



Winmeen's

6th Science
2nd Term Notes
Questions

New Book



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6th Science 2nd Term Notes Questions**1. Heat**

Heat is an energy that raises the temperature of a thing by causing the molecules in that thing to move faster. The sun is the preliminary source of heat energy. We also get heat by combustion, friction and electricity. They are called **sources of heat**. When we heat an object the vibration and the movement of molecules increases and the temperature also increases. Heat is the total kinetic energy of constituent particles of objects. The SI unit of heat is **joule**.

The measurement of warmness or coldness of a substance is known as **temperature**. The SI unit of temperature is **Kelvin**. Temperature can also be measured in Celsius or centigrade. We use thermometer to measure temperature. Heat and temperature are not the same thing. They mean two different things. Heat not only depends on temperature but also the number of molecules in the substance. Suppose that one vessel has one litre of boiling water (100°C) and another vessel has five litres of boiling water (100°C). Now the heat in the five litre water is greater because it has more number of molecules.

Heat energy flows from higher temperature to lower temperature. When you keep ice cubes in the palm of your hand heat flows from the hand to the ice. If we hold a hot cup of coffee, heat will flow from hot coffee to our hand. Solids expand when they are heated and they contract when they are cooled. The expansion in length is called **linear expansion** and the expansion in volume is called **cubical expansion**. Rails are made of iron and they expand in hot summer season. So gaps are left between two rails while laying a railway track. The expansion gap prevents the ends of rails getting hit and dislocated.

Two objects are said to be in **thermal contact** when they exchange heat energy. When the thermal contact doesn't affect each other's temperature the two objects are said to be in **thermal equilibrium**. Electric wire between two electric posts contract on cold days and become stiff. They sag in summer due to the heat. To solve this problem the wires are fixed a little slack so that they can contract or expand in their length. Concrete slabs are fixed in over bridges leaving expansion gap between two slabs. This prevents the hitting of slabs with each other due to expansion.

I. Choose the appropriate answer:

1. When an object is heated, the molecules that make up the object

- | | |
|--------------------------------|-------------------|
| a) begin to move faster | b) lose energy |
| c) become heavier | d) become lighter |

2. The unit of heat is

- | | |
|-----------|-----------------|
| a) newton | b) joule |
| c) volt | d) Celsius |

3. One litre of water at 30°C is mixed with one litre of water at 50°C . The temperature of the mixture will be
- a) 80°C b) more than 50°C but less than 80°C
- c) 20°C d) around 40°C
4. An iron ball at 50°C is dropped in a mug containing water at 50°C . The heat will
- a) flow from iron ball to water.
- b) **not flow from iron ball to water or from water to iron ball.**
- c) flow from water to iron ball.
- d) increase the temperature of both.

II. Fill in the blanks:

1. Heat flows from a **hot** body to a **cold** body.
2. The hotness of the object is determined by its **total kinetic energy**
3. The SI unit of temperature is **kelvin**
4. Solids **expand** on heating and **contract** on cooling.
5. Two bodies are said to be in the state of thermal **equilibrium** if there is no transfer of heat taking place.

III. True or false. If false, give the correct statement:

1. Heat is a kind of energy that flows from a hot body to a cold body. - True
 2. Steam is formed when heat is released from water. - False
- Ice is formed when heat is released from water.**
3. Thermal expansion is always a nuisance. - True
 4. Borosilicate glass does not expand much on being heated. - True
 5. The unit of heat and temperature are the same. - False

The SI unit of heat is joule. The SI unit of temperature is Kelvin.

IV. Give reasons for the following:

- 1. An ordinary glass bottle cracks when boiling water is poured into it, but a borosilicate glass bottle does not.**

Glass is a poor conductor of heat. When hot liquid is poured into the tumbler, the inner surface of the tumbler becomes hot and expands while the outer surface remains at the room temperature and does not expand. Due to this unequal expansion the tumbler cracks.

Glassware used in kitchen and laboratory are generally made up of Borosilicate glass (Pyrex glass). The reason is that the Borosilicate glass does not expand much on being heated and therefore they do not crack.

2. Rivet is heated before fixing in hole to join two metal plates.

Rivets are used to join two steel plates together. Hot rivet is driven through the hole in the plates. One end of the rivet is hammered to form a new rivet head. When cooled, the rivet will contract and hold the two plates tightly together.

V. Match the following:

- | | | |
|------------------------|---|-----------------|
| 1. Heat | - | a) 0 °C |
| 2. Temperature | - | b) 100 °C |
| 3. Thermal Equilibrium | - | c) Kelvin |
| 4. Ice cube | - | d) No heat flow |
| 5. Boiling water | - | e) joule |

Ans: 1-e; 2-c; 3-d; 4-a; 5-b

VI. Analogy:

- Heat: Joule:: Temperature: **Kelvin**
- Ice cube: 0°C :: Boiling water: **100°C**
- Total Kinetic Energy of molecules: Heat :: Average Kinetic energy : **Average heat**

VII. Short Questions & answer:

1. Make a list of electrical equipments at home which we get heat from.

At home we get heat from water heater, electric iron, electric kettle and room heater.

2. What is temperature?

The measurement of warmth and coldness of a substance is known as its temperature.

3. What is thermal expansion?

The expansion of a substance on heating is called the thermal expansion of that substance.

4. What do you understand by thermal equilibrium?

Thermal equilibrium exists when two objects in thermal contact no longer affect each other's temperature.

5. What difference do you think heating the solid will make in their molecules?

Molecules in objects are constantly vibrating or moving inside objects. We cannot see that movement with our naked eye. When we heat the object this vibration and movement of molecules increases and temperature of the objects also increases.

6. Distinguish between heat and temperature,

Heat and temperature are not the same thing. They in fact mean two different things.

- Temperature is related to how fast the atoms or molecules move or vibrate within the substance.
- Heat not only depends on the temperature of the substance but also depends on how many molecules are there in the object.
- Temperature measures the average kinetic energy of molecules. Heat measures the total kinetic energy of the molecules in the substance.

7. When a window is accidentally left open on a winter night, will you feel uncomfortable because the cold is getting in, or because the heat is escaping from the room

When the window is accidentally left open the heat inside the room escapes from it through the open window. So the room becomes cold and we feel uncomfortable.

8. Suppose your normal body temperature were lower than what it is. How would the sensation of hot and cold change?

As the high temperature from outside affects our body we feel that it is hot.

9. If you heat a circular disk with a hole, what change do you expect in the diameter of the hole? Remember that the effect of heating increases the separation between any pair of particles.

The molecules of the solid material around the hole expand on heating. As a result the circumference of the hole decreases. Naturally, the diameter of the hole also gets reduced.

2. Electricity

Any device from which electricity is produced is called the **source of electricity**. We get electricity from Thermal power stations, Hydel power stations, Atomic power stations, sea waves, windmills and solar energy. In thermal power stations steam is produced by burning coal or diesel. This steam is used to rotate turbines and produce electricity. In hydel power stations the force of flowing water from a dam is used to rotate turbines. In atomic power stations nuclear energy is used to produce steam. Here nuclear energy is

converted into mechanical energy and then electrical energy. In windmills, wind energy is used to rotate the turbines.

A device that converts chemical energy into electrical energy is called a cell. The **primary cells** can be used only once and they cannot be recharged. We use them in clocks, watches and toys. A cell that can be recharged many times is called a **secondary cell**. They are used in mobile phones, automobiles and emergency lamps. A cell is a single unit. A collection of cells connected properly is called a **battery**. An electric circuit is a continuous or unbroken closed path along which electric current flows from the positive terminal to the negative terminal of the battery. A circuit generally has a cell or battery, connecting wires, a bulb and a key or switch. When the key is in open (off) condition electricity will not flow and it is called an **open circuit**. When the key is closed (on) then electricity will flow and the circuit is called **closed circuit**.

Two or more bulbs connected in series in a circuit is called **series circuit**. In this series, if one bulb is fused then the entire circuit will not work. If two or more bulbs are connected in parallel circuit then it is called **parallel circuit**. If any one bulb is fused or damaged then the other bulbs will glow. So the parallel circuit is used in homes. The materials which allow electric charges to pass through them are called **conductors**. E.g: copper, iron, aluminum, water, earth. The materials which do not allow electric charges to pass through them are called insulators or **non-conductors**. E.g: plastic, glass, wood, rubber, china clay, ebonite.

An electric cell is a device which converts chemical energy into electrical energy. It contains a solution which gives out positive and negative ions. This solution is called **electrolyte**. Two different metal plates which act as terminals are immersed in the solution. When these terminals are connected by a metal wire electricity passes from +ve terminal to -ve terminal. Normally copper acts as positive terminal and zinc as negative terminal we can replace the electrolyte with porridge with curd, potato or lemon.

I. Choose the appropriate answer:

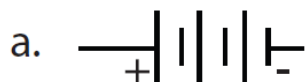
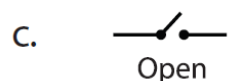
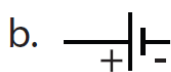
1. The device which converts chemical energy into electrical energy is

- | | |
|----------------|---------------|
| a) fan | b) solar cell |
| c) cell | d) television |

2. Electricity is produced in

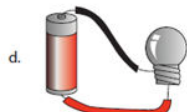
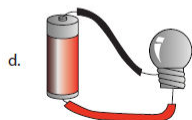
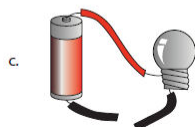
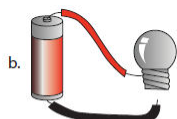
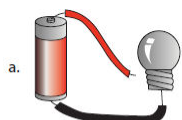
- | | |
|------------------|-------------------------|
| a) transformer | b) power station |
| c) electric wire | d) television |

3. Choose the symbol for battery



Ans:

4. In which among the following circuits does the bulb glow?



Ans:

5. _____ is a good conductor.

a) silver

b) wood

c) rubber

d) plastic

II. Fill in the blanks:

1. **Conductors** are the materials which allow electric current to pass through them.
2. Flow of electricity through a closed circuit is **current**
3. **Switch** is the device used to close or open an electric circuit.
4. The long perpendicular line in the electrical symbol represents **positive** terminal.
5. The combination of two or more cells is called a **battery**

III. True or False. If False give the correct statement:

1. In a parallel circuit, the electricity has more than one path. - True
2. To make a battery of two cells, the negative terminal of one cell is connected to the negative terminal of the other cell. - False

To make a battery of two cells, the negative terminal of one cell is connected to the positive terminal of the other cell.

3. The switch is used to close or open an electric circuit. - True
4. Pure water is a good conductor of electricity. - False

Pure water is a bad conductor of electricity.

5. Secondary cell can be used only once. - False

Secondary cells can be recharged and used again and again.

V. Arrange in sequence:

A Cell A Device Electrical Energy Is Into
Chemical Energy That Converts

Ans: A cell is a Device that converts chemical energy into electrical energy.

VI. Match the following

Sl.No	Symbol	Description	Ans
1		Open Key	Battery
2		Cell	Bulb does not glow
3		Bulb glows	Open Key
4		Battery	Bulb glows
5		Bulb does not glow	Cell

VII. Short Questions & answer:

1. Assertion (A): it is very easy for our body to receive electric shock.

Reason (R): Human body is a good conductor of electricity.

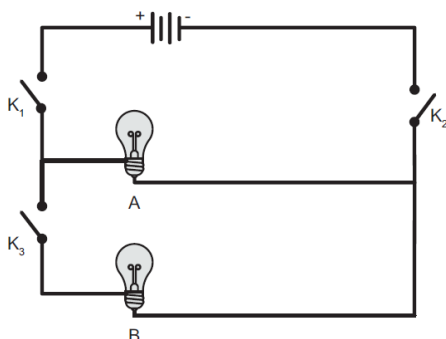
a) Both A and R are correct and R is the correct explanation for A.

b) A is correct, but R is not the correct explanation for A.

c) A is wrong but R is correct.

d) Both A and R are correct and R is not the correct explanation for A.

2. In the given circuit diagram, which of the given switch(s) should be closed. So that only the bulb A glows.



Ans: K_1 & K_2

3. Can you produce electricity from lemon?

Yes, lemon juice should be used as electrolyte. A copper plate and a zinc plate should be made electrodes. By connecting them with a wire we get electricity passing from +ve copper to -ve zinc.

4. What type of circuit is there in a torch light?

Series Circuit

5. Underline the odd one out. Give reason for your choice.

Switch, Bulb, Battery, Generator

Switch, bulb and battery are parts of series circuit. Generator does not find a place in it.

6. Can the cell used in the clock give us an electric shock? Justify your answer.

The cell used in the clock does not give us an electric shock. This is because of low voltage current in the cell. So it does not give us shock.

6. Silver is a good conductor but it is not preferred for making electric wire why?

Silver is a good conductor but it is very expensive. So it is not preferred for making electric wires. We use aluminum or copper wires which are good conductors and are very cheap when compared to silver.

7. Search ten words in the given word grid and classify them in conductors and insulators.

S.No.	Conductors	Insulators
1	Copper	Wood
2	Sea water	Rubber
3	Aluminum	Plastic
4	Earth	Glass
5	Man	Eraser

3. Changes Around Us

The process of an object becoming different from its earlier stage is called **change**. It is the observable difference between the initial state and the final state of a substance. Water becomes ice when cooled and it becomes steam when boiled. These are changes from one state to another. A change can occur over shape, colour, temperature, state and composition.

There are different kinds of changes. Some changes take a long period of time. They are called **slow changes**. E.g.: growth of nails and hair, change of seasons. Germination of seed. Some changes take place within a short period of time. They are known as **fast changes**. E.g.: bursting of a balloon, breaking of glass, bursting of fire crackers, burning of paper.

Changes which can be reversed are known as **reversible changes**. E.g.: stretching of rubber band, melting of ice, the folding of touch-me-not leaves. Changes which cannot be reversed are called **irreversible changes**. In these changes the objects do not return to their former state. E.g.: changes of milk into curd, digestion of food, making idli from batter.

Physical changes are temporary changes in which there is change in physical appearance of the substance but not in its chemical composition here no new substance is formed. E.g.: melting of ice, dissolution of salt or sugar in water, stretching of a rubber band. **Chemical changes** are permanent changes. During this change, there is change in the chemical composition and new substance is formed. E.g.: burning of wood, popping of popcorn, blackening of silver ornaments, rusting of iron. Chemical change is an irreversible change but physical change is reversible and temporary. During a physical change there is no change in the chemical composition of substance.

The changes which are useful and which are not harmful to the environment are called **desirable changes**. E.g.: ripening of fruits, growth of plants, cooking of food, milk changing into curd. The changes which are harmful to the environment and are not desired by us are called **undesirable changes**. E.g.: forest fire, deforestation, decaying of fruits, rusting of iron.

Changes which take place in nature of their own are called **natural changes**. They are beyond the control of human beings. E.g.: rotation of earth, changing phase of the moon, rain. The changes which are brought about by human beings are known as human made or **artificial changes**. They do not happen on their own. E.g.: cooking deforestation, cultivating crops, construction of buildings.

Initial stage	Changing Stage
Seed	Sapling
Day	night
Rock	sculpture
Raw fruit	fruit

What is common in all the above pairs?

There is change from the initial stage to the final stage. These changes are permanent and irreversible.

I. Choose the appropriate answer:

- When ice melts to form water, changes occurs in its
 - position
 - colour
 - state**
 - composition
- Drying of wet clothes in air is an example of
 - Chemical change
 - undesirable change
 - irreversible change
 - physical change**
- Formation of curd from milk is a
 - reversible change
 - a fast change
 - an irreversible change**
 - an undesirable change
- Out of the following an example of a desirable change is
 - rusting
 - change of seasons**
 - earthquake
 - flooding
- Air pollution leading to Acid rain is a
 - reversible change
 - fast change
 - natural change
 - human made change**

II. Fill in the blanks:

1. Magnet attracts iron needle. This is **a reversible** change. (a reversible / an irreversible)
2. Boiling of egg results in **an irreversible** change. (a reversible / an irreversible)
3. Changes that are harmful to us are **undesirable** (desirable / undesirable)
4. Plants convert carbon-di-oxide and water into starch. This is an example of **natural** change. (natural / human made)
5. Bursting of fire crackers is a **fast** change whereas germination of seeds is a **slow** change.

III. True or False, if False, give the correct statement:

1. Growing of teeth in an infant is a slow change. - True
2. Burning of match stick is a reversible change. - False

Correct Statements: The match stick undergoes a chemical change. It is an irreversible change.

3. Change of New moon to Full moon is human made. - False

Correct Statements: Change of New moon to Full moon is a natural change.

4. Digestion of food is a physical change. - False

Correct Statements: The digested food undergoes chemical change.

5. In a solution of salt in water, water is the solute. - False

Correct Statements: In a solution of salt in water, water is a solvent.

IV. Analogy:

1. Curdling of milk : irreversible change :: formation of clouds : **reversible change**
2. Photosynthesis : **natural change** :: burning of coal : human made change.
3. Dissolving of glucose : reversible change :: Digestion of food : **irreversible change**
4. Cooking of food: desirable change:: Decaying of food : **undesirable change**
5. Burning of matchstick: **fast change** :: Rotation of earth : slow change.

V. Underline the odd one out, give reasons for your choice:

1. Growth of a child, blinking of eye, Rusting, Germination of a seed.

Blinking of eye is a fast change. Others are slow changes.

2. Glowing of a bulb, lighting of a candle, breaking of a coffee mug, curdling of milk.

Curdling of milk is a slow change. Others are fast change.

3. Rotting of an egg, condensation of water vapour, trimming of hair, ripening of fruit.

Trimming of hair is a fast change. Others are slow change.

4. Inflating a balloon, popping a balloon, fading of wall paint, burning of kerosene.

Fading of wall paint is a slow change. Others are fast change.

VI. Short Questions & answer:

- 1. What kind of a change is associated with decaying of a plant?**

Natural change, irreversible change, slow change.

- 2. You are given some candle wax. Can you make a candle doll from it? What kind of change is this?**

Yes, it is a human-made change.

- 3. Define a slow change.**

Changes which take place over a long period of time are known as slow change.

- 4. What happens when cane sugar is strongly heated? Mention any two changes in it.**

When cane sugar is strongly heated the water in it becomes steam and it physical change. Finally the sugar undergoes chemical change and only carbon remains in the dish.

- 5. What is a solution?**

The spreading of the solid particles (broken into individual molecules) among the liquid molecules is called as dissolution.

- 6. What will happen when paper is burnt? Explain.**

When paper is burnt it undergoes chemical change. It is a fast change, irreversible change and human made change.

- 7. Can deforestation be considered a desirable change? Explain.**

No, deforestation is an undesirable change. Forests provide shelter to millions of animals and insects. We get rain due to forests. The trees in the forest purify the air by absorbing carbon dioxide and releasing oxygen. They give us food, fruit, medicine, furniture and fuel. The earth is green because of trees and plants. So deforestation is an undesirable change.

8. What type of changes are associated with germination of a seed? Explain.

The germination of a seed is natural change. It is a slow change because the seed takes considerable time to grown into a sapling. It is an irreversible change and it is a desirable change as well.

9. when a candle is lit the following changes are observed

- a. Wax melts
- b. Candle keeps burning
- c. The size of the candle decreases
- d. The molten wax solidifies
- e. Which of the changes can be reversed? Justify your answer
 1. The molten wax can be changed into solid wax by cooling it. This is a reversible change
 2. The molten wax can be changed from its liquid state to solid state by cooling it. This is a reversible change.

4. Air

Our earth is surrounded by a huge envelope of air called **atmosphere**. It extends to more than 800 km above the surface of the earth. The atmosphere is made up of five different layers. They are i) Troposphere ii) Stratosphere iii) Mesosphere iv) Ionosphere and v) Exosphere. The **troposphere** is closest to the earth and it extends upwards for about 16km. this layer is responsible for the weather we experience on earth. It is responsible for the formation of clouds. The **stratosphere** lies above the troposphere and it has ozone layer in it. This ozone layer protects all living things on earth from the harmful ultraviolet rays of the sun.

Joseph Priestly in 1774 found out that air is a composite mixture of different gases. He was able to identify a colourless, highly reactive gas. It was later named oxygen by the French chemist **Antoine Lavoisier**. Plants give out oxygen during photosynthesis. Priestley proved by experiments that the oxygen liberated by plants is absorbed by animals during respiration. **Daniel Rutherford**, a Scottish chemist discovered nitrogen. The air around us contains 78% of nitrogen and 21% of oxygen. Apart from these gases, CO₂, water vapour, helium and argon gases are found in a small proportion in air. The composition of air is not uniform throughout. It varies from place to place.

The process of burning a substance in the presence of oxygen and releasing a large amount of light and heat is called **burning**. If the process does not emit flame then it is called **combustion**. Plants need oxygen for getting energy for growth. The gas exchange takes place in plant leaves through tiny holes called **stomata**. Photosynthesis takes place in plants in presence of sunlight. At that time CO₂ and water are absorbed by the plant and they are changed into starch and oxygen in the presence of chlorophyll.

Carbon-di-oxide + water $\xrightarrow[\text{chlorophyll}]{\text{sunlight}}$ starch + oxygen

When animals inhale this oxygen it reacts with the digested food and release energy.

Food + Oxygen \rightarrow Carbon dioxide + Water + Energy

The plants and animals which live in water use the oxygen dissolved in it. Frogs breathe through their skins when they are under water and fish respire using their gills. Air is used by plants and animals for breathing. Fuels like coal, kerosene and LPG use air for burning. Compressed air is used in the tyre of vehicles. Patients having breathing difficulties, mountaineers and deep sea divers carry with them oxygen cylinders for breathing purposes. Blowing air turns the blades of windmills. These windmills are used to draw water, run flour mills and to generate electricity.

I. Choose the appropriate answer:

1. _____ is the percentage of nitrogen in air.
a) **78%** b) 21%
c) 0.03% d) 1%
2. Gas exchange takes place in plants using ____
a) **stomata** b) chlorophyll
c) leaves d) flowers
3. The constituent of air that supports combustion is _____
a) nitrogen b) carbon-dioxide
c) **oxygen** d) water vapour
4. Nitrogen is used in the food packaging industry because it _____
a) provides colour to the food
b) provides oxygen to the food
c) adds proteins and minerals to the food
d) **keeps the food fresh**
5. _____ and _____ are the two gases, which when taken together, make up about 99 percentage of air.
I, Nitrogen II. Carbon dioxide III. Noble gases IV. Oxygen

- a) I and II
- b) I and III
- c) II and IV
- d) I and IV

II. Fill in the blanks:

1. **Oxygen** is the active component of air.
2. The gas given out during photosynthesis is **oxygen**
3. **Oxygen** gas is given to the patients having breathing problems.
4. **Dust particles** can be seen moving in a beam of sunlight in a dark room.
5. **Carbon dioxide** gas turns lime water milky.

III. True or False, If False, give the correct statement:

1. Inhaled air contains a large amount of carbon-di-oxide. -False

Inhaled air contains a large amount of oxygen.

2. Planting trees help in decreasing global warning. - True
3. The composition of air is always exactly the same. - False

The composition of air varies from place to place.

4. Whales come up to the water surface to breathe in oxygen. - True
5. The balance of oxygen in atmosphere is maintained through photosynthesis in animals and respiration in plants. -False

The balance of oxygen in atmosphere is maintained through photosynthesis in plants and respiration in animals.

IV. Match the following.

- | | | |
|--------------------------|---|-------------------|
| 1. Moving air | - | a) Photosynthesis |
| 2. Layer I which we live | - | b) Troposphere |
| 3. Stratosphere | - | c) Wind |
| 4. Oxygen | - | d) Ozone layer |
| 5. Carbon-di-oxide | - | e) Combustion |

Ans: 1-c; 2-b; 3-d; 4-e; 5-a

V. Arrange the following statements in correct sequence:

1. Plants manufacture food by a process called photosynthesis.
2. Plants require energy for their growth.
3. Plants take in oxygen and release carbon-di-oxide just as animals.
4. Plants take carbon-di-oxide from the atmosphere, use chlorophyll in the presence of sunlight and prepare food.
5. Such oxygen is available to animals and human beings for breathing.
6. During this process, oxygen is released by plants.

Ans:

1. Plants take in oxygen and release carbon-dioxide just as animals.
2. Plants require energy for their growth.
3. Plants take carbon dioxide from the atmosphere, use chlorophyll in the presence of sunlight and prepare food.
4. Plants manufacture food by a process called photosynthesis.
5. During this process, oxygen is released by plants.
6. Such oxygen is available to animals and human beings for breathing.

VI. Analogy:

1. Photosynthesis : carbon dioxide :: Respiration : Oxygen
2. 78% of air : does not support combustion : 21% of air : supports combustion

VIII. Short Questions & answer:**1. What is atmosphere? Name the five layers of atmosphere.**

Our earth is surrounded by a huge envelope of air called the atmosphere. The atmosphere is made of five different layers - the troposphere, the stratosphere, the mesosphere, the ionosphere and the exosphere.

2. How do the roots of land plants get oxygen for breathing?

The roots of land plants have root hair. Using them, plants absorb oxygen from the soil.

3. What should be done if the clothes of a person catch fire accidentally? Why?

We should wrap a thick blanket around his body. We must roll him on the ground. The thick cloth prevents the supply of oxygen to the fire. Naturally, the fire stop burning.

4. What will happen if you breathe through mouth?

Our respiratory track contains hair-like cilia and the sticky mucous membrane. They filter the dust particles and germs from entering the lungs. If we breathe through the mouth these dust particles and germs will reach the lungs unchecked. It will cause infection in our respiratory system.

5. Biscuits kept open on a plate during monsoon days lose their crispness. Why?

During monsoon days the humidity in the air is very high. When biscuits are kept exposed in a plate they easily absorb the moisture in the air and lose their crispness.

6. Why do traffic assistants wear a mask on duty?

Traffic constables are forced to inhale large quantities of polluted air impure with vehicle smoke and roadside dust. In order to filter these harmful particles and gases the traffic constables wear masks on duty. These masks help them to prevent the entry of harmful particles into their respiratory tract.

7. Can you guess why fire extinguishers throw a steam of carbon dioxide while putting out fire?

Carbon dioxide is heavier than oxygen. It is not a combustible gas and it does not support combustion. Carbon dioxide which comes out from fire extinguishers wraps the fire like a blanket. This prevents the supply of oxygen to the fire. Naturally, the fire stops burning and it is put out immediately.

5. The Cell

All living things are made up of one or more cells. These cells are the basic building blocks of every living thing. A scientist by name **Robert Hooke**, built a compound microscope and found out the structure of a cell. The term cell was first used by him. There are two types of cells. Bacteria and Cyanobacteria have **prokaryotic cells**. These cells have no true nucleus and they have no true nuclear membrane around the nucleoid. Plant cells and animal cells are called **Eukaryotic cells**. They have true nucleus and their organelles are bounded by membrane.

A typical cell has three major parts. They are cell membrane, cytoplasm and nucleus. Many minuscule structures called **organelles** lie within the cell. Most cells are microscopic. They can be observed only through the microscope. The egg of an ostrich is the largest single cell and it has 170 millimeter width. We can see this cell with naked eye. The cell size has no relation to the size of an organism. The number of cells present in different organisms may vary. Bacteria, amoeba, chlamydomonas and yeast are unicellular organisms. Spirogyra, mango and human beings are multicellular.

Plant cells are usually larger than animal cells. They are hard in nature. Plant cells have a cell wall in addition to cell membrane. Plant cells have chloroplast which contains chlorophyll. Using these green pigments plants prepare food in sunlight and this process is called photosynthesis. Plant cells have large vacuoles but centrioles are not found in them. Animal cells are smaller than plant cells. They are not as hard as plant cells. Animal cells have no cell wall but they have cell membrane around them. An animal cell has many small vacuoles and centrioles are present in animal cells.

The cell components perform different functions. **Cell wall** surrounds the cell and protects it. It makes the cell stiff and strong. It is called supporter of protector. **Cell membrane** holds and protects the cell and it is the gate of the cell. **Cytoplasm** is a watery, gel-like material in which the cell parts move. It is the area of movement. **Mitochondria** produce and supplies energy for the cell. It is called the power house of the cell.

Chloplasts in plant cells help the plant to prepare starch by photosynthesis. They are the food producers of the cell. Vacuoles store food, water and chemicals. They are storage tanks. **Nucleus** is the brain of a cell. It controls and regulates all the activities of the cell. It is the control centre. **Nuclear membrane** surrounds and protects the nucleus. It controls the movement of materials in and out of the nucleus. It is called the gate of the nucleus.

I. Choose the appropriate answer:

1. The unit of measurement used for expressing dimension (size) of cell is _____
 - a) centimeter
 - b) millimeter
 - c) micrometer**
 - d) meter
2. Under the microscope Priya observes a cell that has a cell wall and distinct nucleus. The cell that she observed is
 - a) a plant cell**
 - b) an animal cell
 - c) a nerve cell
 - d) a bacterial cell
3. A 'Control centre' of the eukaryotic cell is
 - a) cell wall
 - b) nucleus**
 - c) vacuoles
 - d) chloroplast
4. Which one of the following is not a unicellular organism?
 - a) yeast
 - b) amoeba
 - c) spitogyra**
 - d) bacteria
5. Most organelles in a eukaryotic cell are found in the
 - a) cell wall
 - b) cytoplasm**
 - c) nucleus
 - d) vacuole

II. Fill in the blanks:

1. The instrument used to observe the cell is the microscope

2. I control the food production of a cell. Who am I? **Chloroplast**
3. I am like a policeman. Who am I? **cell wall**
4. The term “cell” was coined by **Robert Hooke**
5. The egg of an ostrich is the **largest** single cell.

III. True or False. If False, give the correct answer.

1. A cell is the smallest unit of life. - True
2. Nerve cell is the longest cell. - True
3. Prokaryotes were the first form of life on earth. - True
4. The organelles of both plants and animals are made up cells. - False

The cells of both plants and animals are made up of organelles.

5. New cells are produced from existing cells. - True

IV. Match the following:

- | | | |
|-------------------------------|---|---------------------|
| 1. Control center | - | a) Cell membrane |
| 2. Good producer (plant cell) | - | b) Mitochondria |
| 3. Gate of the nucleus | - | c) Nucleus |
| 4. Gate of the cell | - | d) Chloroplasts |
| 5. Energy producer | - | e) Nuclear membrane |

Ans: 1-c; 2-d; 3-e; 4-a; 5-b

V. Arrange in a correct sequence:

1. Elephant, Cow, Bacteria, Mango, Rose plant.

Bacteria, Rose plant, Mango, Cow, Elephant

2. He Egg, Ostrich Egg, Insect Egg

Insect egg, Hen egg, Ostrich egg.

VI. Analogy:

1. Prokaryote : Bacteria :: Eukaryote : **Alga**
2. Spirogyra : Plant cell :: Amoeba : **Animal cell**

3. Food producer : Chloroplasts :: Power house: Mitochondria

VII. Short Questions & answer:

1. Who discovered the cell in 1665?

Robert Hooke

2. What type of cells do we have?

Eukaryotic cells

3. What are the essential components of a cell?

Cell membrane, cytoplasm, nucleus

4. What are the organelles found only in plant cell?

Chloroplasts

5. Give any three examples of eukaryotic cell?

Plants, animals, algae

6. Which one is called as “Area of movement”?

Cytoplasm

7. Shiva said “Bigger onion has larger cells when compared to the cells of smaller onion”! Do you agree with his statement or not? Explain why?

No, I don't agree with the statement. Cell size has no relation to the size of an organism.

8. Why are cells called building blocks of life?

As bricks are the basic building block of a brick wall cells are the building blocks of animal or plant body. The cell is the basic structural and functional unit of every living organism. So it is called the building block of life.

9. Distinguish between prokaryotic and eukaryotic cells.

Prokaryotic cell	Eukaryotic cell
Its diameter ranges from 1 to 2 micron	Its diameter ranges from 10 to 100 micron
Absence of membrane bound organelles	Presence of membrane bound organelles.

Nucleus consisting of no nuclear membrane	True nucleus consisting of nuclear membrane.
Absence of nucleoli	Presence of nucleoli

10. Write about the contribution of Robert Hooke in cell biology.

The Englishman Robert Hooke was a scientist, mathematician and inventor. He improved microscope which was used in those days, and built a compound microscope. He placed water-lens beside the microscope to focus the light from an oil-lamp on specimens to illuminate them brightly so that he was able to see the minute parts of the objects clearly.

One day Hooke made thin sections of the cork and observed them through his microscope. He observed many small identical chambers which were hexagonal in shape. He was surprised.

After that he saw many objects like butterfly's wings. Bee's compound eye etc.,

Based on these observations Hooke published a book named micrographica in the year 1665, where he first used the term cell. He described the structure of tissue using the term cell.

11. Cell Organelles and their functions

S.No	Cell Components	Main Functions	Special Name
1	Cell Wall	<ul style="list-style-type: none"> • Surrounds and protects the cell • Makes the cell Stiff and strong 	Supporter and protector
2	Cell membrane	<ul style="list-style-type: none"> • Holds and protects the cell • Controls the movement of materials in and out of the cell 	Gate of the cell
3	cytoplasm	<ul style="list-style-type: none"> • A watery, gel-like material in which cell parts move 	Area of movement
4	Mitochondria	<ul style="list-style-type: none"> • Produce and supply most of the energy for the cell 	Powerhouse of the cell
5	Chloroplasts	<ul style="list-style-type: none"> • Contain green pigment chlorophyll • Capture the energy of sunlight and use it to produce food for the cell by photosynthesis 	Food producers for the cell (plant cell)

6. Human Organ Systems

A group of organs that work together to perform a particular function is known as an **organ system**. The human body has eight major organ systems. They are 1) Skeletal system 2) Muscular System 3)

Digestive system 4) respiratory system 5) Circulatory system 6) Nervous system 7) Endocrine system 8) Excretory system.

The **skeletal system** consists of bones, cartilages and joints. The skull is made up of cranial bones and facial bones. The **hyoid bone** is at the base of buccal cavity. Malleus, Incus and Stapes are **auditory ossicles**. The vertebral column made up of vertebrae protects the spinal cord. The forelimbs and hind limbs help us to hold, write and to walk. The rib cage is made up of 12 pairs of ribs protect the heart and the lungs. The skeletal system gives shape to the body and protects the soft internal organs.

There are three types of muscles in our **muscular system**. They are i) Skeletal muscles ii) Smooth muscles and iii) Cardiac muscles. Skeletal muscles are attached to the bones. They are **voluntary muscles** because they can be controlled by our will. Smooth muscles are found in the walls of digestive tract, urinary bladder and arteries. They are called **involuntary muscles** because they are not controlled by our will. Cardiac muscles in our heart are capable of rhythmic contraction continuously and they are involuntary in nature.

Digestion is a process in which complex food substances are converted into simple forms. It includes the absorption of digested food. The alimentary canal consists of mouth, buccal cavity, pharynx, oesophagus, stomach, small intestine, large intestine and anus. These organs form the digestive tract, salivary glands, gastric glands, liver, pancreas and intestinal glands secrete **enzymes**. These enzymes play a vital role in digestion of food.

Our **respiratory system** consists of nostrils, nasal cavity, pharynx, larynx, trachea, bronchi and lungs. A flap like structure called **epiglottis** is found at the upper end of the wind pipe. It closes the wind pipe when we swallow our food. This it prevents the entry of food particles into our lungs. The **diaphragm** is a large flat muscle that forms the floor at the chest cavity. The contraction and expansion of the diaphragm help us to inhale and exhale the air. The lungs are covered by double layered **pleura**. Diffusion of O_2 and CO_2 occurs across the alveolar membrane.

The **circulatory system** consists of the heart, blood vessels and blood. The heart is four chambered and it is surrounded by a double layered membrane called **pericardium**. Arteries, veins and capillaries are the three kinds of blood vessels. Our blood has red blood corpuscles, white blood corpuscles and platelets. The red blood corpuscles are produced in the bone marrow. They are oxygen-carriers. The white blood corpuscles fight against the germs which try to enter the body. They protect our body from harmful intrusion. Platelets cause blood clotting and they prevent excessive bleeding by sealing the flow of blood.

Our **nervous system** is composed of neurons or nerve cells. This system includes brain, spinal cord, sensory organs and nerves. The brain is the controlling centre of the body. It is protected by a three layered covering called **meninges**. There are five sense organs in our body and they are eyes, ears, nose, tongue and skin. The eye has three parts namely cornea, iris and pupil. Our ear has three parts. They are outer ear, middle ear and inner ear. The skin is the largest sense organ in our body and it protects us from germs. It regulates body temperature and keeps the body moist.

The human body has the following **endocrine glands**, pituitary gland, pineal gland, thyroid gland, thymus gland, pancreas, adrenal gland and gonads. These glands secrete **hormones**. These hormones regulate various functions of the body and they maintain the internal environment. The excretory system consists of kidneys, ureters, urinary bladder and uterus. The nephrons in the kidneys filter the blood and form the urine.

I. Choose the appropriate answer:

1. Circulatory system transports these throughout the body.
 - a) oxygen
 - b) nutrient
 - c) hormones
 - d) all of these**
2. Main organ of respiration in human body is
 - a) Stomach
 - b) splech
 - c) heart
 - d) lungs**
3. Breakdown of food into smaller molecules in our body is known as
 - a) muscle contraction
 - b) respiration
 - c) digestion**
 - d) excretion

II. Fill in the blanks:

1. A group of organs together make up an **organ** system.
2. The part of the skeleton that protects the brain is **the skull**
3. The process by which the body removes waste is **excretion**
4. The **skin** is the largest sense organ in our body.
5. The endocrine glands produce chemical substances called **hormones**

III. True or False. If False, give the correct statement:

1. Blood is produced in the bone marrow. - True
2. All the waste products of the body are excreted through the circulatory system. - False

All the waste products of the body are excreted through the excretory system.

3. The other name of food pipe is alimentary canal. - True
4. Thin tube like structures which are the component of circulatory system are called blood vessels.

– False

Thin tube like structures which are the component of circulatory system are called capillaries.

5. The brain, the spinal cord and nerves form the nervous system. - False

The brain, the spinal cord, the nerves and the sensory organ form the nervous system.

IV. Match the following:

- | | | |
|--------------------|---|----------------------------------|
| 1. Ear | - | a) cardiac muscle |
| 2. Skeletal system | - | b) Flat muscle |
| 3. Diaphragm | - | c) Sound |
| 4. Heart | - | d) Air sacs |
| 5. Lungs | - | e) Protection of internal organs |

Ans: 1-c; 2-e; 3-b; 4-a; 5-d

V. Arrange in correct sequence:

1. Stomach → large intestine → Oesophagus → Pharynx → Mouth → Small intestine → Rectum → Anus

Mouth → Pharynx → Oesophagus → Stomach → Small intestine → large intestine

2. Urethra → Ureter → Urinary Bladder → Kidney

Kidney → Ureter → Urinary Bladder → Urethra

VI. Analogy:

1. Arteries: carry blood from the heart :: **Veins** : Carry blood to the heart
2. Lungs: Respiratory system :: **Heart** : Circulatory system
3. Enzymes : Digestive glands :: **Hormones** : Endocrine glands

VII. Short Questions & answer:

1. Describe about skeletal system.

The skeletal system consists of bones, cartilages and joints. Bones provide a framework for the body. Along with the muscles bones help in movement.

2. Write the functions of epiglottis.

Epiglottis is a flap like structure on top of the windpipe. While eating, epiglottis closes the wind pipe and thus it prevents the entry of food into the windpipe.

3. What are the three types of blood vessels?

- i) Arteries ii) Veins iii) Capillaries

4. Define the term “Trachea”.

The trachea is also called windpipe. It is a tube supported by cartilaginous rings that connect the pharynx and larynx to the lungs allowing the passage of air.

5. Write any two functions of digestive system.

- i) It is involved in the conversion of complex food substances into simple forms.
ii) It is also involved in the absorption of digestive food.

6. Name the important parts of the eye.

- i) Cornea ii) Iris iii) Pupil

7. Name the five important sense organs.

- i) Eyes ii) Ears iii) Nose iv) tongue v) skin

8. Write a short note on rib cage.

The rib cage is made up of 12 pairs of curved, flat rib bones. It protects the delicate vital organs such as heart and lungs.

9. List out the functions of the human skeleton.

The skeletal system consists of bones, cartilages and joints. Bones provide a framework for the body. They give shape and support to the body. Bones along with muscles help in movements such as walking, running, chewing and dancing etc.

10. Differentiate between the voluntary muscles and involuntary muscles.

Voluntary muscles can be controlled by our will. Eg. muscles of arm.

Involuntary muscles cannot be controlled by our will. Eg. Cardiac muscles.

11. What will happen if the diaphragm shows no movement?

We inhale and exhale gases due to the movement of the diaphragm. If the diaphragm shows no movement our lungs cannot inhale air from outside. They cannot exhale impure air from the lungs.

12. Why is the heart divided into two halves by a thick muscular wall?

The pure blood in one side of the heart should not get mixed with the impure blood on the other side. So the heart is divided into two halves by a thick muscular wall.

13. Why do we sweat more in summer?

In hot summer, the sweat glands expand more and give out more sweat. As we sweat more our skin remains cool and it does not get heated up.

14. Why do we hiccup and cough sometimes when we swallow food?

The epiglottis closes the windpipe when we swallow our food. When we eat in haste the epiglottis remains open and food particles go into the windpipe accidentally. To throw out the food the lungs push out air forcefully. As a result we hiccup and cough.

7. Parts of Computer

A computer has three parts. They are i) Input Unit 2) Central Processing unit 3) Output Unit. The **input** unit helps us to send the data and commands for processing keyboard, mouse, scanner, barcode reader, web camera and light pen are some of the input devices.

The key board has two types of keys. The keys with number are called number keys and the keys with letter are called alphabet keys. The **mouse** has two buttons and a scroll ball in the middle. The right button is used to select files. The left button is used to carry out corrections in the file. We use the scroll bar to move page on the monitor.

CPU is the brain of the computer. It has Memory Unit, Arithmetic Log Unit (ALU) and Control Unit. The **memory unit** saves all data and information temporarily. Memory can be classified into primary and secondary memory. It can be extended externally using CD and pen drive. The **control unit** controls the functions of all parts of the computer. All arithmetic computations are carried out by means of ALU.

The **output unit** converts commands received as binary signals into understandable characters. Monitor, printer, speaker and scanner are some of the out devices. The monitor is an important output device. Pictures, cartoons and videos are displayed on a **monitor**. There are two types of monitors 1) CRT and 2) TFT. Nowadays TFT monitors are widely used because they occupy less space and emit less heat.

Computers can be classified as Mainframe computer, Minicomputer, Micro or personal computer and Super computer. Of these the personal computer is used largely as it is user-friendly. A PC can be classified as 1) desktop 2) Laptop and 3) Tablet. As many parts are connected to a computer it is called a system.

We make use of many cables to connect with a computer. They are

- 1) VGA (Video Graphics Army)
- 2) HDMI (High Definition Multimedia Interface)

- 3) USB (Universal Serial Bus)
- 4) Data Cable
- 5) Power cord
- 6) Mic cable
- 7) Ethernet Cable

VGA cable is used to connect the computer monitor with the CPU. USB cable is used to connect devices like printer, pen drive, scanner and web camera. HDMI cable connects monitor and projector with the computer. Data cable is used to connect tablet and mobile phones to CPU. Audio jack is used to connect the speaker to the computer. Power cord connects an appliance to the main electricity supply. Mic cable connects Mic to CPU. Ethernet cable helps to establish internet connectivity. **Bluetooth and Wi-Fi** are used to connect to internet without using cables. Using the Bluetooth the data can be shared with nearby devices. Net connectivity can be obtained using the Wi-Fi without any connecting cables.

I. Choose the correct answer:

1. Which one of the following is an output device?
 - a) mouse
 - b) keyboard
 - c) speaker**
 - d) pendrive
2. Name the cable that connects CPU to the Monitor.
 - a) Ethernet
 - b) Power cord
 - c) HDMI**
 - d) USB
3. Which one of the following is an input device?
 - a) speaker
 - b) keyboard**
 - c) monitor
 - d) printer
4. Which one of the following is an example for wireless connections?
 - a) Wi-Fi**
 - b) Electric wires
 - c) VGA
 - d) USB
5. Pen drive is _____ device.
 - a) output
 - b) input
 - c) storage**
 - d) connecting cable

II. Match the following:

- | | | |
|--------------|---|------------------------|
| 1. VGA | - | a) Input device |
| 2. Bluetooth | - | b) Connecting cable |
| 3. Printer | - | c) LDMI |
| 4. Keyboard | - | d) Wireless connection |
| 5. HDMI | - | e) Output device |

Ans: 1-b; 2-d; 3-e; 4-a; 5-c

III. Short Questions & answer:**1. Name the parts of a computer.**

- i) Input unit ii) Central Processing Unit (CPU) iii) Output Unit.

2. Bring out any two differences between input and output devices.

The input unit helps to send the data and commands for processing. The output unit converts commands received by the computer in the form of binary signals into understandable characters.

Keyboard, mouse, scanner, barcode reader mic and web camera are some of the input devices. Monitor, printer and scanner are some of the output devices.