each of the following.
   1. Rectilinear motion
   2. Curvilinear motion
   3. Periodic motion
   4. Non-periodic motion

2. Define the following.
   1. Motion
   2. Periodic motion

SHORT ANSWER TYPE
3. Why do we need standard units of measurements?
4. Give one advantage of using SI units.

LONG ANSWER TYPE
5. Discuss with examples how people measured length in ancient times.
6. Describe the different types of motion with examples.
EXERCISE # 1
SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS :

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>D</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>

FILL IN THE BLANKS
1. Inseparable
2. Measurement
3. Vehicles
4. Translatory
5. Periodic

TRUE / FALSE
1. False
2. False
3. True
4. False

MATCH THE COLUMN
1 → e, 2 → a, 3 → b, 4 → c, 5 → d
INTRODUCTION

What is Matter?

Anything that occupies space and has mass is called **matter**. Matter exists in three states – solid, liquid and gas.

A solid has a definite shape and volume.

A phase describes the physical state of matter. The phase or state of matter can change when the temperature changes. Generally, as the temperature rises, matter assumes a more active state since energy is added. Matter changes states through freezing, melting, evaporation and condensation.

1.1 PHASES OF MATTER

"Phase" describes a physical state of matter. The key word to notice is physical. Things only move from one phase to another by physical means. If energy is added (like increasing the temperature) or if energy is taken away (like freezing something), you have created a physical change.
When molecules move from one phase to another they are still the same substance. There is water vapour above a pot of boiling water. That vapour (or gas) can condense and become a drop of water in the cooler air. If you put that liquid drop in the freezer, it would become a solid piece of ice. No matter what physical state it was in, it was always water. It always had the same chemical properties.

<table>
<thead>
<tr>
<th></th>
<th>Solid</th>
<th>Liquid</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retains a fixed volume and shape independent of the container</td>
<td>Takes the shape of the part of the container that it occupies</td>
<td>Takes the shape and volume of its container</td>
<td></td>
</tr>
<tr>
<td>There is very little free space between molecules. It is very difficult to compress</td>
<td>Not too much free space between the molecules. It cannot be compressed easily</td>
<td>Plenty of free space between the molecules. It can be compressed</td>
<td></td>
</tr>
<tr>
<td>It is very rigid. Its molecules cannot move or slide past one another, that is, it does not flow easily</td>
<td>Its molecules can move or slide past one another</td>
<td>Its molecules can move past one another, that is, it flows easily</td>
<td></td>
</tr>
<tr>
<td>Its molecules are tightly packed usually in a regular pattern</td>
<td>Its molecules are close together with no special arrangement</td>
<td>Its molecules are separated with no regular arrangement</td>
<td></td>
</tr>
</tbody>
</table>

Before we read about the molecular arrangement in three states of matter, let us understand the terms intermolecular force and intermolecular space.

Molecules constituting a given substance are very small and they cannot be seen even under a microscope. These molecules attract each other with a force. This force is called **intermolecular force**. The molecules of a substance may be very close to each other while in some other substance they may be far from each other. The space between the molecules is called **intermolecular space**.

**1.2 Change of State**

Matter can change from one physical state to another.

The change of state from solid to liquid is known as **melting**

The change of state from liquid to solid is known as **freezing**.
The change of state from liquid to gas is known as vapourisation. The change of state from gas to liquid is known as condensation.

### 1.3 ATOMS

A molecule can be broken down further into smaller units called atoms. Atoms are called the building blocks of matter. There are more than 100 kinds of atoms. These atoms join up in different ways to form molecules of all matter, whether it’s you, your house or your books!

### 1.4 MOLECULE

What are Molecules?

All matter is made up of tiny particles called **molecules**.

The properties of matter depend on the nature of the molecules present in it and how they are arranged. State of a matter depends on the arrangement of the molecules constituting the matter. A **MOLECULE** is the smallest particle of a substance that has all the properties of the substance.

For example, a sugar molecule is the smallest particle that is still sugar, if you take out a single thread of a bedsheet, it possesses all the properties of big bedsheet.

### 1.5 ELEMENT

An element is considered as a pure homogeneous substance made of only one kind of atoms. An element is a substance that cannot be broken down further by an ordinary chemical change.

Eg. : Gold, silver, iron, copper, hydrogen, oxygen etc.

### 1.6 COMPOUND

We have read that elements are pure substances which are made up of only one kind of atoms and cannot be broken down further by any chemical change. A compound is also a pure substance, but it is made up of two or more different elements. Further a compound can be split into simpler substances (that is, its constituting elements) by chemical means.

Eg. : Sodium chloride (common salt) is a compound made of two elements sodium and chlorine.

Also water is a compound made of two elements, hydrogen and oxygen.

![Characteristics of Solids, Liquid and gases](image)

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1.7 SOLIDS IN LIQUIDS

Many solids like salt, sugar, potassium permanganate and copper sulphate dissolve in water to form solution. When a solid dissolve in a liquid its molecules find space between the molecules of water and spread throughout the liquid.

Can you name five substances that are soluble and insoluble in water respectively?

1.8 SOLIDS & SOLUTION

A solution is formed when a solid is dissolved in a liquid. The solid is called solute and the liquid is called a solvent. For example, when sugar is dissolved in water, sugar crystals are the solute and water is the solvent.

Thus,

solvent + solute = solution
water + sugar = sweet water

1.9 LIQUIDS IN LIQUIDS

Some liquids like glycerine and alcohol dissolve in water to form solutions. When two liquids dissolve in each other, they are said to be MISCIBLE. Now try to mix oil with water. Are oil and water miscible? Oil is insoluble in water. They are called IMMISCIBLE in water. Can you name five liquids which are miscible and immiscible with water respectively?

1.10 GASES IN LIQUIDS

We can mix gases like oxygen, carbon dioxide and ammonia in water. Water plants and fishes breathe the oxygen dissolved in water. The fizz in the colas we drink is actually dissolve carbon dioxide.
1.11 CHANGES IN MATTER

Matter changes from one form to another due to heating or cooling. When we heat ice which is a solid, the space between its molecules increases and it becomes water which is a liquid. Similarly, when we heat water, the space between the molecules increases further and water turns into water vapour, which is a gas. On cooling, the opposite happens. A gas (water vapour) changes into a liquid (water). On cooling further, it changes into a solid (ice).

1.12 PHYSICAL CHANGES

When the change is only in state of matter, it is called a physical change.
- It is temporary change. It can be reversed.
- No new substance is formed.

Heating or cooling brings about physical changes.

If we heat water, it changes into water vapour on cooling water vapour, its changes into water again.

```
Water    Heating    Water vapour
Water    Cooling    Ice
Water    Heating    Water vapour
Water    Cooling    Ice

Solid wax Heating Liquid wax
Solid wax Cooling Liquid wax
```

PHYSICAL CHANGES IN MATTER

A physical change is a change in how matter looks, but not the kind of matter it is.

- Tear
- Folded
- Mixture: plates broken into pieces
- Solution
1.13 CHEMICAL CHANGES

When a change is in the state as well as composition of matter, it is called a chemical change.

- Chemical change is permanent and cannot be reversed.
- A new substance is formed.

When a piece of paper is burnt, it changes into ash.

In some cases, heating or cooling results in a chemical change.

The molecules of ash are different from the molecules of paper.
Physical Changes | Chemical Changes
---|---
1. New substance are not formed | New substances with entirely new properties are obtained
2. The molecular composition of the substance does not change | The molecular composition of the substance also changes
3. It is a temporary change. Original substance can be obtained by simple means | It is permanent change. Original substance cannot be obtained back by simple means

Examples of Chemical Change

Ripening of Fruits

Curdling of Milk

Ask yourself

ACTIVITY

EQUAL VOLUMES: DIFFERENT MASSES

You will need two identical glasses, equal quantities of water and kerosene, and a beam balance.

1. Fill the two glasses with equal amounts of water and kerosene.
2. Place the glass containing water on one pan and the one containing kerosene on the other.
3. The pan with the glass of water will tilt down. Why?

Water has more mass than kerosene (even though they both have the same volume) and so the glass with water is heavier. Thus an equal volume of water has more mass than kerosene.
Weight of an Object under water

When an object is immersed in water the buoyant force of the water acts upon it. Due to this, things seem to lose weight. The weight of an object in water is called its **apparent weight**. The difference in the weight of an object in air and its weight in water is called **apparent loss** of weight. This is the buoyant force of the object. Thus,

Weight of object in air = **REAL WEIGHT**

Weight of object in water = **APPARENT WEIGHT**

Real weight - Apparent weight = **APPARENT LOSS OF WEIGHT**

The weight of the water pushed aside by an object is equal to the real weight of the object. This fact first discovered by the Greek scientist, Archimedes, and is called **Archimedes' Principle**.

**Summary**

- Matter is made up of molecules. Molecules are made up of atoms.
- Matter made up of the same kind of atoms is called an element.
- Matter made up of different atoms joined together in fixed ratio is called a compound.
- Matter can be changed from one state to another by changing the temperature.
- A physical change is reversible. A chemical change is irreversible.
- Mass does not depend on volume.
- The upward push of water on a floating object is called upthrust or buoyant force.
- Density is the mass per unit volume.
SECTION - A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS:

1. A liquid in which a solid dissolves:
   (A) Solution    (B) Solute    (C) Solvent    (D) All of these

2. Carbon dioxide is made up of:
   (A) one carbon atom and two oxygen atoms
   (B) two carbon atoms and one oxygen atom
   (C) one carbon atom and one oxygen atom
   (D) two carbon atoms and two oxygen atoms

3. A solid has:
   (A) a definite volume but not definite shape
   (B) a definite shape and definite volume
   (C) neither definite shape nor definite volume
   (D) all the above

4. Molecules are made up of:
   (A) neutrons    (B) protons    (C) electrons    (D) atoms

5. The molecules of a gas are ....... packed:
   (A) closely    (B) loosely    (C) compactly    (D) randomly

6. A ....... has a definite volume and shape:
   (A) gas    (B) liquid    (C) solid    (D) all of these

7. The smallest particle into which a substance may be broken is a/an ........ : 
   (A) molecule    (B) atom    (C) crystal    (D) element

8. ........ makes the salt highly pure:
   (A) Decantation    (B) Filtration    (C) Evaporation    (D) sublimation

FILL IN THE BLANKS

1. The three states of matter are ________, ________ and ________.

2. Matter has ________ and takes up ________.

3. Elements have ________ of the same kind.

4. The state of matter changes due to ________.

5. Gases ________ not be compressed.

TRUE / FALSE

1. There is a force of attraction between the molecules.
2. Liquids have a definite shape.

3. Gases have a definite volume.

4. Water consists of different atoms.

5. There is no space between the molecules in gases.

**MATCH THE COLUMN**

<table>
<thead>
<tr>
<th>Column-1</th>
<th>Column-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Solid</td>
<td>a. Milk</td>
</tr>
<tr>
<td>2. Liquid</td>
<td>b. Wood</td>
</tr>
<tr>
<td>3. Gas</td>
<td>c. H₂O</td>
</tr>
<tr>
<td>4. Water</td>
<td>d. CO₂</td>
</tr>
<tr>
<td>5. Carbon dioxide</td>
<td>e. Air</td>
</tr>
</tbody>
</table>

**SECTION -B (FREE RESPONSE TYPE)**

**VERY SHORT ANSWER TYPE**

1. Which of the three states of matter is easily compressed?
2. Which one of the three states of matter flows easily?
3. What is the process called when a solid becomes a liquid?
4. What is the process called when a liquid becomes a solid?
5. What is the process called when a gas becomes a liquid?

**SHORT ANSWER TYPE**

6. What are the three states of matter?
7. What is intermolecular space?
8. How many types of atoms are there in water and carbon dioxide?

**LONG ANSWER TYPE**

9. How can you get back salt from its solution?
10. What is the difference between a physical change and a chemical change?
11. Why can a liquid take the shape of the container?

12. Why solids are generally hard?

**EXERCISE 02**

**SECTION - A (COMPETITIVE EXAMINATION QUESTION)**

**MULTIPLE CHOICE QUESTIONS**

1. Find out the correct statements from the following:
   (A) Heating and cooling bring changes in matters
   (B) Physical change is always a permanent change
   (C) Gases cannot be dissolved in liquid
   (D) All liquids get mixed with each other.

2. Which of the following shows the arrangement of molecules in liquid?
   (A) ![Image](image1.png)
   (B) ![Image](image2.png)
   (C) ![Image](image3.png)
   (D) None of these

3. Which property is true for a solid?
   (A) It takes the shape of its container
   (B) It flows downward but not upward
   (C) It has a definite shape
   (D) It has no definite volume

4. Which of the following is a mixture?
   (A) Lemonade
   (B) Iron filings in sand
   (C) Pepsi
   (D) All of these

5. Plastic is a good insulating material for ice-cubes because:
   (A) It is expensive
   (B) It conduct electricity well
   (C) It does not conduct heat well
   (D) It increases friction with the water

**EXERCISE 03**

**(PREVIOUS YEAR EXAMINATION QUESTIONS)**

1. A substance ‘P’ does not have a fixed volume. It occupies the total space of the container and it can be compressed. What is ‘P’ likely to be?
   (A) Solid
   (B) Liquid
   (C) Gas
   (D) All of these

2. Which would be the best material to use, while making the handle of a tea kettle?
   (A) Aluminium
   (B) Wood
   (C) Glass
   (D) Iron
3. Boiling point of substance P = 120°C
   Melting point of substance P = 25°C
   At 20°C, we can expect substance P to be:
   (A) a gas  (B) a liquid  (C) a solid  (D) none of these

4. Identify the INCORRECT statement from the following:
   (A) Matter exists in three forms
   (B) Matter can be changed from one form to another
   (C) A new substance is formed in a chemical change
   (D) Ice is heavier than water

5. Deepak filled a glass to the brim with water. Then, he placed some ice cubes into the glass of water. Some water overflowed as shown in the diagram below.

   ![Diagram showing ice cubes in a glass of water]

   The observation above shows that the ice cubes __________.
   (A) Float on water  (B) Have mass  (C) Have no definite volume  (D) Occupy space
EXERCISE # 1
SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS :

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>D</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

FILL IN THE BLANKS
1. solid, liquid, gas
2. mass, space
3. atoms
4. temperature
5. can

TRUE / FALSE
1. True
2. False
3. False
4. True
5. False

MATCH THE COLUMN
1 → b, 2 → a, 3 → e, 4 → c, 5 → d

EXERCISE # 2
SECTION -A (COMPETITIVE EXAMINATION QUESTION)

MULTIPLE CHOICE QUESTIONS

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>C</td>
</tr>
</tbody>
</table>

EXERCISE # 3
(PREVIOUS YEAR EXAMINATION QUESTIONS)

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>C</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>D</td>
</tr>
</tbody>
</table>
Terminologies
Predecessor, Successor, Face value, Place value, Indian System, International System, Roman numerals

INTRODUCTION
Numbers are a very important part of our day to day life. We also know that these numbers have different names too. So in this chapter we are going to learn to name these numbers. We are also going to learn to write number in roman numbers which is far different from the hindu arabic numerals we use.

1.1 PREDECESSOR AND SUCCESSOR
(a) Predecessor:
Predecessor is 1 less than the given number.
For Ex.: Predecessor of 59028 is 59027.
(b) Successor:
Successor is 1 more than the given number.
For Ex.: Successor of 9999 is 10000.

Illustration 1.1
Write the successor of each of the following numbers:
(A) 8085670  (B) 500000  (C) 155439  (D) 799999
Sol. (A) 8085671  (B) 500001  (C) 155440  (D) 800000

Illustration 1.2
Write the predecessor of each of the following numbers:
(A) 81513  (B) 401506  (C) 1000000  (D) 700001
Sol. (A) 81512  (B) 401505  (C) 999999  (D) 700000

Illustration 1.3
Counting by thousands, write next three numbers starting from 872318
Sol. The numbers are: 873318, 874318, 875318

Illustration 1.4
Write in ascending order the numbers between 537809 and 537813
Sol. The numbers are: 537810, 537811, 537812

1.2 PLACE VALUE AND EXPANDED FORM
(a) Face value: of a digit in a numeral is the value of the digit itself at whatever place it may be.
(b) Place value: of a digit in a given number is the value of the digit because of the place or the position of the digit in the number.
Place-value of a digit = Face-value of the digit × value of the place
(c) Expanded form: writing a number to show the value of each digit it is shown as a sum of each digit multiplied by its matching place value (units, tens, hundreds etc.)
Illustration 1.5

Write each of the following numbers in the expanded form and find the place value of the digit 5 in words and in figures:

(i) \(858492\)

Sol. (i) \(858492 = 800000 + 50000 + 8000 + 400 + 90 + 2\)

\(\therefore\) Place value of 5 in words is fifty thousand and in figures is 50000

(ii) \(2503702\)

\[= 2000000 + 500000 + 0 + 3000 + 700 + 0 + 2\]

\(\therefore\) Place value of 5 in words is five lakh and in figures is 500000

Illustration 1.6

Find the place value of the digit which are underlined:

(i) \(562391\)

(ii) \(295600\)

Sol. (i) The place value of 6 is 60000

(ii) The place value of 2 is 200000.

Ask yourself

1. Write the successors and predecessors of:
   (i) 4320  (ii) 90000  (iii) 7600  (iv) 5640

2. Place value of 8 in 86, 93, 04, 600.

3. Find the difference between the place values of “3” in 3116365.

4. Find the difference of the sum of place values of “4” and “7” in 4786746.

1.3 INDIAN NUMBER SYSTEM:

(a) Use of commas:
In Indian number system, the first comma is placed after leaving 3 digits from the right and rest commas are placed after every 2 digits. e.g.: 32,45,12,578

(b) Naming of number:
The numbers are named according to the group in which they fall. Digits falling under the same group are read together.

Illustration 1.7

Write in words, in Indian system:

(i) 304219  (ii) 9340596

Sol. (i) \(304219 = 3,04,219\)

= Three lakhs four thousand two hundred and nineteen.

(ii) \(9340596 = 93,40,596\)

= Ninety three lakhs forty thousand five hundred and ninety six.
1.4 INTERNATIONAL NUMBER SYSTEM:

In English System (Or International system), we use the following:
1 lakh = 100 thousands
10 lakhs = 1 million

In offices also, we sometimes use millions etc.

While writing in international system, we separate the period by putting comma (,) in groups of three from the extreme right, e.g., 3,540,986.

INTERNATIONAL SYSTEM OF NUMBERS

<table>
<thead>
<tr>
<th></th>
<th>Billions</th>
<th>Millions</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hundred Billion</td>
<td>Ten Billion</td>
<td>One Billion</td>
<td>Hundred Million</td>
<td>Ten Million</td>
</tr>
<tr>
<td>12 Digits</td>
<td>11 Digits</td>
<td>10 Digits</td>
<td>9 Digits</td>
<td>8 Digits</td>
</tr>
<tr>
<td>100,000,000,000</td>
<td>10,000,000,000</td>
<td>1,000,000,000</td>
<td>100,000,000</td>
<td>10,000,000</td>
</tr>
</tbody>
</table>

Illustration 1.8

Write in words, in international system:
(i) 304219
(ii) 9340596

Sol. (i) 304219 = 304,219
    = Three hundred four thousand two hundred and nineteen.
(ii) 9340596 = 9,340,596
    = Nine million three hundred forty thousand five hundred and ninety six.

1.5 FORMATION OF GREATEST AND SMALLEST NUMBER

(a) Repetition of digits not allowed

Illustration 1.9

Form greatest and the smallest number of 6 digits using the digits 3, 1, 8, 0, 5 and 9 only once.

Sol. To write the greatest number of 6 digits, start with the greatest digit on the left most place and then write the other digits in descending order.
    \[ \therefore \] The greatest number of 6 digits is : 985310
To write the smallest number of 6 digits, start with the smallest digit on the left most place and then write the other digits in ascending order.
    \[ \therefore \] The smallest number of 6 digits is : 103589

(b) Repetition of digits allowed

Illustration 1.10

Write 6-digit greatest and smallest numbers by using the digits 1, 8, 5, 0, 2

Sol. For writing the greatest number, the greatest digit is repeated on the left most place. We start writing from ones place and write the smallest given digit and then other digits in ascending order. The greatest 6-digit number is 885210.
For writing the smallest number, the greatest digit is written in ones place and the smallest number is repeated on the left most places.
The smallest 6-digit number is 100258.
1.6 PATTERN IN NUMBERS

<table>
<thead>
<tr>
<th>Smallest</th>
<th>Greatest</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-digit number 1000</td>
<td>9999</td>
</tr>
<tr>
<td>5-digit number 10000</td>
<td>99999</td>
</tr>
<tr>
<td>6-digit number 100000</td>
<td>999999</td>
</tr>
<tr>
<td>7-digit number 1000000</td>
<td>9999999</td>
</tr>
</tbody>
</table>

Also, 9999 + 1 = 10000
99999 + 1 = 100000
999999 + 1 = 1000000

So we see that 100000 is obtained by adding 1 to 99999.
The number name for 100000 is ‘one lakh’
similarly, 1000000 is obtained by adding 1 to 999999.
The number name for 1000000 is ‘ten lakh’

Again look at the following pattern:
Ten thousand + one = 10001
One lakh + one = 100001
Ten lakh + one = 1000001

Ask yourself
1. Write the greatest 5 digit number and find its successor.
2. Name the numbers according to Indian number system after applying commas:
   (i) 976834523
   (ii) 6253984
   (iii) 80004264
3. Find the sum of smallest 4 digit number and largest 5 digit number.
4. Find the difference of largest and smallest 4 digit number formed using 5, 6, 1, 2 without repetition

1.7 ROMAN NUMERALS

We know that the seven basic Roman numerals are I, V, X, L, C, D and M.
These numerals stand respectively for 1, 5, 10, 50, 100, 500 and 1000. We have used I, V and X and formed numbers upto 39 in class IV. Here we shall learn the use of L and C and form numbers upto 100.
According to the convention, the compound symbols are formed by the rules given below:

(i) X when written to the left of L or C, it is subtracted from that numeral, e.g.,
    XL = 50 – 10 = 40 ; XC = 100 – 10 = 90

(ii) X when written to the right of L or C, it is added to that numeral, e.g.,
    LX = 50 + 10 = 60 ; LXX = 50 + 10 + 10 = 70
    LXXX = 50 + 10 + 10 + 10 = 80

(a) Rules to Form Roman Numerals
We can form different Roman numerals using the symbols and the following rules.
Rule-1 If a symbol is repeated one after the other, its value is added as many times as it occurs. For example
    III = 1 + 1 + 1 = 3
    XX = 10 + 10 = 20

Rule-2 The symbols I, X, C and M can be repeated up to a maximum of three times. For example
    I = 1,
    II = 2,
    III = 3
    X = 10,
    XX = 20,
    XXX = 30
C = 100,  
CC = 200,  
CCC = 300  
M = 1000,  
MM = 2000,  
MMM = 3000

**Rule-3**  The symbols V, L and D (i.e., 5, 50, and 500 respectively) can never be repeated in a Roman numeral.

**Rule-4**  If a symbol with a smaller value is written on the right of a symbol with a greater value, then its value is added to the value of the greater symbol. For example  
XII = 10 + 2 = 12,  
LX = 50 + 10 = 60,  
DCCCX = 500 + 300 + 10 = 810

**Rule-5**  If a symbol with a smaller value is written on the left of a symbol with a larger value, then its value is subtracted from the value of the greater symbol. For example,  
IV = 5 – 1 = 4,  
IX = 10 – 1 = 9,  
CD = 500 – 100 = 400,  
VI = 5 +1 = 6,  
XI = 10 + 1 = 11,  
DC = 500 + 100 = 600

**Illustration 1.11**  
Write the following in Roman numerals:

(i)  47  (ii)  75  (iii)  89  (iv)  98

*Sol.*  
(i)  47 = 40 + 7 = XL + VII = XLVII  
(ii)  75 = 70 + 5 = LXX + V = LXXV  
(iii)  89 = 80 + 9 = LXXX + IX = LXXXIX  
(iv)  98 = 90 + 8 = XC + VIII = XCVIII

**Illustration 1.12**  
Write in Hindu Arabic numerals:

(i)  CXXXV  (ii)  CXL

*Sol.*  
(i)  CXXXV = C + XXX + V = 100 + 30 + 5 = 135  
(ii)  CXL = C+XL+ I = 100 + 40 +1 = 141

**Ask yourself**

1.  Write the roman numerals for:
   (i)  345  (ii)  99  (iii)  677  (iv)  1675  (v)  634

2.  Write in hindu arabic numerals:
   (i)  CDLVII  (ii)  CDXLIV  (iii)  CDXCIII  (iv)  CDXCIII

3.  Raju is 22 years old and Ramu is 19 years old. Write the difference of their ages in Roman system.

4.  The number of boys in a class are 27 while the girls are 19. Write the total strength of the class.

**Add to Your Knowledge**

(a) **Integers**: We have learnt about natural and whole numbers in the previous chapters. But when we subtract a greater whole number from a smaller whole number, then the difference will not be a whole number. Hence, there is a need to extend the number system to include such numbers. The idea of a negative sign for the opposite direction provides us with an infinite collection of numbers on the left side of zero too. All these numbers are less than zero and are called negative numbers. They are –1, –2, –3, ...

Whole numbers along with the negative numbers are called integers.

(b) **Zero**: Zero was developed by an Indian mathematician “Aryabhatta”. Zero was required to show the absence of quantity. Zero was also named as Zillion.
**Important Points:**

1. **Predecessor** is 1 less than the given number.
2. **Successor** is 1 more than the given number.
3. **Face value** of a digit in a numeral is the value of the digit itself at whatever place it may be.
4. **Place value** of a digit in a given number is the value of the digit because of the place or the position of the digit in the number.
5. **Expanded form** writing a number to show the value of each digit it is shown as a sum of each digit multiplied by its matching place value (units, tens, hundreds etc.)
6. **INDIAN NUMBER SYSTEM:**

<table>
<thead>
<tr>
<th>Crores</th>
<th>Lakhs</th>
<th>Thousands</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ten Crore</td>
<td>One Crore</td>
<td>Ten Lakh</td>
<td>One Lakh</td>
</tr>
<tr>
<td>Ten Thousand</td>
<td>One Thousand</td>
<td>Ten Thousand</td>
<td>One Hundred</td>
</tr>
<tr>
<td>One</td>
<td></td>
<td>One</td>
<td>Ten</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>One</td>
</tr>
</tbody>
</table>

7. **INTERNATIONAL SYSTEM OF NUMBERS:**

<table>
<thead>
<tr>
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<th>Millions</th>
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</tr>
<tr>
<td>1,000,000,000</td>
<td>10,000,000</td>
<td>1,000,000</td>
<td>100,000</td>
</tr>
<tr>
<td>8 Digits</td>
<td>7 Digits</td>
<td>6 Digits</td>
<td>5 Digits</td>
</tr>
<tr>
<td>10,000</td>
<td>1000</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>5 Digits</td>
<td>4 Digits</td>
<td>3 Digits</td>
<td>2 Digits</td>
</tr>
<tr>
<td>1,000</td>
<td>100</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>

8. Seven basic Roman numerals are:
   I = 1, V = 5, X = 10, L = 50, C = 100, D = 500 and M = 1000.

9. **Rules to write roman numerals**

   (i) If a symbol is repeated one after the other, its value is added as many times as it occurs.
   (ii) The symbols I, X, C and M can be repeated up to a maximum of three times.
   (iii) The symbols V, L and D (i.e., 5, 50, and 500 respectively) can never be repeated in a Roman numeral.
   (iv) If a symbol with a smaller value is written on the right of a symbol with a greater value, then its value is added to the value of the greater symbol.
   (v) If a symbol with a smaller value is written on the left of a symbol with a larger value, then its value is subtracted from the value of the greater symbol.
Summary
SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS :

1. Find the successor of 32.
   (A) 20          (B) 33          (C) 31          (D) 30

2. Find the successor of 10.
   (A) 11          (B) 9           (C) 8           (D) 10

3. Find the predecessor of 110.
   (A) 109         (B) 110         (C) 111         (D) 101

4. Find the place value of 3 in 93478.
   (A) 3000        (B) 30          (C) 300         (D) 3

5. Find the place value of 0 in 78091.
   (A) 100         (B) 10          (C) 1000        (D) 0

6. Find the place value of 8 in 812890
   (A) 800000      (B) 800         (C) 80          (D) both (A) and (B)

7. 90000+500+70+__________+ 5 = 92575
   (A) 2000        (B) 200         (C) 20          (D) 2

8. 0 + ____ + 600 + 6000 + 30000 = 36630
   (A) 3000        (B) 30          (C) 300         (D) 3

9. 60 + 40000 + 700 + 9000 + 5 + 800000 = _____
   (A) 849706      (B) 874960      (C) 849765      (D) 890000

10. Which one of the following is the smallest numeral ?
    (A) 15673       (B) 15700       (C) 15198       (D) 15623

11. The largest number using each of digits 5, 7, 8, 9 is :
    (A) 9875        (B) 5879        (C) 8759        (D) 7589

12. The smallest 4-digit number using 2, 0, 9, 5 is :
    (A) 9520        (B) 0295        (C) 2059        (D) 5209

13. Which of the following represent 27?
    (A) XXVII       (B) XVII       (C) VII         (D) VIIX

14. Which of the following represent 18?
    (A) XVII        (B) XVIII      (C) VIII        (D) VIII X

15. Which of the following represent XXV?
    (A) 20          (B) 5          (C) 25          (D) 15

16. Which of the following represent 32?
    (A) XXII        (B) XII        (C) II          (D) XXXII

FILL IN THE BLANKS

1. The smallest number formed by using the digits 3, 2, 1, 9, 0 is _____________

2. The greatest number formed by using the digits 8, 2, 7, 9, 0 is _____________

3. The place value of 5 in the greatest number formed by using the digits 8, 2, 3, 1, 4, 5, 0 is _____________

4. The number 2,908,765 when written in words according to the International System of Number
   __________________________________________________________________________

5. The greater number among 92384765 and 9238765 is ________________
TRUE / FALSE
1. The expanded form of 59046 is 50000 + 900 + 40 + 6.
2. The Roman Numeral D stands for 500.
3. The symbol L can be repeated in a Roman numeral upto a maximum of three times.
4. The symbol M can be repeated up to a maximum of three times.
5. DC – CD = CC

MATCH THE COLUMN
1. Column – I                               Column – II
   (A) The predecessor of 1000000 is       (p) 100000
   (B) The successor of 999999 is          (q) 1000000
   (C) The place value of 1 in 2134569 is  (r) 900000
   (D) The place value of 9 in 7984502 is  (s) 999999
2. Column – I                               Column – II
   (A) ∇                                    (p) 99
   (B) LXXXV                                (q) 711
   (C) XCV                                  (r) 5000
   (D) DCCXI                                (s) 85

SECTION -B (FREE RESPONSE TYPE)

VERY SHORT ANSWER TYPE
1. Find the successors of the following
   (a) 110  (b) 32  (c) 98  (d) 452
2. Find the predecessors of the following
   (a) 432  (b) 898  (c) 537782  (d) 1000
3. Write the following numbers in short or standard form:
   (a) 4,00,00,000 + 2,000 +50 +7  (b) 50,00,000 + 80,000 + 7, 000 +50 + 4
4. Write the expanded form of the following:
   (a) 1092  (b) 30023  (c) 870024  (d) 298353
5. Write the number names of the following (in indian system)
   (a) 234  (b) 4289  (c) 37488  (d) 48363

SHORT ANSWER TYPE
6. Arrange in ascending order : 123,122,263,012,212,222
7. Arrange in ascending order : 01,23,22,1314,1231,5344,54423
8. Arrange in descending order : 3224,4332,2322,2322,2992,25534,234
9. Arrange in descending order : 12,211,2342,5432,3454
10. Write the place value of 4s in each number:
    (a) 42,34,082  (b) 46,72,49,106
LONG ANSWER TYPE

11. Write the number names of the following (in international system)
   (a) 3214  
   (b) 5432  
   (c) 102455  
   (d) 9408363

12. Make the greatest and the smallest four digit numbers by using any one digit twice:
   (a) 6, 3, 2  
   (b) 1, 0, 6  
   (c) 7, 9, 4  
   (d) 2, 5, 0

13. Write the equivalent Roman numeral of each of the following Hindi-Arabic numeral.
   (a) 46  
   (b) 90  
   (c) 120  
   (d) 150

14. Write the equivalent Hindu-Arabic numerals of the following Roman numerals.
   (a) XXII  
   (b) CCX  
   (c) DCC  
   (d) LXIII

15. Write down the numbers that come between the given numbers:
   (a) 4260 and 4268  
   (b) 72,42,601 and 72,42,610

EXERCISE 02

SECTION - A (COMPETITIVE EXAMINATION QUESTION)

MULTIPLE CHOICE QUESTIONS

1. Roman numeral for 2143 is
   (A) MMCXLIII.  
   (B) MMCLIII.  
   (C) MMCXLII.  
   (D) MMCXL.

2. Difference between the place values of “3” in 3116365 is
   (A) 2999700.  
   (B) 3000700.  
   (C) 2990700.  
   (D) 200070.

3. XIX + XXX = .......... (Write in numerals)
   (A) 44  
   (B) 49  
   (C) 51  
   (D) 55

4. Sum of the greatest 6 digit number and the greatest 7 digit number is
   (A) 1099998.  
   (B) 10999998.  
   (C) 10099998.  
   (D) 1099998.

5. Express five hundred three million eight thousand seven hundred two in figures:
   (A) 500380702  
   (B) 503800702  
   (C) 503008702  
   (D) 503080702

6. I as a Roman numeral, am CMXCIX. Break me up and then can you recognise me?
   (A) 9910  
   (B) 999  
   (C) 1109  
   (D) 1119

7. Ram is 10 and Manu is 15 years old. The difference of their ages written in Roman System is
   (A) VI.  
   (B) V.  
   (C) IV.  
   (D) III.

8. The correct pair of Roman numeral and its equivalent Hindu-Arabic numeral is
   (A) XCX = 99.  
   (B) CCCXL = 340.  
   (C) LXXVI = 86.  
   (D) XXV = 24.

9. Standard form of 90000000 + 800000 + 50000 + 3000 + 20 + 3 is
   (A) 900085323  
   (B) 98503023  
   (C) 900853023  
   (D) 985323

10. According to International System, the number 648340021 would be written with commas as:
    (A) 648,340,021  
    (B) 6, 4, 8, 3, 0, 0, 2, 1  
    (C) 64, 83, 40, 0, 2, 1  
    (D) none

SECTION - B (TECHIE STUFF)

1. If height above the ground is taken as positive and height below the ground is taken as negative, then state the following in integers:
   (a) A lift goes 40 m above the ground.  
   (b) A submarine goes 80 meter below the ground.  
   (c) Depth of the sea is 4300 meter.  
   (d) A plane flies at a height of 570 kilometer.

2. A boy went 30 meter in west direction and 50 meter in east direction, can you express this using integers taking east as positive.
3. Can you give one example where negative integer is used.

4. In an examination there were +1 marks for every correct answer and -1 marks for every wrong choice. A boy attempted 10 questions, in which 4 were correct rest all were incorrect. Can you guess the marks of the boy.

**EXERCISE 03**

**(PREVIOUS YEAR EXAMINATION QUESTIONS)**

1. The table below shows the populations of four cities in India.

<table>
<thead>
<tr>
<th>CITY</th>
<th>POPULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>mumbai</td>
<td>75,17,973</td>
</tr>
<tr>
<td>kolkata</td>
<td>95,38,544</td>
</tr>
<tr>
<td>hyderabad</td>
<td>33,90,635</td>
</tr>
<tr>
<td>chennai</td>
<td>43,53,893</td>
</tr>
</tbody>
</table>

What is the place value of the digit 9 in the smallest population listed in the table?
(A) Ninety (B) Nine hundred (C) Ninety thousand (D) Ninety lakhs

2. The difference between the smallest 6-digit number and the greatest 4-digit number is:
(A) 9,00,001  (B) 90,001  (C) 90,000  (D) 1

3. The place value of “2” in 17,9852 is:
(A) 2000  (B) 2  (C) 2  (D) 5000

4. What is the place value of 3 in the sum of 5.25 and 3.38?
(A) 3  (B) 3  (C) 3  (D) 0

5. What is the difference of the greatest 7-digit number and smallest 5-digit number?
(A) 9,98,099  (B) 99,899  (C) 9,98,999  (D) 99,89,999

6. Which expression is true?
(A) 1/5 > 0.2  (B) 1/4 < 0.25  (C) 1/4 > 0.5  (D) 1/4 > 0.2

7. How many numbers containing 8 in their tens place are there between 300 and 400?
(A) 9  (B) 10  (C) 19  (D) 20

8. Write the Roman numerals for 24.
(A) XXVI  (B) XXIV  (C) XXVIII  (D) XXXIV

9. Which number is the successor of the smallest 6-digit number?
(A) 100000  (B) 10001  (C) 100001  (D) 999999

10. Four students Kartik, Hari, Akhil, and Pawan wrote Roman numerals on their slates as given below.

<table>
<thead>
<tr>
<th>KARTIK</th>
<th>HARI</th>
<th>AKHIL</th>
<th>PAVAN</th>
</tr>
</thead>
<tbody>
<tr>
<td>XXXIX</td>
<td>XXXII</td>
<td>XXV</td>
<td>XVIII</td>
</tr>
</tbody>
</table>

Who wrote the least number?
(A) KARTIK  (B) HARI  (C) AKHIL  (D) PAVAN


SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS:

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>D</td>
<td>D</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>C</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ques.</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>D</td>
</tr>
</tbody>
</table>

FILL IN THE BLANKS
1. 10239  2. 98720  3. 500000
4. Two million Nine hundred eight thousand seven hundred & sixty five  5. 92384765

TRUE / FALSE

MATCH THE COLUMNS
1. (A) - s, (B) - q, (C) - p, (D) - r
2. (A) - r, (B) - s, (C) - p, (D) - q

SECTION -B (FREE RESPONSE TYPE)

1. (a) 111  (b) 33  (c) 99  (d) 453
2. (a) 431  (b) 897  (c) 537781  (d) 999
3. (a) 40002057  (b) 5087054
4. (a) 10000+900+20+3  (b) 30000+20+3  (c) 800000+70000+20+4  (d) 200000+90000+8000+300+50+3
5. (a) Two hundred and thirty four.
     (b) Four thousand two hundred and eighty nine
     (c) Thirty seven thousand four hundred and eighty eight.
     (d) Forty eight thousand three hundred and sixty three.
6. 012<122<123<212<222<263.  7. 01<22<231<1231<1314<5344<54423.
8. 25534>4332>3232>3224>2992>2322>234.  9. 5432>3454>2342>211>12.
10. (a) 4000000.4000  (b) 400000000,40000
11. (a) Three thousand two hundred and fourteen.
     (b) Five thousand four hundred and thirty two.
     (c) One hundred two thousand four hundred fifty five.
     (d) Nine million four hundred eight thousand three hundred sixty three.
12. Smallest  Largest
    (a) 2236  6632
    (b) 1006  6610
    (c) 4479  9974
    (d) 2005  5520
13. (a) XLVI  (b) XC  (c) CXX  (d) CL
14. (a) 22  (b) 210  (c) 700  (d) 63
15. (a) 4261,4262,4263,4264,4265,4266,4267.
     (b) 72,42,602, 72, 42, 603, 72, 42, 604, 72, 42, 605, 72,42,606, 72,42,607, 72,42,608, 72,42,609
SECTION -A (COMPETITIVE EXAMINATION QUESTION)

MULTIPLE CHOICE QUESTIONS

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
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<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
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</tr>
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<tbody>
<tr>
<td>Ans.</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>B</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>A</td>
</tr>
</tbody>
</table>

SECTION -B (TECHIE STUFF)

1. (a) 40 m (b) – 80 m (c) – 4300 m (d) 570 km
2. 20 meter
3. To measure temperature
4. – 2.

(PREVIOUS YEAR EXAMINATION QUESTIONS)

<table>
<thead>
<tr>
<th>Ques.</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ans.</td>
<td>C</td>
<td>B</td>
<td>D</td>
<td>B</td>
<td>D</td>
<td>D</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>
INTRODUCTION
Animals are found everywhere - on land, in water and in air. Since animals live in different surrounding each one has its own lifestyle. The different types of animals are microbes, insects, birds, reptiles, fish, amphibians and mammals.
Since animals live in different surrounding, each one has its own lifestyle. They have different body features, behaviours and habits. They have special structures for feeding, breathing, movement, reproduction and protection from weather and predators.

1.1 BREATHING IN ANIMALS
Breathing is a procedure of taking in and releasing out of air. Animals breathe O₂ & release CO₂. Oxygen is essential to produce energy in the body. It burns the food within their bodies and releases energy. This energy is used by our body for doing different types of activities and work.
Different animals breathe in different ways. Different animals have different organs of breathing.

(a) Insect
Insects like cockroach, caterpillar and grasshopper breathe through tiny air holes, called spiracles, on their bodies. The blood of insects does not have the oxygen carrier called haemoglobin. This is why their blood is not red in colour.

Instead, it contains haemocyanin which acts as oxygen carrier in insects.

(b) Aquatic Animals
Animals like fish, prawns, crabs and tadpoles breathe through gills. Just below the gill-slits are the gills on each side, under a cover, called operculum. Gill is made up of a number of gill-filaments. These are red in colour due to abundant blood supply. As water flows over the gills exchange of gases takes place.
A whale looks like a fish but it is not a fish. A whale does not have gills. It has lungs. A whale has very large lungs so it can take in enough oxygen in one breath to last for some time under water. Then it comes up to the water surface and empties its lungs carbon dioxide. This it does through its blow-hole of nostril with such force that a stream of water is blown to a great height, like a fountain.

(c) Amphibians

Frog is an amphibian. A tadpole (baby frog) breathes through its gills. An adult frog breathes through its lungs on the land. Under water it breathe through its moist skin.

Tadpoles are **water breathers**

and metamorphose into **air breathing** frogs
1. LIFE STYLE OF ANIMALS:

(d) Higher Animals

Including human beings, birds, reptiles breathe through lungs. Humans have a pair of lungs in their chest. They can breathe through their nose or mouth. When we breathe in air the lungs expand and fill with air. When we breathe out, the lungs contract and push out the air with the carbon dioxide from the body. Inside the lungs, the air goes to different parts of the body through the blood. The oxygen helps to burn or breakdown the absorbed food and to release energy.

1.2 FEEDING IN ANIMALS

Different animals eat different types of food. Their feeding habits depend on the type of food they eat. Organs of feeding are also suited to the type of food they eat and their ways of eating.
1.3 MOVEMENT IN ANIMALS

Animals need to move in order to:
(a) search for food          (b) build their homes
(c) protect themselves from enemies  (d) protect themselves from being hunted

(a) Water Animals
All water animals swim by paddling and pushing water. Different animals use different organs for swimming.
Fishes use three types of fins for swimming. The paired fins help them to move forward. The unpaired fins help them to keep their balance. The tail fin is used to change direction.
Frogs use their webbed feet. Their long, strong hind legs help them to hop on land. Turtles have flippers to move. Penguins too have flippers which are actually short, strong wings.
(b) Insects

The insects crawl by means of their legs. Insects have three pairs of legs. Insects like ants, beetles and cockroaches walk with their legs. Grasshoppers use their legs for hopping.

The insects living in water use the legs as oars while swimming. Lice, bugs and termites have no wings at all. They move with their legs.

c) Birds

Birds can walk on land and fly in air. The forelimbs of birds are in the form of wings which help them to fly. They move the wings downwards and slightly backwards. This lifts the bird upwards and makes it move forward. The feathers on the wing and tail also help in flight. The tail feathers act as a rudder to change direction and help the bird in landing. The lightness of their bones also helps in flight. Some birds such as emu, ostrich and kiwi cannot fly at all. Birds use their hindlimbs or legs to land on the ground, walk, run, hop, perch, scratch the ground, and catch their prey.

d) Reptiles

Crocodiles, lizards, tortoise, and turtles have short limbs to help them crawl. Snakes are legless reptiles. They crawl with the help of scales or plates on the underside of their bodies. These plates are attached to their ribs. Strong muscles and a flexible backbone help them to move.

(e) Man

Man is the most highly developed of all animals. Man uses only one pair of limbs (lower limbs or legs) to support his body. This is why, unlike other animals, man has an erect posture. He walks, runs and stands with only one pair of limb called legs.
Man’s hands are adapted to hold objects. The arrangement of the thumb and the fingers is such that they can be brought opposite to one another and makes them capable of holding and working with things easily.

1.4 MIGRATION IN ANIMALS

To avoid the unfavourable climatic changes, some animals migrate from one place to another and come back to their original homes when the weather conditions become favourable again. This sort of mass movement of animals from one place to another and back is called migration. The greatest migrator is the Arctic tern. In Africa, wild beasts and other grazers migrate in large numbers, whenever the area in which they are living becomes poor in plant food.

Siberian Cranes migrate to India as it is warmer here than in their home country, where very cold weather makes it difficult to get food or even to stay alive.

Some other animals migrate too.

Mallard ducks, storks, flamingos are migratory birds.

The Arctic tern flies a distance of nearly 1,70,000 km between the Arctic and the Antarctic twice a year.

The European stork migrates from Europe to Africa every winter and returns to the same nest.

Fishes like eels have their homes in freshwaters. They travel in large groups to the sea to lay eggs. On hatching, the parents die while the baby eels travel to the river from where their parents came.
Ask yourself:

Across
2. Breathing holes in insects.
4. Animals that eat plants.
5. Flesh eating animals.

Down
1. The long journey that animals take up every year to escape cold weather and in search year to escape cold weather and in search of food and to breed.
3. Outer body covering of a snail.
4. The surrounding in which animals live and survives.

Add to Your Knowledge:

ADAPTATIONS are characteristic that birds and animals have developed over the years which help them survive in their environment or habitat. An elephant has a long trunk. Its trunk is actually a blend of the upper lip and the nose. The elephant uses its trunk just as human beings use their hands. The hippopotamus has a lot of fat under its skin, while helps it to stay afloat. Camels have wide feet that keep them from sinking in the sand. They have long eyelashes that prevent the sand from getting in their eyes. A snake is equipped with fangs. Snakes use their fangs to inject venom into their prey as they hunt. Bats are nocturnal mammals that have very poor vision. They emit high-pitched sound and listen to resultant echoes to locate their prey and nearby objects. This process is known as echolocation.
Summary

- Different animals are found in different environments.
- The organs of movement, breathing and feeding in animals are suited to their environments.
- Some animals use gills to breathe, while others use their lungs. Some animals breathe through their thin, moist skins. Some others breathe through tiny air holes along the sides of their bodies.
- Some animals eat other animals, while some eat plants. Some eat other animals as well as plants.
- Animals move in search of food and shelter with the help of fins, legs and wings.
- Some animals and birds travel to another place every year at the beginning of a season. At the end of the season, they return home. This is called migration.
SECTION -A (FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS :
1. Ducks and frogs have which type of feet to swim in water
   (A) Webbed  (B) Jointed  (C) Legs absent  (D) Can’t say

2. Man walks with the help of
   (A) Fore limb  (B) Hind limb  (C) Both A & B  (D) None

3. Snake moves with help of
   (A) Scales  (B) Limbs  (C) Muscular body  (D) None

4. Aquatic animals breathe through
   (A) Gills  (B) Lungs  (C) Buccal cavity  (D) None

5. Rats and rabbits live in
   (A) Water  (B) Burrows  (C) Nests  (D) Trees

6. Birds which swim in water have :
   (A) Broad wings  (B) Webbed feet  (C) Long beaks  (D) Toes with claws

7. An animal that lives in the water is :
   (A) Cockroach  (B) Tiger  (C) Dolphin  (D) Elephant

8. Tiny tubes inside the lungs are :
   (A) Capillaries  (B) Bronchi  (C) Delivery tube  (D) Test tube

FILL IN THE BLANKS
1. Fish take in oxygen from ________________.
2. A whale comes to the water surface to ________________.
3. Amoeba and paramecium breathe through their ________________.
4. Carnivorous birds have ________________ beaks and ________________ claws.
5. Omnivores have ________________ as well as ________________ to eat both __________ and __________.

TRUE / FALSE
1. The blood of insects is red in colour.
2. All birds can fly in the air.
3. Insects breathe through spiracles.
1. Birds use their tails as rudders.

5. Different animals have different kind of limbs.

6. Scales help a snake to crawl.

7. Penguins fly with their forelimbs.

**MATCH THE COLUMN**

<table>
<thead>
<tr>
<th>Column-1</th>
<th>Column-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Fishes</td>
<td>(a) Lungs</td>
</tr>
<tr>
<td>(2) Insects</td>
<td>(b) Gills</td>
</tr>
<tr>
<td>(3) Mammals</td>
<td>(c) Moist skin</td>
</tr>
<tr>
<td>(4) Earthworm</td>
<td>(d) Spiracles</td>
</tr>
</tbody>
</table>

**SECTION -B (FREE RESPONSE TYPE)**

**VERY SHORT ANSWER TYPE**

1. How does an insect breath?

2. How does fish and frog move in water?

3. What helps a bird to fly?

4. Define migration

**SHORT ANSWER TYPE**

5. How is breathing process of an insect different from that of a fish?

6. What are herbivores? What kind of teeth do they have?

7. Why do animals need to move.

8. Write one difference between fish and whales.

**LONG ANSWER TYPE**

9. Explain process of breathing in insects with example.

10. Why do animals migrate? Explain about any two migratory animals.
SECTION -A (COMPETITIVE EXAMINATION QUESTION)

MULTIPLE CHOICE QUESTIONS

1. Travelling long distances to avoid hardship of winter is called :
   (A) migration          (B) adaptation
   (C) hibernation        (D) aestivation

2. Which of the following animals breathe through gills ?
   (a)  (b)  (c)  (d)

   (A) d only           (B) Only a and c
   (C) Only b and c     (D) Only a,b and c

3. What is the adaptation by which a grasshopper protects itself from being eaten by its predator ?
   (A) It taste bad       (B) It can hop away quickly
   (C) It can camouflage itself in the grass  (D) It has a poisonous sting

4. Animals used different methods to escape from their predators. Which one of the following is NOT true ?
   (A) The lizard sheds a wriggling tail to distract the enemy
   (B) The grasshoper has powerful hind legs to hop away quickly
   (C) Crocodiles, lizards and turtles use their legs to crawl on the ground
   (D) A snake and a worm use their legs to crawl on the ground.

5. Observe the organism below

   Which of these animals breathe through moist skin ?
   (A) Only P and Q       (B) Only P and R       (C) Only Q and R       (D) P,Q and R
(PREVIOUS YEAR EXAMINATION QUESTIONS)

1. Which animal is being referred to in the information given below?

(i) Changes skin colour
(ii) Has a long tongue
(iii) Lays eggs

(A) A chameleon  (B) A flying fish  
(C) A giraffe  (D) A crocodile

2. Camels have thick, leathery pad under their heels. This helps them
(A) walk in the hot  (B) swim easily  
(C) climb steep slopes  (D) None of these

3. Which of the following organisms is adapted for survival in cold regions?

![Organisms](image)

(A) P and R  (B) P, Q and S  
(C) R and S  (D) P, Q, R and S

4. P feeds on Q, Q and S. Q and S only feed on R. R is one of the earth’s natural resources. Which is most probably true of the following?

(A) P is an omnivore  (B) R is a herbivore  
(C) S is an omnivore  (D) Q is a carnivore

5. The animals given below are similar in some way

![Animals](image)

Name the feature common to all these.

(A) Scales  (B) Feathers  
(C) Shells  (D) Moist skin
EXERCISE # 1
SECTION -A (FIXED RESPONSE TYPE)
MULTIPLE CHOICE QUESTIONS :

<table>
<thead>
<tr>
<th>Ques.</th>
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<tbody>
<tr>
<td>Ans.</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>C</td>
<td>B</td>
</tr>
</tbody>
</table>

FILL IN THE BLANKS
1. water  2. breathe  3. body surface  4. hooked, sharp
5. incisors, molar, flesh, plants

TRUE / FALSE

MATCH THE COLUMN
(1) → (b), (2) → (d), (3) → (a), (4) → (c)

EXERCISE # 2
SECTION -A (COMPETITIVE EXAMINATION ANSWERS)
MULTIPLE CHOICE QUESTIONS

<table>
<thead>
<tr>
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<th>5</th>
</tr>
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<tbody>
<tr>
<td>Ans.</td>
<td>A</td>
<td>C</td>
<td>C</td>
<td>D</td>
<td>C</td>
</tr>
</tbody>
</table>

EXERCISE # 3
(PREVIOUS YEAR EXAMINATION ANSWERS)

<table>
<thead>
<tr>
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<tr>
<td>Ans.</td>
<td>A</td>
<td>A</td>
<td>C</td>
<td>A</td>
<td>D</td>
</tr>
</tbody>
</table>
INTRODUCTION: Our planet, Earth, is home to all living beings. It has both landmasses and water masses on its surface. It is also surrounded by an envelope of air called the atmosphere. The presence of water and air makes life possible on the Earth. The Earth was believed to be flat for many years, whereas it is actually spherical in shape, as proved by explorers and astronomers. The photographs taken from the spaceships show that our Earth is spherical (Geoid) in shape.

1.1 SURFACE OF THE EARTH

More than 70% of the Earth's surface is covered with water and the remaining is land. There are huge landmasses called continents and large water bodies called oceans on its surface. The landmasses have mountains, plateaus, hills, plains or deserts.
There are also smaller water bodies in and around the continents called seas, bays, gulfs, rivers, lakes, etc. In all there are seven continents and four oceans. According to some geographers, there is a fifth ocean called the Southern Ocean, consisting of the southernmost parts of the Indian, Pacific and Atlantic Oceans.

### Continents
- Asia
- Africa
- Antarctica
- Europe
- North America
- South America
- Australia

### Oceans
- Pacific Ocean
- Atlantic Ocean
- Indian Ocean
- Arctic Ocean

#### 1.2 THE GLOBE

To study the Earth, which is a large planet, a model of the Earth showing all the continents, countries, oceans, seas, rivers, etc., in their correct positions and shape is made. This man-made model of the Earth is called a globe. It gives an accurate picture of the Earth's surface as it is a spherical representation. The globe has two end points - the North Pole, which is at the top and the South Pole which is at the bottom. There is an imaginary line joining the North Pole with the South Pole. This is called the axis of the Earth. Halfway between the two poles is another imaginary line called the equator. It divides the Earth into two equal halves, the Northern Hemisphere and the Southern Hemisphere.

#### 1.3 LATITUDES

If you observe the globe carefully, you will be able to see a number of lines running parallel to the equator. These lines are called **Parallels or Latitudes**. They are numbered from 0° to 90°, the equator being at 0°. The North Pole is at 90° N and the South Pole is 90° S. The other important latitudes are:

- The Tropic of Cancer - 23½° N
- The Tropic of Capricorn - 23½° S
- The Arctic Circle - 661/2° N
- The Antarctic Circle - 66½° S

**Properties of Latitudes**
The equator is the largest latitude. It is also called the Great Circle.

Latitudes don’t touch or cut each other.

All latitudes are complete circles, except the North Pole and the South Pole, which are points.

All latitudes are located at an equal distance from each other.

There are 181 latitudes.

Latitudes are marked in degrees (°) and minutes (’), where 60’ = 1°. Longitudes

1.4 LONGITUDES

On the globe, we can also see semi-circles running from the North Pole to the South Pole. These are called Longitudes or Meridians. The word meridian means ‘mid-day’. The longitudes are of equal length unlike the latitudes and are 360 in number. But it was difficult to number them due to their equal length. Thus, it was decided all over the world that the meridian passing through Greenwich near London should be taken as the 0° meridian. The meridian is also called the Prime Meridian. Meridians to the east of the Prime Meridian are called East Meridians those to the west are called West Meridians. There are 180 meridians to the east of the Prime Meridian and 180 meridians to the west of the Prime Meridians. India is located to the east of the Prime Meridian.

All longitudes are of equal length.

Longitudes cross the latitudes at right angles (90°).

* The distance between any two longitudes decreases as one moves away from the equator towards the poles.

Longitudes are marked in degrees (°) and minutes (’), where 60’ = 1°

The 180° meridian is called the international Dateline. The moment you cross to the east of it, you gain a day. The moment you cross to the west, you lose a day.
1.5 THE GRID

On a globe, the lines of latitude and the lines of longitude intersect each other at right angles forming a grid. The grid is a network of both these lines drawn on the globe. Thus, the grid is very helpful to locate a place on a globe or a map.
It’s a fact:
The largest continent is Asia and our country India is in Asia. The smallest continent is Australia. Antarctica is the only planet having no human population as 90% of it remains covered with ice throughout the year.

Key Words:
ENVELOPE OF AIR: thick layer of air
EXPLORER: A person who travels through an unfamiliar area so as to learn about it.
ASTRONOMER: A person who studies heavenly bodies like stars, planets, etc.
HEMISPHERE: A half of a sphere
GRID: A network of crossed lines forming a series of squares

Let’s Recall:
- The Earth is spherical in shape and looks like a flattened ball.
- There are huge landmasses called continents and large water bodies called oceans on its surface. In all there are seven continents and four oceans.
- A man-made model of the Earth is called a globe. Lines running parallel to the equator are called latitudes or parallels.
- Circular lines running from the North Pole to the South are called longitudes or meridians.
  The latitudes and longitudes intersect at right angles, forming a grid on the globe.

EXERCISE 01

FIXED RESPONSE TYPE

MULTIPLE CHOICE QUESTIONS:

1. The word ‘Meridian’ comes from which word?
   (A) English  (B) Egypt  (C) Latin  (D) Persian

2. How many axis does the Globe have?
   (A) 4  (B) 8  (C) 2  (D) 3

3. Near which place, the meridian passing through Greenwich?
   (A) Paris  (B) London  (C) Delhi  (D) Bombay

4. The portion, which is south of the equator is called:-
   (A) North Hemisphere  (B) South Hemisphere  (C) Longitude  (D) Altitude

5. The imaginary lines around the earth is called:-
   (A) Longitude  (B) Latitude  (C) Both A & B  (D) None

6. What is the name of longest most important line of latitude?
   (A) Equator  (B) Grid  (C) Axis  (D) Line of Longitude

7. The model of the earth is called:-
   (A) Globe  (B) Drawing  (C) Map  (D) Sketch
8. The Prime Meridian is near:-
   (A) London  (B) Paris  (C) Delhi  (D) Bombay

9. How many cardinal directions we have ?
   (A) 5  (B) 4  (C) 6  (D) 7

10. There are ________ latitudes
    (A) 360  (B) 180  (C) 361  (D) 181

FILL IN THE BLANKS

1. The lines of latitudes are also called __________.

2. The latitudes and longitudes cross each other to form __________.

3. The Earth is in __________ shape.

4. Longitudes, to east of Greenwich are called ____________.

5. There are __________ longitudes.

TRUE / FALSE

1. The Globe is not a model of Earth.

2. Meridians are imaginary lines.

3. The Parallels in the Southern hemisphere are marked 20° N, 10° 5 N.

4. The equator is not at 0°.

5. The north axis of the Globe is called north pole.

MATCH THE COLUMN

Column-A  Column-B
(i) Model of Earth  (a) 90°N
(ii) Arctic Circle  (b) Globe
(iii) Longitudes  (c) 23½°S
(iv) Tropic of Capricorn (d) 66½°N
(v) North Pole  (e) 360°

(A) i-b, ii-d, iii-e, iv-c, v-a  (B) i-d, ii-b, iii-e, iv-c, v-a
(C) i-b, ii-d, iii-e, iv-a, v-c  (D) i-b, ii-d, iii-c, iv-e, v-a

FREE RESPONSE TYPE

SUBJECTIVE QUESTIONS

1. What is a Globe and How is it useful?
2. What are latitudes? Which is the longest latitude?

3. What are longitudes? They cut the latitudes at what angle?

4. What is a Prime meridian?

5. What is a Grid and explain its use on the globe?

**Answer Key**

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**Fill in the Blanks:**

1. parallels 2. grid 3. geoid 4. East Longitudes 5. 360

**True and False:**


**Match the Column:**

(A) i-b, ii-d, iii-e, iv-c, v-a
INTRODUCTION

Words are divided into different kinds or classes according to the purpose for which they are used. Different kinds of words are called Parts of speech.

1.1 DEFINITION OF PARTS OF SPEECH

THE EIGHT PARTS OF SPEECH

There are eight parts of speech in the English language: noun, pronoun, verb, adjective, adverb, preposition, conjunction, and interjection. The part of speech indicates how the word functions in meaning as well as grammatically within the sentence. Understanding parts of speech is essential for determining the correct definition of a word when using the dictionary.

(a) **Noun (Naming words)**

A word (other than a pronoun) used to identify any of a class of people, places, or things (common noun), or to name a particular one of these (proper noun).

(b) **Pronoun (Replaces a noun)**

A word which functions as a replacement for a noun and to avoid the repetition of nouns.
(c) **Adjective (Describing words)**
An adjective is a word that describes, identifies or further defines a noun or a pronoun.

(d) **Verb (Action words)**
A word used to describe an action, state, or occurrence, and forming the main part of the predicate of a sentence.
(e) **Adverb (Describes verbs)**
A word or phrase that modifies the meaning of a verb, an adjective, or other adverb, expressing manner, place, time, or degree.

(f) **Preposition (Shows relationship)**
They are usually used in front of nouns or pronouns and they show the relationship between the noun or pronoun and other words in a sentence.
(g) **Conjunction (Joining words)**

A conjunction is a word that joins two or more words, phrases, or clauses. Think of them as gluing words. They glue words, phrases, and clauses together.

(h) **Interjection (Expressive words)**

An interjection is a part of speech that shows the emotion or feeling of the author. These words or phrases can stand alone or be placed before or after a sentence. Many times an interjection is followed by a punctuation mark, often an exclamation point (!)
Ask yourself

Fill in the blanks
1. Yesterday, I __________ for two hours.
2. This song is _______ than that song.
3. I sat _______ the coffee shop.
4. I _________ sleepy.
5. Alas! is an example of -__________.

Add to Your Knowledge

Same word can be used as a different part of speech. It is the function or use which determines which part of speech a particular word belongs to.

Example-
- The heavens showered blessings from above. (Adverb)
- She is above average in intelligence. (Preposition)
- Study the above sentence. (Adjective)

CONCEPT MAP
(FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS

1. A word which identifies person, name thing is known as
   (A) Pronoun  (B) Adjective  (C) Noun  (D) Adverb

2. “Books are kept in library” Here library describes which part of speech.
   (A) Noun  (B) Adverb  (C) Interjection  (D) None of these.

3. The use of conjunction is to :-
   (A) Join the words  (B) Separate the words  (C) Replace the words  (D) None of these

4. ‘Her voice is so sweet’ which part of speech is the word so ?
   (A) Adverb  (B) Adjective  (C) Verb  (D) Noun

FILL IN THE BLANKS

5. ___________ is a word which express emotion or feeling. (Interjection / Conjunction)

6. ___________ describes noun or pronoun. (Adverb / Adjective)

7. Verbs have ___________ forms. (one / three)

8. ‘Rashi is a beautiful girl’. The part of speech of the word girl is ___________. (noun / verb)

TRUE / FALSE

9. A word which describes action, state is called verb - [True / False]

10. Is, did are examples of helping verb - [True / False]

11. She is sitting behind Ravi. Here, ‘behind’ is an example of adverb - [True / False]

12. She lives near River Ganga. Here, she is a pronoun - [True / False]

(SUBJECTIVE QUESTIONS):

Directions: Identify the part of speech of the underlined words.

1. India is a land of festivals.

2. He is a nice person.

3. The bell rings.

4. I got up at nine o’clock.

5. Reema and Rita are friends.

6. Soldiers are brave.


8. She walks very slowly.
ANSWER KEY

EXERCISE 01
(FIXED RESPONSE TYPE)

MULTIPLE CHOICE QUESTIONS

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FILL IN THE BLANKS
5. Interjection
6. Adjective
7. Three
8. Noun

TRUE / FALSE
9. True
10. True
11. False
12. True

EXERCISE 02
(FIXED / FREE RESPONSE TYPE)

SUBJECTIVE
1. Noun
2. Pronoun
3. Verb
4. Preposition
5. Conjunction
6. Adjective
7. Interjection
8. Adverb
INTRODUCTION
We have two words, Lock and Loan, which comes first in the dictionary.

We have to arrange the words according to dictionary and also recognise some words made by using letters of other word.

1.1 ALPHABETICAL ORDER
You have to arrange the given words in order in which they are arranged in the dictionary. In the dictionary the words are placed in alphabetical order.

Illustration : 1.1
Arrange the given words in the correct alphabetical order.
Parrot, pigeon, penguin, peacock
Sol. The given words can be arranged in the alphabetical order as parrot, peacock, penguin, pigeon

Illustration : 1.2
Arrange the given words in the order they occur in dictionary.
1. SMALL 2. SUCCESS 3. SECRET 4. SMART 5. SUIT
(A) 3, 1, 5, 2, 4 (B) 3, 1, 4, 2, 5 (C) 3, 4, 1, 2, 5 (D) 3, 5, 4, 2, 1
Sol. (B) The correct alphabetical order of the given words is SECRET, SMALL, SMART, SUCCESS, SUIT Thus, the correct sequence is 3, 1, 4, 2, 5.

1.2 WORD FORMATION USING LETTERS OF A GIVEN WORD
Illustration : 1.3
A meaningful word is made from the first, the second, the seventh, the eighth and the eleventh letters of “ANYBODYCANDANCE”, which of the following is the middle letter of the word?
(A) C (B) N (C) D (D) Y
Sol. (B) The first, the second, the seventh, the eighth and the eleventh letters of the “ANYBODYCANDANCE” are A, N, Y, C, and D respectively. The meaningful word will be CANDY and N will be the required letter.

Illustration : 1.4
In the following question, find which one word can not be made from the letters of the given word.
TEMPERAMENT
(A) METER (B) PETER (C) TENTER (D) TESTER
Sol. (D) The word TEMPERAMENT contains all the letters of the word TESTER except S. So, the word TESTER cannot be formed.
Directions : (1 to 2) Arrange the given words in alphabetical order and tick the one that comes first :
1. (A) Grammar  (B) Granary  (C) Gradient  (D) Grand
2. (A) Mahender  (B) Mahendra  (C) Maninder  (D) Mahindra

3. If the following words are arranged in an alphabetical order, which word will appear in the second?
   (A) Principal  (B) Principle  (C) Principia  (D) Principled

4. In a telephone directory, which of the following names will appear in the last?
   (A) Sajewat  (B) Segvan  (C) Sajevar  (D) Sajewet

5. Arrange the given words in the sequence in which they occur in the dictionary and choose the correct sequence.
   (A) 5, 3, 1, 4, 2, 6  (B) 5, 4, 1, 3, 2, 6  (C) 5, 1, 3, 4, 2, 6  (D) 5, 1, 4, 2, 3, 6

6. Choose the one word which can be formed from the letters of the given word.
   RATIONALISATION
   (A) NATIONALISTIC  (B) NATIONALIST  (C) SITUATION  (D) REALISATION

Directions : (7 to 8) In each of the following questions, find which one word can not be made from the letters of the given word.
7. SUPERIMPOSABLE
   (A) SPIRE  (B) REPTILE  (C) POSSIBLE  (D) REPOSE

8. REASONABLE
   (A) ARSON  (B) BONES  (C) NOBLE  (D) BRAIN

Directions : (9 to 10) In each of the following questions, find which one word can be made from the letters of the given word.
9. MEASUREMENT
   (A) MASTER  (B) MANTLE  (C) SUMMIT  (D) ASSURE

10. IMMEDIATELY
    (A) DIALECT  (B) LIMITED  (C) DIAMETER  (D) DICTATE

11. How many meaningful English words can be made with the letters N,W,T,I using each letter only once in the word?
    (A) One  (B) Two  (C) Three  (D) More than three

Directions : (12 to 13) Arrange the given words in alphabetical order and choose the one that comes first.
12. (A) Sport  (B) Spouse  (C) Squash  (D) Sprout

13. (A) Praise  (B) Prank  (C) Prayer  (D) Practise
Arrange the given words in the sequence in which they occur in the dictionary and then choose the correct sequence.

1. Select
2. Seldom
3. Send
4. Selfish
5. Seller

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

A meaningful word starting with A is made from the first, the second, the fourth, the fifth and the sixth letters of the word **CONTRACT**, which of the following is the middle letter of the word?

(A) C
(B) T
(C) O
(D) R

Arrange the following group such that when arranged in a specific order, meaningful word is formed.

R    U    S    G    A
1     2    3     4    5

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

Sol. The given letter, when arranged in the order
3, 2, 4, 5, 1. Form the word **SUGAR**.

Similarly can you make a meaningful word by arranging these letters
R    T    A    N    U    E
1     2    3     4    5     6

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

In the alphabet series, we can define the left side and right side of the alphabet series, now can you find the 11th letter from the right.

**EXERCISE**

1. Which of the following words cannot be formed from the given word?
   **MATHEMATICS**
   (A) TIME
   (B) MAT
   (C) MENTAL
   (D) TAME

2. Which of the following CANNOT be formed from the letters of the given word?
   **ATTRIBUTABLE**
   (A) BATTER
   (B) TRIAL
   (C) EAT
   (D) ATTITUDE

3. How many meaningful English words can be made with the letters ERTU using each letter only once in each word?
   (A) 0
   (B) 1
   (C) 2
   (D) More than two

4. Select a combination of numbers from the options which will form a meaningful word.
   **Y L P E A R**
   1 2 3 4 5 6
   (A) 3, 2, 5, 1, 6, 4
   (B) 3, 2, 5, 1, 4, 6
   (C) 3, 1, 2, 5, 4, 6
   (D) 3, 2, 1, 5, 6, 4
5. Find the combination of numbers from the options so that letters arranged accordingly forms a meaningful word. 

\[ \text{ERBKN} \]
\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \]

(A) 3, 2, 6, 1, 4, 5  \quad (B) 3, 2, 6, 4, 5, 1  \quad (C) 3, 6, 2, 1, 4, 5  \quad (D) 3, 2, 1, 6, 5, 4

6. How many meaningful English words can be formed from the letters ADRW using each letter only once in each word? 

(A) One  \quad (B) Two  \quad (C) Three  \quad (D) None of these

7. Some letters given are numbered 1, 2, 3, 4 and 5 followed by four options containing combinations of these numbers. Find the combination of numbers so that letters are arranged accordingly to form a meaningful word. 

\[ \text{UJCIE} \]
\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \]

(A) 1, 2, 3, 4, 5  \quad (B) 2, 4, 1, 5, 3  \quad (C) 2, 1, 4, 3, 5  \quad (D) 3, 1, 2, 4, 5

8. In the given letter series, which letter is exactly midway between F and R? 

\[ \text{YACBEDFIJKMNOPRUVXTZ} \]

(A) N  \quad (B) K  \quad (C) M  \quad (D) H

9. Study the given arrangement carefully. 

\[ 1 \quad F \quad A \quad 3 \quad D \quad K \quad U \quad J \quad 9 \quad B \quad R \quad 2 \quad K \quad E \quad L \quad 8 \quad G \quad P \]

Which of the following is eighth to the right of seventh letter from the left end in the above arrangement? 

(A) F  \quad (B) P  \quad (C) L  \quad (D) 2

10. Which letter is the 10th to the right of 11th letter from the left end in English alphabet? 

(A) t  \quad (B) u  \quad (C) V  \quad (D) f

11. Choose one word from the options which can be formed from the letters of the given word using each letter only once. 

'SIGNIFICANT'  \[ \text{NSO\_Level-II\_2011-12} \]

(A) SCANT  \quad (B) SIGNIFY  \quad (C) STINGY  \quad (D) START

12. Find one word which can be made from the letters of the given word.

GERMINATION  \[ \text{IMO\_Level-II\_2013-14} \]

(A) GERMAN  \quad (B) NOTION  \quad (C) NOTATION  \quad (D) SMART

13. Which of the following letter is fifteenth to the right of the sixth letter from the left end of the given arrangement? 

\[ \text{DUBCABEDCABUDEBACDEBAUCDAEB} \]

(A) D  \quad (B) B  \quad (C) E  \quad (D) A

14. Some letters are given which are numbered 1, 2, 3, 4, 5, 6 and 7. Find that combination of numbers so that letters arranged accordingly form a meaningful word. 

\[ \text{E1CANS}E \]
\[ 1 \quad 2 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \]

(A) 2, 1, 5, 3, 4, 6, 7  \quad (B) 6, 4, 2, 1, 5, 3, 7  \quad (C) 3, 4, 5, 2, 1, 6, 7  \quad (D) 1, 6, 2, 4, 5, 3, 7

15. Which word among the following options cannot be formed using the letters of the given word? 

CONSTRUCTION  \[ \text{IMO\_Level-II\_2012-13} \]

(A) SUCTION  \quad (B) COINS  \quad (C) CAUTION  \quad (D) NOTION
**ANSWER KEY**

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