STANDARD

# SCIENCE

Class-8

TEACHER GUIGE



## I N D E X

# PREFACE

The series standard science and its teacher guide is a set of books according to the new syllabus of 6th, 7th and 8th class students. These science books and guides are in particular written for young children to build up awareness about basic science in their scientific background.

In these books and guides we give most activities and exercise for students to increase their knowledge about science easily.

It is important that your children start learning early. The aim is to spark the interest of the students in the sciences and prevent them from disliking and rejecting the sciences and possibly scientific professions as the result of negative experience at school and at home.

It is especially for those students who later work in a field related to the sciences to have a foundation for understanding their world that allows them to make informed decisions.

This will expand their horizon and they will be interested about things they read, hear or see in this 21st century and ahead.

The guide is written in simple and easy language. For help of students short and long questions also giving in these books. All these thing will make learning cool for children.



# DISTRIBUTION OF SYLLABUS

There are 12 (Twelve) chapters in Standard Science for Class-VIII. These chapters are suitable for the level of Class VIII. The further detail is given below.

| S.# | CHAPTER NAME |
|---|---|
| 01 | WHAT IS SCIENCE? |
| 02 | NUTRITION IN ORGANISMS (Plants & Animals) |
| 03 | RESPIRATION IN ORGANISMS |
| 04 | SUPPORT AND MOVEMENT |
| 05 | NATURE AND COMPOSITION OF SUBSTANCE |
| 06 | SOLUTION AND SUSPENSION |
| 07 | ACIDS, BASES AND SALTS |
| 08 | HOW SOUND IN PRODUCED? |
| 09 | OPTICAL INSTRUMENT |
| 10 | NATURE OF LIGHT AND ELECTROMAGNETIC SPECTRUM |

## DISTRIBUTION OF FIRST TERM'S SYLLABUS

There are four chapters in First term syllabus. These chapters are suitable for first term. The further detail of these chapters are:

| S.# | CHAPTER NO: | CHAPTER'S NAME |
|---|---|---|
| **01** | CHAPTER-01 | SCIENCE AND SCIENTIFIC WORLD |
| **02** | CHAPTER-02 | STUDY OF LIFE (BIOLOGY) |
| **03** | CHAPTER-03 | ORGANIZATION OF LIFE |
| **04** | CHAPTER-04 | CLASSIFICATION OF LIVING ORGANISMS |

## DISTRIBUTION OF SECOND TERM'S SYLLABUS

There are four chapters in second term syllabus. These chapters are suitable for second term. The further detail of these chapters are:

| S.# | CHAPTER NO: | CHAPTER'S NAME |
|---|---|---|
| 05 | CHAPTER-05 | VIRUSES, BACTERIA, CYNOBACTERIA |
| 06 | CHAPTER-06 | STUDY OF MATTER (CHEMISTRY) |
| 07 | CHAPTER-07 | CHEMICAL COMBINATION |
| 08 | CHAPTER-08 | STRUCTURE OF ATOM |

**DISTRIBUTION OF FINAL TERM'S SYLLABUS**

There are four chapters in final term syllabus. These chapters are suitable for final term. The further detail of these chapters are:

| S.# | CHAPTER # | CHAPTER'S NAME |
|---|---|---|
| 09 | CHAPTER-09 | PERIODICITY OF ELEMENTS |
| 10 | CHAPTER-10 | STUDY OF MATTER AND ENERGY (PHYSICS) |
| 11 | CHAPTER-11 | MEASUREMENT |
| 12 | CHAPTER-12 | FORCE AND FRICTION |

# NOTES FOR TEACHERS

| CHAPTER-01 | WHAT IS SCIENCE |
|---|---|

Read this chapter once time. Tell the main points of this chapter to the students. Tell them importance of Science. Tell laboratory safety rules. Demonstrate the scientific method and its importance in science.

| CHAPTER-02 | NUTRITION IN ORGANISMS (PLANTS AND ANIMALS) |
|---|---|

Read this chapter once time. Tell the main points of this chapter to the students. Demonstrate them need and importance of Nutrition for organism. Describe them the process of nutrition in Plants and Animals.



| CHAPTER-03 | RESPIRATION IN ORGANISMS |
|---|---|

Read this chapter once time. Tell the main points of this chapter to the students. Demonstrate them the importance of respiration for organisms. Demonstrate them the terms. (i.e. Respiration, breathing and composition) Tell them the respiration in Plants.

| CHAPTER-04 | CLASSIFICATION OF ORGANISMS |
|---|---|

Read this chapter once time. Tell the main points of this chapter to the students. Demonstrate them the importance of respiration for organisms. Demonstrates that the terms, support in plants, movement in plants, support and movement in animals. Demonstrate them the importance of support and movement for organisms.

| CHAPTER-05 | NATURE AND COMPOSITION OF SUBSTANCE |
|---|---|

Read this chapter once time. Tell the main points to the students. Demonstrate the meaning of matter, states of matter and composition of matter. Tell them particle nature of matter. Tell them the terms, Elements, Compounds and mixture with examples.

| CHAPTER-06 | SOLUTION AND SUSPENSION |
|---|---|

Read this chapter once time. Tell the main points to the students. Tell them types of solution, composition of solution. Demonstrate them comparison of solution and suspension. Tell them solubility, affecting solubility and crystallization.

| CHAPTER-07 | ACIDS, BASES AND SALTS |
|---|---|

Read this chapter once time. Tell them main points to the students. Tell them the meaning of Acid, Base and Salt. Tell them the Composition, Properties and types of

Acid, Base and Salts.

| CHAPTER-08 | HOW SOUND IN PRODUCED? |
|---|---|

Read this chapter once time. Tell the main points to the students. Tell them heat, modes of transfer of heat. Demonstrate them the importance and uses of heat.

| CHAPTER-09 | OPTICAL INSTRUMENT |
|---|---|

Read this chapter once time. Tell the main points to the students. Tell the sound, characteristics and types of sound. Demonstrate them that how is sound is produced? Tell them, what is sound pollution?

| CHAPTER-10 | NATURE OF LIGHT AND ELECTROMAGNETIC SPECTURUM |
|---|---|

Read this chapter once time. Tell the main points to the students. Tell them meaning of light. Demonstrate them composition of light. Demonstrate them reflection, laws of reflection. Tell them importance of light in our daily life.

## POINTS TO REMEMBER

(1) Arrange the monthly quize competition to increase the interest of learning science.
(2) Arrange weekly student demonstration in class to enhance the confidence and adopting skills.
(3) Arrange group discussion of students after completing a topic or chapter.
(4) Give them different projects to make their own notes/ script and data.
(5) Give them projects to make different models i.e planetary system, Green House effect, Atomic models of element, Jet fighter, power stations etc.
(6) Visit them zoological gardens to understand them



different living organisms i.e animals and plants.
(7) Visit the scientific lab and teach them the usage of scientific appratus.
(8) Describe and teach that Islam and Science are closely related each other. Show and tell different verses of the Holy Quran are witness of phenomenon, relating science.
(9) Arrange the workshop for students. Arrange a lot scientific models and brief the students and tell them to give their view about workshop.

| CHAPTER-01 | WHAT IS SCIENCE |
|---|---|

## EXERCISE

### ☆ CHOOSE THE CORRECT ANSWER:

01. The word science is derived from the latin word _____ which means knowledge.
(Scientia, Scientista, Scientica)
02. We all need to know _____ because it is closely related to our lives.
(Science, world, Nothing)
03. The experiments are performed in a special room called:
(Library, Laboratory, Clinic)
04. The person who studies and researches about science is called _____.
(Scientist, Politician, Surgeon)
05. _____ warn users about the harm, chemicals can cause.
(Symbols, Labels, Elements)
06. Chloroform, Xylene, Alcohol and Bromine vapours are _____.
(Comfortable, Irritating, Useable)
07. Mass per unit volume is called _____.
(Volume, Space, Density)
08. The Greek letter P(rho) is symbol used for _____.
(Mass, Volume Density)
09. The SI unit of density is _____.
(kg/m3, kg/mol, kg.N/mo)
10. _____ is a comparison of two quantities.
(Rate, Speed, Ratio)
11. The distance travelled in unit time is called _____.
(Rate, Speed, Displacement)
12. The SI unit of speed is _____.
(Metre/second, metre/kilogram, Newton/mass)



13. The speed of light is _____.
(200,000km/s, 250,000km/s, 300,000km/s)
14. _____ is the shortest distance from one point to the other.
(speed, displacement, Velocity)
15. The rate of change of distance moved in unit time is called: (speed, Velocity, Acceleration)

| ANSWER KEY | | | |
|---|---|---|---|
| **01** | | **02** | |
| **03** | | **04** | |
| **05** | | **06** | |
| **07** | | **08** | |
| **09** | | **10** | |
| **11** | | **12** | |
| **13** | | **14** | |
| **15** | | | |

## SHORT ANSWER QUESTIONS

**Q1: What is Science?**

Ans: The word science is derived from the latin word "Scientia" which means knowledge.

Q2: What is science laboratory?

Ans: Experiments are performed in a special room called laboratory or science laboratory.

Q3: Who is scientist?

Ans: The person who studies and researches science is called scientist.

Q4: Give any five laboratory safety rules.

Ans: (1) Do not enter the labortory until the science teacher gives you permission.

(2) Open the doors and windows of the laboratory for ventilation.

(3) Apparatus should only be handled with the teacher's

permission.

(4) Apparatus must only be used for the purposed allowed by the teacher.

(5) Do not taste or smell any chemical.

Q5: What is density?

Ans: The mass packed in a unit volume is called density.

Q6: What is speed?

Ans: It can be defined as the distance traveled in unit time is called speed.

Q7: What is velocity?

Ans: The rate of change is called speed.

Q8: What is acceleration?

Ans: The rate of change of velocity is called acceleration.

Q9: What is scientific method?

Ans: The scientific method is a guideline for investigating scientific problems.

## LONG QUESTION ANSWER

**Q1: Define importance of science. Describe the natural phenomena that give the knowledge of science.**

Ans: The study of science is not just for scientists. An artist needs to know the science of mixing colours and painting materials. A photographer needs to know science to understand the nature of light so as to take good photographs. A cooker needs to know science so that he or she can cook balanced and nutritious meals for the family.

The following natural phenomenas give us thhe knowledge of science.

☆ Growing of animals.

☆ Dropping of fruits from trees.

☆ Motion of bodies.

☆ Heat and light of the sun.

☆ Colours in rainbow.



☆ Burning of coal.

☆ Day and Night.

**Q2: Describe in detail the laboratory safety rules.**

Ans:(1) Do not enter the laboratory until the science teacher give you permission.

(2) Open the doors and windows of the laboratory for ventilation.

(3) Apparatus should only be handled with the teacher's permission.

(4) Read and understand the intructions properly before you start conducting experiment.

(5) Apparatus must be handled correctly for example, bottles should not be carried by the neck.

(6) Do not taste or smell any chemical.

(7) Always check the label on the container before using the substance contains.

(8) To avoid contamination, do not pour back any chemical into the container.

(9) Keep flamable substances away from flame.

(10) Wash your hands after all laboratory work.

**Q3: Distinguish between speed and velocity.**

Ans:

| SPEED | VELOCITY |
|---|---|
| It can be define as the distance traveled in unit time is called speed. | The rate of change of distance moved in unit time is called velocity. |
| Methematically. | Mathematically. |
| Speed = $\frac{\text{Distance travelled.}}{\text{time taken}}$ | Velocity = $\frac{\text{Distance moved.}}{\text{time}}$ |

**Q4: Distinguish between Velocity and Accelearation.**

**Ans:**

| SPEED | VELOCITY |
|---|---|
| The rate of change of distance move in unit time is called velocity. | The rate of change of velocity is called acceleration. |
| Mathematically | Methamatically. |
| Velocity = $\frac{\text{Distance moved}}{\text{Time}}$ | Acceleration= $\frac{\text{change in velocity}}{\text{Time}}$ |

**Q5: What is scientific method? Describe its various steps in detail.**

Ans: The scientific method is a guideline for investigating scientific and technical problems. Scientific method consists of the following steps.

**OBSERVATION:**

Observation are made by using the five senses. When we feel, man made equipment is used for the purpose.

**INFERENCE:**

An inference is a statement a person makes by reasoning on the basis of observation.

**HYPOTHESIS:**

A hypothesis is a statement and a possible explanation or solution for a problem.

**EXPERIMENT:**

Experiment are conducted to test a hypothesis.

CONCLUSION:

From the results of experiments, conclusions are drawn about the truth of the hypothesis.

THEORY:

If a hypothesis is accepted on the basis of experiments it becomes a theory.

LAW:

A theory when repeatedly gives the same results after experiments and explains a phenomenon satisfactory, it then becomes a law or principle.

**ACTVITY:**



(1) What does the figure show? Discuss with your class students.

Note: Do your self teachers.

(2) What do you know about this figure? Discuss.

Note: Do yourself teacher.

(3) What does the figure show? Discuss.

Note: Do yourself teacher.

(4) What do you know about this figure? Explain.

Note: Do these activities teacher himself.

| CHAPTER TWO | NUTRITION IN ORGANISMS (PLANTS AND ANIMALS) جانداروں میں غذائیت |
|---|---|

## EXERCISE

**☆ CHOOSE THE CORRECT ANSWER:**

(1) The mode of nutrition in a green plant is described as_____.
(A) holophytic, (b) holopolyric, (c) holozoic

(2) The mode of nutrition in animals and human beings is described as_____.
(A) holophytic, (b) holopolyric, (c) holozoic

(3) Most of the plants possess the green pigment called _____.
(A) autophyll (b) chlorophyll (c) merophyll

(4) Plants are called_____.
(A) Producer, (b) consumers (c) hetertrophs

(5) _____is a process in which green plants manufacture their food.
(A) photosynthesis (b) Glycolysis (c) Assmilation

(6) _____that takes place in the presence of sunlight.
(A) light reaction (b) dark reaction (c) NOT

(7) Monotropa, bacteria, fungi are_____.
(A) Saprophytes (b) Parasites
(c) Insectivores

(8) There are some plants, which grow on trees for support.
(A) Saprophytes (b) Insectivores
(c) Epiphytes

(9) It is a process of converting complex insoluble food into simple and soluble form.
(A) Ingestion (b) Digestion (c) Egestion

(10) There are_____types of teeth in our mouth.
(A) three (b) four (c) five



(11) These teeth are used for cutting and tearing the food.
(A) canines, (b) Molars, (c) Premolars

(12) In_____the food is sucked in by the sucking action of pharynx.
(A) Hydra (b) Earthworm (c) cockroach

(13) An enzyme called_____Present in salivary juice helps to digest carbohydrates into sugar.
(A) Pepsin (b) resine (c) amylse

(14) It is about B metre long coiled tube.
(A) small intestine (b) Large intestine (c) viii

(15) It lies in the abdomen and is about 30cm long.
(A) liver (b) Kidney (c) Stomach

| ANSWER KEY | | | |
|---|---|---|---|
| 01 | | 02 | |
| 03 | | 04 | |
| 05 | | 06 | |
| 07 | | 08 | |
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| 11 | | 12 | |
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## SHORT ANSWER QUESTIONS

**Q1: What is Science?**

Ans: The process by which organisms obtain and utilize their food, digest and assimilate is called nutrition.

**Q2: Define the terms.**

**Ans: HOLOPHYTIC:**

The mode of nutrition in a green plant is holophytic.

HALAZOIC:

The mode of nutrition found in animals and human beings is halozoic.

Q3: What is Photosynthesis?

Ans: Photosynthesis is a process in which green plants

manufacture organic compounds by carbondioxide and water in the presence of sunlight and cholorophyll.

Q4: What factors are involved in photosynthesis?

Ans: Water, sunlight, carbondioxide, temperature and chlorophyll are involved in photosynthesis.

**Q5: Define Symbiosis.**

Ans: It is an other mode of nutrition in which two types of organisms live together and are mutually benefitted eg. Leguminous plants with root nodules and lichens.

**Q6: What is digestion?**

Ans: It is a process of converting complex insoluble food into simple and soluble form.

**Q7: What is Assimilation?**

Ans: It is the process of converting digested food taken into protoplasm of the cell. When the food reaches the cell, part of it chemically combines with oxygen to release energy.

**Q8: What is peristalfic movement?**

Ans: The food passes by the contraction and relaxation of the muscles of the food pipe. This is called peristaltic movement.

## LONG ANSWER QUESTIONS

**Q1: Describe the process of nutrition in plants.**

Ans: Most of the plants possess the green pigment called cholorophyll. Hence, they are able to manufacture their own food by the process of photosynthesis. Such plants are called the producers or autotrophs.

Photosynthesis is a process in which green plants manufacture organic compounds by carbondioxide and water in the presence of sunlight and chlorophyll. Photosynthesis can be represented by the following equation.



$$6CO_2 + 12H_2O \longrightarrow C_6H_{12}O_6 + 6H_2O + 6O_2$$

The above euqation shows that the process in simple form. In fact, all types of carbohydrates are formed. Glucose is simple carbohydrate and has a sweet taste. Sugar is complex carbohydrate. Starch is also complex carbohydrate.

A leaf has cellulose and starch both. A fruit has all the four types of carbohydrates but main content is glucose.

Photosynthesis occurs in all green parts of the plant body, more so in green leaves as they are better suited for the purpose. Photosynthesis occurs in two phases i.e. light reaction takes place in the presence of sunlight and dark reaction that occurs in the absence of sunlight.

**Q2: Differentiate between parasites and insectivores.**

**Ans: PARASITES:**

These are the organisms, which obtain their food from other organisms. The other organisms on whose bodies are parasites grow and live are called hosts. Parasites are of two types. Semi-parasites and total parasites.

**INSECTIVORES:**

Certain green plants grow in marshy places are capable of preparing the own food. They derive their nourishment partly from the soil and atmosphere and partly from small insects. They catch insects to obtain nitrogenous substances. They possess specialized leaves to trap insects, e.g pitcher plants, Sundew etc.

**Q3: Describe the process of nutrition in Animals.**

Ans: The mode of nutrition in animals is as holozoic as holozoic as the consume solid organic food, which is

broken into simple particles so that these are absorbed into the blood. In lower organisms the process of nutrition is very simple. However in higher organisms the process of nutrition involves sub-processes. These are ingestion, digestion, absorption assimilation and egestion.

**INGESTION:**

It involves taking in of food including solid food and water inside the body.

**DIGESTION:**

It is a process of converting complex insoluble food into simple and soluble form.

**ABSORPTION:**

It is defined as taking in of soluble digested nutrients into blood.

**ASSIMILATION:**

It is the process of converting digested food taken into protoplasm of the cell.

**EGESTION:**

It is the process of eliminating undigested food from the body.

**Q4: Write a detailed onte on Human Digestive System.**

Ans: In human beings, digestion is extracellular. The food enters the body through the mounth. From the mouth the food passes through a food canal called alimentary canal. It is a long muscular and coiled tube. It starts from the mouth and at anus. It involves many organs such as mouth, food pipe, stomach and intestines, various enzymes are also involved in the process such as anmylase, pepsin, trypsin, lipase and maltose. They are known as digestive enzymes.

Associated with the alimentary canal are some glands. These are salivary glands, liver and pancrease.



**MOUTH:** The process of digestions starts in the mouth. The food taken in the mouth is cut and chewed by the teeth. The tongue helps to mix the food with saliva produced by salivary glands present in the mouth.

**OESOPHAGUS:** The food moves to food pipe (oesophagus) from the mouth. The food passes by the contraction and relaxation of the muscles of the food pipe.

**STOMACH:** The stomach lies in the abdomen and about is 30cm long. The food churned in the stomach and turned into a chyme. Its walls secretes gastric juices. Proteins are made by the action of enzymes present the gastric juice.

**SMALL INTESTINE:** It is about 6 metres long coiled tube, the primary part of small intestine is called duodenum. Here bile from the liver and pancreatic juice from pancreas and mixed with food. As a result of digestion food is converted into simple form. Carbohydrate is turned into glucose, protein into amino acids and fat into fatty acids. The main part of small intestine is called ileum. In ileum intestinal juices mix with the food to digest it completely.

**LARGE INTESTINE:** It is about 1.5 to 2 metres long tube, last part of it is rectum which opens outside by an aperture, the anus. Large intestine has no digestive function. Water in the undigested food as absorbed by the walls of the large intestine. The remaining undigested and unabsorbed food is thrown out through anus as faeces.

**ACTIVITY:**

(1) What is difference between nutrition in animals and plants?
(2) Label the diagram.
(3) What does the figure show? Write eight lines about this figure.

Note: Do these activities teacher himself.

| CHAPTER-03 | RESPIRATION IN ORGANISMS |
|---|---|

## EXERCISE

**☆ CHOOSE THE CORRECT ANSWER.**

(1) It is a physical process where in exchange of gases occurs.
(A) Breathing (B) Respiration
(C) Digestion

(2) It is a chemical process where in the food molecules get oxidised to carbon dioxide and water.
(A) Breathing (B) Respiration (C) Digestion

(3) Most of the organisms take_____and give out carbon dioxide.
(A) Hydrogen (B) Nitrogen (C) oxygen

(4) The respiration wherein oxygen is used is called _____.
(A) Aerobic Respiration (B) anaerobic respiration
(C) None of these

(5) The respiration without oxygen is called_____.
(A) aerobic respiration (B) anaerobic respiration
(C) All of these

(6) Burning or combustion also takes place in presence of oxygen like respiration.
(A) Hydrogen (B) Nitrogen (C) oxygen

(7) The process of respiration in plants occurs in _____ and it is a cellular process.
(A) Cell wall (B) Nucleus (C) Mitochondria

(9) In _____ there is breakdom of glucose i.e- a sex carbon atom compound into three casbes atom compounds.
(A) Plasma lysis (B) Hydrolysis (C) Glycolysis

(10) The skin of frog is moist and carries out respiration. This is called respiration.
(A) aerobic (B) anerobic (C) cutaneous

(11) These are the respiratory organs of aquatic animals such as fishes and prawns.
(A) Lungs (B) Trachea (C) gills



(12) The lungs are made up of large number of small sacs called the_____.
(A) diaphragm (B) alveoli (C) Bronchi

(13) The_____is a common chamber for food and air.
(A) Pharynx (B) Kidney (C) Lungs

(14) Human beings breathe_____bimes in a minute.
(A) 11-13 (B) 12-14 (C) 15-17

(15) The volume of air breathed in and out during normal breathing is called_____.
(A) TV (B) IRV (C) ERY

| ANSWER KEY | | | |
|---|---|---|---|
| 01 | | 02 | |
| 03 | | 04 | |
| 05 | | 06 | |
| 07 | | 08 | |
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| 15 | | | |

## SHORT QUESTION & ANSWERS

**Q1: What is respiration?**

Ans: Respitation is a process in which carbohydrated react with oxygen in the cells and energy is realased in the form of storage in a chemical molecule. It is also called cellular process common to all organisms.

**Q2: What is breathing?**

**Ans:** It is a physical process wher e in exchange of gases ($O_2$ and $Co_2$) occurs. It takes place utside the cell. It generally takes place in higher animals.

**Q3: Define Aerobic respiration.**

**Ans:** The respiration where in oxygen is used is called aerobic respiration.

**Q:4 Define Anaerobic respiratio.**

**Ans:** The respiration where in oxygen is not used is called an aerobic repiraton.

**Q.5: Define stoma.**

**Ans:** It cnsists of an opening. This opening is surrounded by two guar cells and some other susdiary cells. the stoma help in exchange of crbondioxed and oxygen.

**Q.6: Define the following terms.**

**Ans: Gills:**

Thesee are the respiratory organs of aquatic animals such as fish and prawns. These Gills are the perfoations in the walls of pharynx and the folds of the skills.

**Trachea:**

The insects have trechea for breathing e.g cockroach. Mosquito, butterfly, antt etc. These are respiratory braching tubes.

**Lungs:**

In land vertebrates like reptiles, birds and mammals, the air enters through the nostrils and reaches thhe lungs by the way of pharynx, trachea and brochi. The lungs are made up of large number of small sacks called the air sacs or alreoli.

**Q.7: Define bronchioles.**

**Ans:** The treachea is divided into tow braches called bronchus which are further divide into bronchioles. The bronchiole carries the air into the lungs that spongy scas. The air is carried by bronchioles into a thin part at the end called alveoli.

**Long Asnwer Question**

**Q.1:** Differentiate between Breathinbg and cellular Respiration.



| Breathing | Cellular Respiration |
|---|---|
| (1) It is phycical process where in exchange of gases $o_2$ and $Co_2$ occurs. | (1) Itr is chemical process wher in the fold molecules ger oxidized to carbondiopxide and water. |
| (2) It takes place outside the cells. | It takes place insed the cells |
| (3) Enzymes are not inroved. | (3) Enzymes are involed |
| (4) No ener is rleaded. | (4 )Energy is realeaded. |
| (5) It generally takes place in higher plants. | (5) It takes place in all animals and all plants. |

**Q2: Differentiate betwwin respiration and combustion.**

| Respiration | Combustion |
|---|---|
| (1) It takes place at lower temperature, generally below 40 $^{o}$C. | (1) It ccours at very hing temperatures generally above 300$^{o}$C |
| (2) There is alow and step-wise production of encery. | (2) There is a sudden diresct (one-step) producton of energy. |
| (3) Enzymes are involved. | (3) Enzymes are not involved |
| (4) It occurs in all linving cells. | (4) It does not occur in lincinf cells. |
| (5) It is a slow process. | (5) It is a fast process. |
| (6) The energy is always stored in a chemical molecule. | (6) Eneergy is realeaded in different forms such as heat and lingt. |

**Q.3: Wirte the importance of ana erobic respiration.**

**Ans:** There are some organisms that cancarry out respiraton without oxygen sucah Bacteria, some Fangi. etc. Even gerningating seeds can repire in the absence of oxygen for some time In this process the energy is

uberated.

This is called a fermentation.

**Q.4: Describe the process of respiration in plants.**

**Ans:** Respiration is the glame of life. It is a process of oxidation of stored good sugars, Sratrch, facs etc, In linving cells to obtain energy There are various respirtion in plants occur in mitochondria and it is a celluar process. There are vorious repiratory enzymes present inthe mitochondria. Sugar is the substrate for substance. The sugar molecule breaks down inthe presence of oxygen and energy is released.

**$C_6 H_{12} O6 + 60_2$ RESPIRATOREY $6CO_2 + 6HO$ + Energy**

**Enzymes**

Duyring this Process, the oxygen enters the plants throught the Stomato of the called aerobic respiration. There is complete oxidation or gulcose i.e simple sugar. Aerobic respiration is a regular phenomenon in higher plants.

The planct do not possess any Special organs. for breathing. But the exchange of gases in them occurs through a Simple process called diffusion. This process occurs due to the presence of small opeings on the surface of leaves called the Stomata.

Oxygen ffom the air Passes inthe plant through Stomata and reaches the cells throught out the body. This oxygen oxideses the organic sustances of thhe living cells and reesults in the formation of carbondioxide, water and energy.

**Q.5: Descibe the breathing Sustem of man.**

**Ans:** It is one the most important part of the process of respiration. The oxygen in air is inhaled and it reaches the lungs. Tje blood releases water vapours and carbon dioxide into the lungs. The get rormoved from the lungs when we breath. Human beings lungs when we breath.



Human beings breeath 12-14 times in a minute.

Parts of the respiratory System.

(A) Nose ( Nostrik)
(B) Pharynx and larynx
(C) Lungs.
(D) Trachea
(E) Bronchus
(F) Bronchicles
(G) Alreoli
(H) Diaphragm.

**(A) Nose:**

The nose allows the air to enter into nostrils. We breath in and breath out mostly with only nostril.

**(B) Pharynx and larynx and Trachea:**

From the nostrils air enters the pharynx and then the larynx. The larynx produces voice when we speak due to vibration of air when it passes through the larynx, air passes to Trachea. The trachea serves as a passage for air from the nostrils to the lungs.

**(C) Bronchus, Bronchioles, Lungs and Alveoli:**

The trachea is divided into two branches called bronchus which are further divided into bronchides. The bronchiole carries the air into the lungs that are spongy sacs. The air is carried by bronchioles into a thin part at the end called alveoli. These are surrounded by blood vessels where exchange of gases takes place i.e. The inhaled oxygen is absorbed and carbon dioxide and water vapours are given out.

**(D) DIAPHRAGM:**

It is a muscular wall between the chest cavity and the abdomin cavity that brings about the breathing movement. It is the movement of the diaphragm that results in expansion and contraction of the lungs.

**Q6: Describe the respiratory organs of Earthworm, fish and insects.**

**Ans: Respiratory Organ of Earthworm:**

Earthworms and leeches have moist skin richly supplied with blood capillaries. The whole body surface helps in exchange of gases. The moist skin absorbs oxygen that comes in contact with blood capillaries of skin and is absorbed in the blood. The skin of from is also moist and carries out respiration. This is called cutaneous respiration.

**RESPIRATORY ORGAN OF FISH:**

Gills are the respiratory organs of aquatic animals such as fish and al prawns. These gills are the perforations in the walls of pharynx and the folds of skin. These are richly supplied with blood capillaries. The folds are constantly bathed by water. So, the blood is able to absorb the oxygen dissolved in water and carbondioxide in the blood.

**RESPIRATORY ORGAN OF INSECTS:**

The insects have trachea for breathing e.g. Cockroach, Mosquito, Butterfly, Ant etc. These are respiratory branching tabes. The branches are called tracheoles. In insects these open to the outside by aperature called spiracles situated on the ventral side of the thorax and abdomen. The exchange of gases takes place here.

**ACTIVITIES:**

(1) What does the figure show? Discuss.
(2) Write four line description about these figures.
(3) Label the diagram.

Note: Do these activities teacher himself.



| CHAPTER-04 | SUPPORT AND MOVEMENT<br>سہارا اور حرکت |
|---|---|

**EXERCISE**

☆ CHOOSE THE CORRECT ANSWER:

(1) Plants which are_____,depend on their turgid cells for mechanical support.
(A) Vascular (B) Non vascular
(C) None of these

(2) A_____wills when its cells are flaccid.
(A) Animals (B) Humans (C) Plants

(3) _____is a complex permanent tissue which conducts water and minerals.
(A) Xylem (B) Pholem (C) None of these

(4) In a young dicot stem of sunflower, support is due to_____and turgidity of parechymatous tissues.
(A) Atmospheric pressure (B) Pascal pressure
(C) Osmotic pressure

(5) The change in the environment which includes a change in the plant is called a_____.
(A) response (B) Co-ordination
(C) Stimulus

(6) Tactic movement in response to the stimulation of sun-light is called_____.
(A) Phototaxis (B) Chemotaxis
(C) Thermotaxis

(7) This is the movement in response to temperature.
(A) Phototaxis (B) Chemotaxis
(C) Thermotaxis

(8) It is the movement of plant organ in response to the stimulus of moistare.
(A) Phototropism (B) Geotropism
(C) Hydrotropism

(9) Movement in Euglena occurs by:
(A) Cilia (B) Flagella (C) Pseudopodia

(10) _____bone is the longest bone.
(A) Tibia (B) Femur (C) Fibula

(11) Minerals deposited in bones are:
(A) Magnesium and sodium (B) Calcium and phosphate
(C) Magnesium and sulphate

(12) Muscles in man involved in locomotion are:
(A) Smooth (B) Skeletal (C) Involuntary

(13) Muscles are attached to the bones by:
(A) Ligament (B) Tendon
(C) Both ligament and tendon

(14) Knee-joint is an example of type of joint.
(A) Ball and socket (B) Immoveable
(C) Slightly moveable

(15) Skeleton in earth is called:
(A) Exoskeleton (B) Hydroskeleton
(C) Endoskeleton

| ANSWER KEY | | | |
|---|---|---|---|
| **01** | | **02** | |
| **03** | | **04** | |
| **05** | | **06** | |
| **07** | | **08** | |
| **09** | | **10** | |
| **11** | | **12** | |
| **13** | | **14** | |
| **15** | | | |

## SHORT ANSWER QUESTIONS

## SHORT ANSWER QUESTIONS

**Q1: Define turgi8dity of Cell?**

Ans: The fully expanded condition of a cell with its wall in a state of tension dur to excessive accmulation of water is called turgiditty of cell.



**Q2: What is tactic movement?**

Ans: These movements are locemotery in which the placnty body as a whole moves from one place to another in reponse to external stimuli such as light, chemicalsm, temperature etc.

**Q3: What is nastic movement?**

Ans: These are the movements of mainly doriventral organs like leaves and petals, induced by external stimule such as contact, light and temperature,

**Q4: What is Skeleton?**

Ans: The support which we and other animals nedd comes from the sturcture is called skeleton- Beside, Support, Skeleton affers protecton. It also helps in locomotion.

**Q5: What is axial Skelton? Name its main components.**

Ans: It consists of all the bones which lie on the central axis of the body and form the main frame-work of the body. Its main components are of the body. Its main components are skull. verttebbrate, Sternum and ribs.

**Q6: Name various types of muscles.**

Ans: The various types of muscles are:
(1) Skeletal muscles
(2) Cardiac muscles
(3) Smooth muscles

**Q7: How does osteoporsis ffect the bones?**

Ans: Osteoporosis is a disorder related to the aging process. In this condition the bones become porous or more spongy. thinner andd weaker so that they become frogile and a slight injury may break the bone.

## LONG QUESTION AND ANSWER

**Q1: what are the function of xylem?**

**Q: What are the two types of conducting elemnts with in xylem and so they compare to one another?**

**Ans: Functions the xylem:**

**Xylems perform three functions.**

(1) They conduct soil water form the root to the shoot upward.

(2) They also conduct mineral salts along with water.

(3) They also give michanicalsupport ot plants.

**Xylem:**

Xylem is found in cascular tissues of vascular bundles along with phloem and cambium in roots, stems and leaves. xylem has xylem vassels and tracheids two conducting vessels.

**(1) Xylem Vessels:**

They are composed of dead, elongated, thick cwalled cells with large diameters, Their wall are lignified. Their protoplasmic contents have disappeard and they are therefore dead cells. Vessels lackk transsverse and walls and are arranged to form a continuous pipline.

**Functions:**

(1) They are the main conducting elements.

(2) They give support and sigidity to plant body.

**(2) Tracheids:**

Tracheids are narrower than the xylem vessels intransverse sectionn but are very long. They are composed of deassd cells and have lingnified cell walls.

**Function:**

(1) They are mainly concerned with th conduction of water and minrals.

(2) They also give support andrigidity to the plant body.

**Activities:**



(1) Write ten lines descrption about the figure You can get help form you science treacher

(2) What does the figure show? Discuss.

(3) What do you know abou these figures A and B? Discuss.

**Note:**

Do these activities teacher himself

**Q2: Describe in detail various types of movement in plants.**

Ans: The movements in the plants which are caused by external stimuli are of three types:

(I) Tactic movements.

(II) Tropic movements.

(III) Nastic movements.

**(i) Tactic Movements:**

These movements are locomotory in which the plant body as a whole moves from one place to another in response to external stimuli such as light, chemicals, temperature etc. Depending on the nature of the stimuli the tactic movements may be:

**(A) PHOTOTAXIS:**

Tactic movement in response to the stimulation of sun-light is called phototaxis.

**(B) CHEMOTAXIS:**

Tactic movement in response to certain chemicals is described as chemotaxis.

**(C) THERMOTAXIS:**

This is the movement in response to temperature.

**(2) Tropic Movements:**

These are the movements of plant organs of stationary plants in response to external stimuli such as light, gravity, water etc.

Tropic movements are of following three types.

(A) Phototropism.

(B) Geotropism.

(C) Hydrotropism.

**(A) PHOTOTROPISM:**

It is the movement of plant in response to the stimulus of unilateral light.

**(B) GEOTROPISM:**

It is the movement of plant organs in response to the stimulus of gravity.

**(C) HYDROTROPISM:**

It is the movement of plant organs in response to the stimulus of moisture.

**(3) Nastic Movements:**

These are the move-ments of mainly dorsiventral organs like leaves and petals, induced by external stimuli such as contact, light and temperature etc.

Following are main types of nastic movements:

**(A) Nyctinasty Or Sleep-movement:**

This movement is caused by alternation of day and night. Flowers of Oxalis and leaves of leguminous plants open in the morning and close at night.

**(B) Photonasty:**

This movement is caused due to variations in temperature. Crocus and tulip flowers open in increased temperature.

**(C) Thermonasty:**

This movement is caused due to variations in temperature. Crocus and tulip flowers open in increased temperature.

**(D) Seismonasty:**

It is the movement caused by mechanical stimuli such as contact/touch.



**Q3: What is skeleton? Describe its types and the main functions in animals.**

Ans: The support which we nd other animals need comes from the structure called skeleton. Besides support, skeleton offers protection. It also helps in locomotion.

In man, the internal frame-work of 206 bones constitutes the skeleton. The bony skeleton performs following functions.

(1) It provides support to the body.

(2) It gives shape to the body.

(3) It offers protection to vital organs such as brain, heart, lungs etc.

(4) It helps in locomotion.

(5) It helps in locomotion.

(6) Its long bones produce.

Femur (Thigh) bone is the longest bone, stapes (in ear) is the smallest bone.

Bones are hard, calcified structure being composed of living cells surrounded by deposition of minerals like calcium and phosphate.

Skeleton can be divided into following two groups.

**(i) Axial Skeleton:**

It consists of all the bones which lie on the central axis of the body and form the main frame-work of the body. Skull, vertebrae, sternum, and ribs constitute our axial skeleton.

**(ii) Appendicular Skeleton:**

The bones which are attached with axial skeleton form the appendicular skeleton. Shoulder bones (pectoral girdle), bones of arms (humerus, radio-ulna, carpals, etc), hip bones girdle (pelvic girdle) and bones of legs (femur, tibia, fibula, tarsals etc) form the appendicular skeleton.

**TYPES OF SKELETON:**

Three different types of skeleton are found in animals.

(I) Exoskeleton (II) Endoskeleton (III) Hydrostatic

skeleton.

**(I) EXOSKELETON:**

You are already familiar with the shell of molluscs and cuticle of arthropods. These are the external covers or exoskeletons. The exoskeleton in non-living and made up of substances such as calcium carbonate and chitin. It helps in locomotion, provides support and protection to the body.

**(II) ENDOSKELETON:**

In contrast to molluscs and arthropods many animals such as sponges, echinodermates, vertebrates have their skeleton inside their bodies. The internal skeleton is called endoskeleton. The endoskeleton in sponges is chiefly made up of hard, sharp and microscopic structures called spicules. Chemically, they are made up of calcium carbonate or silica.

**(III) HYDROSTATIC SKELETON:**

Soft bodied animals such as cnidarians, annelids, caterpillar, etc. Maintain their structure due to their body fluids which are filled inside the body, with pressure. The skeleton formed of fluids is called hydrostatic skeleton. It helps in the locomotion of animals.

**Q4: What is joint? Discuss its types and the extent movement they allow.**

**Ans: Joints:**

The junction of two or more bones in our skeleton is called joint. They can be broadly divided into two types. Immovable joints (e.g. Joints or sutures of skull bones) which do not allow movements, and movable joints (e.g. Knee joint) which allow movements.

Movable joints are of two types, ball and socket joint, and hinge joint. Hinge joints (e.g. Knee joint) allow movement in one plane only, whereas ball and socket joint (e.g. Shoulder joint) allow movement in many planes such as forward, backward and side ways. Both hinge joint, and ball and socket



joints have the same basic structure. The joint is enclosed within a capsule of connective tissue. The inner surface of capsule secretes a lubricating synovial fluid inside the joint. The ends of bones inside the joint are covered by layers of smooth articular cartilage. Both articular cartilages and the fluid of the joint serve to minimize friction during the movements of bones at joints.

| CHAPTER-05 | NATURE AND COMPOSITION OF SUBSTANCE |
|---|---|

## EXERCISE

**☆ CHOOSE THE CORRECT ANSWER.**

(1) Heat, light and sound are some form of:
(A) energy (B) Work (C) Power

(2) A matter can exist in_____states.
(A) two (B) three (C) four

(3) Stone, iron, wood and coal are examples of:
(A) Solids (B) Liquids (C) gases

(4) Water, oil, kerosene and spirit are examples of:
(A) Solid (B) liquids (C) gases

(5) Air, oxygen, nitrogen and hydrogen are examples of:
(A) Solids (B) Liquids (C) gases

(6) In the universe_____are found most commonly.
(A) Hydrogen and helium
(B) Nitrogen and oxygen
(C) Bromine and Fluorine.

(7) They are usually soft solids or gases having low melting and boiling points.
(A) Metals (B) Non-metals (C) Metalloids

(8) _____is made up of 12 atoms of carbon, 22 atoms of hydrogen and 11 atoms of oxygen.
(A) Glucose, (B) Salt (C) sugar

(9) Cooking gas is known as_____.
(A) Ammonia (B) Helium
(C) LPG (Liquified Petroleum gas)

(10) Dalton in_____started using circles with various sign inside them for this purpose.
(A) 1806 (B) 1807 (C) 1808

(11) The system of chemical symbols now is use was first introduced by_____in 1811.



(A) John Dalton (B) J.J. Thomson
(C) J.J. Berzelius.

(12) the symbol of sodium is:
(A) So (B) Na (C) sm

(13) The formula of water is:
(A) $H_2O$ (B) $H_2O_2$ (C) HO

(14) the formula aluminium oxide is:
(A) ALO (B) $Al_2O_3$ (C) $ALO_2$

(15) The number of atoms in the molecule of an element is called its_____.
(A) Atomic nos (B) Atomicity (C) Atomic reaction

| ANSWER KEY | | | |
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| 01 | | 02 | |
| 03 | | 04 | |
| 05 | | 06 | |
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| 15 | | | |

## SHORT ANSWER QUESTIONS

**Short Answer Questions:**

**Q1: What is matter? Name states of matter.**

Ans: Any thing which has weogjt amd occupies space is called matrter, i.e, solid, liquid and gas.

**Q2: What do you understnd by forces between particles?**

Ans: In solids, the particles are tightly packed. the attractive force between the particles called the intermoleculart force.

**Q3: What is element?**

Ans: Simple substance which are made up of only one king of atoms are called elements. Till now 118 elements are known to exist onthe earth. Out of these 92 element occur naturally and other elements have been prepared by the scientist in the laboratories.

**Q4: What is Symbol?**

Ans: A symbol is defined as the abbreviation or the short name for the full name of the element.

**Q5: Write the symbols of following elements.**

Ans: Boron, oxygen, Cobalt, Iron, Gold, Mercury, Lead, Copper, Uranium, Magnesium, Potassium, Zinc, Alumsnium, Calcium.

| Name of elements | Symbols |
|---|---|
| Boron | B |
| Oxygen | O |
| Cobalt | Co |
| Iron | Fe |
| Gold | Au |
| Mercuray | Hgg |
| Lead | pb |
| Copper | Cu |
| uranium | Ur |
| Magnesium | Mg |
| Potassium | K |
| Zinc | Zn |
| Aluminium | Al |
| Calcium | Ca |

**Q6: What is chemical Formula?**

Ans: Achemical formul is the symbolic representation of a molecul;e of a substance. It is a short hand method



of using th symbols to represent the composition of a compound.

**Q7: What is chemical equation?**

Ans: It is a shorthand representation of a chemical reactionwith the help of chemical symbols and formulue.

Q.8: What is crystallization?

Ans: It is a method of producaing the crystals of a substance by cooling its hot saturated solution.

**Activities:**

(1) What is the signifiaceane of Symbols?
(2) Writhe the symbols of the following element.
(3) What does the figure show? Discuss.

**Note:**

Do these actirties teacher himself.

## LONG QUESTION AND ANSWER

**Q1: Describe the state of matter with respect to their molecular arrangement.**

Ans: In solids, the particles are tightly packed. The attractive force between the particles called the intermolecular fore is very strong. This holds the particles tightly together. Thus, this arrangement results in solids having a definite shape and volume.

In liquids, the particles are loosely packed. The intermolecular force i.e the force of attraction is not as much as it is in solids. Thus, the particles in liquids slide on one another and take the shape of the container. Therefore liquids have a definite volume but no definite shape.

In gases, the particles are far apart. It is because the intermolecular force i.e the force of attraction among the particles is the least or negligible. Thus, the particles move in any direction. Therefore, gases neither have a

definite shape nor definite volume.

As in solids, the particles are held tightly so solids cannot be compressed. In liquids, the particles are held loosely, so they can be slightly compressed. In gases, the particles are spread far apart, so the gases can be compressed easily.

**Q2: Describe the chemical reactions with examples.**

Ans: When one or more substances undergo chemical changes, entirely new substances with new properties are produced. Such a change takes place due to hat is known as chemical reaction. It is defined as a chemical change, involving the transformation of any substance into one or more completely new substances with altogether new properties. The substances taking part in any chemical reaction, are called its reactants, whereas the new substances produced in it are called its products. In a chemical reaction, the reaction, are transformed into products. Let us consider the following examples:

(I) On heating sugar, it changes into water and carbon particles. This is called charring of sugar.

Sugar---->Carbon+Water

Here sugar is the reactant whereas carbon and water powder of magnesium oxide is produced.

Magnesium + Oxygen ------> Magnesium oxide

Mg + O2 -------> MgO

Here magnesium and oxygen are the reactants and magnesium oxide is the product formed.

The transformation of reactants into products is accompanied by some features. Let us now study about the characteristics of chemical reactions.

**(1) Evolutions of a gas:**

In some reactions, there is evolution of a gas.

**(2) Change of colour:**



Some reactions are characterised by change of colour.

**(3) Formation of precipitate:**

In some reactions, formation of a precipitate i.e. An insoluble solid shows that a chemical reaction is taking place.

**(4) Production of energy:**

Some reactions are characterised by production of heat and light, e.g burning of fuels such as coal produces lot of heat. In some reactions, light is produced.

**(5) Change of state:**

In some reactions, there is change of state or appearance.

**(6) Production of sound:**

Some reactions are characterised by production of sound.

We have studied about the characteristics shown by chemical reactions. However, some chemical reactions might show more than one characteristics, e.g. Burning of candle is characterised by the production of energy, evolution of gas and change of state.

**Q3: Describe the types of chemical reactions.**

**Ans: TYPES OF CHEMICAL REACTIONS:**

There are different type of chemical reactions. Based on the changes that occur in chemical reactions, they can be categorised into the following types:

**(I) Combination Reactions or Synthesis:**

When two or more substances combine to form a new substance, the change is called combination or synthesis.

**For example.**

(A) Sodium and chlorine combine with one another to form sodium chloride.

Sodium + chlorine -----> sodium chloride

Na + Cl -----> NaCl

(B) Mercury and oxygen combine to form mercury oxide.

Mercury + Oxygen -----> Mercury oxide

2Hg + O2 -----> 2HgO

Some other examples of combination are:

Formation of iron sulphide by the com-bination of iron and sulphur

Iron + Sulphur ------> Iron sulphide

Fe + S ------> FeS

Formation of ammonia by the combination of nitrogen and hydrogen.

Nitrogen + Hydrogen ------> Ammonia

N2 + 3H2 ------> 2NH3

**(II) Decomposition Reactions or Analysis:**

In this type of a chemical reaction, a substance splits into different substances i.e two or more products are obtained from a single reactant. For example:

(A) On passing electric current through water, it breaks up giving hydrogen and oxygen.

$$2H_2O \text{ -------> } 2H_2 + O_3$$

(B) Potassium chlorate decomposes on heating into potassium chloride and oxygen.

$$2KClO_3 \text{ ------> } 2KCl + 3O_2$$

**ACTIVITIES:**

(1) What is the significance of symbols?

(2) Write the symbols of the following elements.

(3) What does the figure show? Discuss.

**Note:** Do these activities teacher himself.



| CHAPTER-06 | SOLUTION AND SUSPENSION<br>محلول اور معلق |
|---|---|

## EXERCISE

**☆ CHOOSE THE CORRECT ANSWER:**

(1) The component of solution present in smaller amount is called _____.
(A) Solute (B) Solvent (C) None of these

(2) The component of solution present in larger amount is called _____.
(A) Solute (B) Solvent (C) All of these

(3) When water is solved the solution is called _____ solution.
(A) Normal (B) Mixture (C) aqueous

(4) Solubility of a solid in liquid _____ with increase in temperature.
(A) Increases (B) Decreases (C) Fixed

(5) The solubility of sugar in water at 00C is.
(A) 178g/100ml (B) 179g/100ml
(C) 782g/100ml

(6) The solubility of a gas in a liquid is _____ proportional to the pressure of gas.
(A) Directly (B) Inversely (C) NOT

(7) Which one is ionic compound.
(A) H2O (B) Co2 (C) NaCl

(8) The solubility of gases in a liquid with the increase in temperature.
(A) increase (B) decreases (C) fixed

(9) The solution which contains less B solute than it has the capacity to dissolve.
(A) unsaturated (B) saturated
(C) Super saturated

(10) Solubility is defined as the amount of solute in gram

at a given temperature, dissolved in_____of the solvent.

(A) 2og (B) 100g (C) 200g

(11) The suspended particles in suspensions are generally of the size.

(A) 10nm (B) 100nm (C) 1200nm

(12) The sum f the mole fractions of solute and solvent is equal to:

(A) 5 (B) 2 (C) 1

(13) The process in which a solid directly changes to vapours is known as:

(A) Sublimation (B) Evaporation

(C) Fusion

(14) The solution that contains less amount of solute as compared to the amount of solvent is known as_____solution.

(A) dilute (B) concentrated

(C) Super saturated

(15) _____is defined as the number of moles of the solute dissolve per dm3 or litre of the solution.

(A) Molarity (B) Molality (C) Mole fraction

| ANSWER KEY | | | |
|---|---|---|---|
| **01** | | **02** | |
| **03** | | **04** | |
| **05** | | **06** | |
| **07** | | **08** | |
| **09** | | **10** | |
| **11** | | **12** | |
| **13** | | **14** | |
| **15** | | | |



## SHORT QUESTION AND ANSWERS

**Q1: What is solution?**

Ans: A solution is defines as homogeneous ixture of two or more subtacnes.

**Q2: What is soute?**

Ans: The component of saoution present in smasller amount is callee soute in smaller amount is called soute.

**Q3: What is solvent?**

Ans: tje The component of solution present oin larger amount is caled solvent.

**Q4: What is supension?**

Ans: Suspension is defines as a heteorgeneous mixture consists of visible particles, each of which contains many thousands or revwen millions of molecules surrounded by molecules of liquids.

**Q5: Define Sdubility.**

Ans: The slou8bility is defined as tyhe amount of aloute in gram sisolved at a giventemperature in 100 grams of the solvent.

**Q6: Name the factour afeecting saoubility.**

Ans: Many factours affect the slubility of alote in a solvent. thes factour may be.

(1) Temperature

(2) Pressure

(3) nature of solute

(4) nature of solvent

**Q7: What is strength of aolution means the mass or volume of thhe solute preseent in known amount of solvent aor soution.**

**Ans:**

**Q8: Explain why common salt dissolves in water but no in petrol?**

Ans: Polar and ionic solutes easily dissolve inopolar

solvent whereas non- polar solute easilly dissolves like. i.e common salt being an ionic compoound easily dissolves in polar solvent like water but is insolube in non- polac solvent like benzene or petrol.

**(2) Difference between Molarity and Molality:**

| **Molarity** | Molality |
|---|---|
| It is defines as the number of moles of solute dissolved in 1 (one) litre of solution. It is denoted by M. | It is defined as the number of moles of solute dissoolved in per 1000g of solvent. It is denoted by m. |
| Mathematically. | Mathematically. |
| Molarity = mass of sloute x 1000 ml / Gram formul mass x ml of solution | Molality = Mass of solute x 1000g / Gram formul mass x gram of solvent |

**Q3: Descibe the factors affecting the solubility.**

Ans: Fatour affecting soubility.

Many factore afeect the solubility of a solute in solvent. These factoru may be.

**Solubility and Temperatue:**

Solubility of a solid in liquid or solubility of partatially miscible liquids increses with increase in temperture. Thus solubility of sugar in water at O0C is 179g/100ml where as at 100oc it is 487g/100ml.

But the soubility of gases in a liquid decresases with the increase in temperature. For thsis reason when a glass of cold water is warmed, bubbles of air are seen on the inside of glass.

**Solubility and Pressure:**

The solubilities of solid and liquid are not affected by pressure. But solubility of a gas in a liquidf is directly proportional to the preesure of gas. this called Henry's Law



i-e

$$m \times P \text{ or } m = kp$$

Where "m" is the amount of gas dissolved. This effect is used in manufavture of bottled soft drinks as coca- cola 7-up etc Thes are bottled under a Co2 pressure Slightly greater than 1 atm.

When the bottles are opened. pressure decreases, so solubility of Co2 also decreases, henver bubbles of Co2 come out opf solutiion.

**Solubility and Natures of Solute and Solvent:**

Solute and solven may be polat and to non-plart. polar and ionic solutes easily dissolve in polar solvent wheere as non- polar solute easily dissolved innon-polar solvent. Hence it is said that like dissolves like. For example common saly (NacL) being an ionic compound esasily dissolves in polar solvent like water but it is insoluble in non-polar solvent like benzene and petrol.

**Activities:**

(1) Write the name of five solutionsand suspension with the help of your science teacher.
(2) What do you know about this figure?
(3) What does the figure show? Discuss.
(4) What does the figure Show? Discuss.

## LONG ANSWER QUESTIONS

**Q1: Describe Saturated, Unsaturated and Super Saturated Solution?**

Ans: UNSATURATED SOLUTION:

An unsaturated solution is that one which contains less solute than it has the capacity to dissolve. If more solute is added, at least some of it will dissolve.

**Preparation of unsaturated solution:**

Take a few crystals of sugar and dissolve them in a glass of water. This results in an unsaturated solution, because

the solution has a capacity to dissolve more crystals of sugar (solute) at a given temperature.

**Saturated solution:**

A saturated solution is that one which contains maximum amount of solute in a given solvent at room temperature. No more solute can dissolve in it and there is a dynamic equilibrium between the undissolved and dissolved solute. This type of solution is called saturated solution.

The amount in grams of a solute required to be dissolved in 100 grams or 100ml of a solvent to prepare a saturated solution at room temperature is called solubility of that solute, it is expressed in g/100 ml or g/100 g at that specific temperature.

**Preparation of a saturated solution:**

Take some water, in a beaker. With constant stirring, add crystals of sugar, till they do not dissolve and start to settle down. The solution thus obtained is saturated solution of sugar, at rom temperature.

**Super Saturated Solution:**

A super saturated solution is that which contains greater amount of dissolved solute than that present in a saturated solution; at the given temperature. Preparation of super saturated solution is required for crystallization. Crystallization is simple and general technique for purification of impure compounds.

**Q2: Differntiate between Solution and Suspension.**

Ans:

| SOLUTION | SUSPENSION |
|---|---|
| 1.The size of particles is between 0.1 to 1nm. | The size of particles is larger than 1000 nm. |
| 2. Particles cannot be seen with low power microscope. | Particles can be seen by low power microscope. |
| 3. It is homogeneous. | It is heterogeneous. |



| | |
|---|---|
| 4. It is transparent. | It is not transparent. |
| 5. Components cannot be separated by filtration. | Components can be separated by filtration. |

**Q2: Differntiate between Molarity and Molality.**

Ans:

| MOLARITY | MOLALITY |
|---|---|
| It is defined as the number of moles of solute dissolved in 1 (one) litre of a solution. It is denoted by M. Mathematically. | It is defined as the number of moles of solute dissolved in per 1000g of solvent. It is denoted by m. Mathematically: Molality = Mass of Solute x 1000g / Gram Formula mass x gram of solvent |

Q3: Describe the factors affecting the solubility.

Ans: FACTORS AFFECTING SOLUBILITY:

Many factors afffect the solubility of a solute in a solvent. These factors may be:

SOLUBILITY AND TEMPERATURE:

Solubility of a solid in liquid or solubility of partially miscible liquids increases with increase in temperature. Thus solubility of sugar in water at 0oc is 179g/ 100ml where as at 100oc it is 4879/100ml.

But the solubility of gases in a liquid decreases with the increase in temperature. For this reason when a glass of cold water is warmed, bubbles of air are seen on the inside of the glass.

SOLUBILITY AND PRESSURE:

The solubilities of solids and liquids are not affected by pressure. But solubility of a gas in a liquid is directly proportional to the pressure of gas. This is called Henry's law i.e.

**m@ P or M= kP**

Where "m" is the amount of gas dissolved.

This effect is used in manufacture of bottled soft drinks as coca-cola, 7up etc. These are bottled under a Co2 pressure slightly greater than 1atm. When the bottles are opened, pressure decreases, so solubility of Co2 also decreases, hence bubbles of Co2 come out of solution.

Solubility and Natures of Solute and Solvent:

Solute and solvent may be polar and and non-polar and ionic solutes easily dissolve in polar solvents where as non-polar solute easily dissolved in non-polar solvents. Hence it is said that like dissolves like. For example common salt (NaCl) being an ionic compound easily dissolves in polar solvent like water but it is insoluble in non-polar solvent like benzene and petrol.

**Q4: Describe the preporation of crystals of copper Sulphate (Blue vitriol).**

Ans:

Preparation of crystals of copper sulphate (Blue vitriol cuSO4.5H2O):

Prepare a saturated solution of copper sulphate in water at room temperature using a beaker. Heat th saturated solution and try to dissolve some more quantity of copper sulphate while stirring the solution with glass rod. Allow the super saturated solution of copper sulphate to cool down at room temperature. Upon cooling and standing, crystals of CuSO4.5H2O, i.e., Blue vitriol will form. Filter out the crystals and observe the shape of crystals under a light microscope.

**Q5: Describe the Purification of Solids by Crystallization.**

**Ans: Purification of solids by crystallization:**

An impure solid generally contains two types of impurities. An insoluble impurity ad a soluble impurity. Insoluble impurity is totally insoluble in the solvent used for crystallization even at boiling temperature. While the soluble



impurity remains in soluble form at room temperature. Therefore, a compound containing such two types of impurities could be easily removed by means of crystallization technique.

For example, a 42g impure sample of KNO3 contains a small quantity of sand and NaCl. To obtain pure crystalline KNO3, we perform the crystallization technique as follows:

**ACTIVITIES:**

(1) Write the name of five solutions and suspensions with the help of your science teacher.
(2) What do you know about this figure? Discuss.
(3) What does the figure show? Discuss.
(4) What does the figure show? Discuss.

| CHAPTER-07 | ACIDS, BASES AND SALTS<br>تیزاب،اساس اور نمکیات |
|---|---|

## EXERCISE

**CHOOSE THE CORRECT ANSWER:**

(1) The term acid is derived from the_____word which means soar.
(A) Greek (B) French © Latin

(2) Many acids react with certain metals giving_____gas.
(A) Hydrogen (B) Nitrogen © Oxygen

(3) Citrus fruits like lemons, oranges etc contain:
(A) Acetic acid (B) Lactic and
© Citric acid

(4) HCL contains_____replaceable hydrogen.
(A) One (B) Two © Three

(5) The substances whose aqueous solution change the blue litmus to red.
(A) Acids (B) Bases © Salts

(6) _____are pure acids containing little water.
(A) Dilute acid (B) Concentrated acid
© None of these

(7) _____is prepared y dissolving hydrogen chloride gas in water.
(A) Hydrochloric acid (B) Sulphuric acid
(C) Alitric acid

(8) _____is used is batteries runs down and needs charging.
(A) Acetic acid (B) Hydro iodic acid
(C) Sulphuric acid

(9) The formula of hydrochloric acid is_____.
(A) HCL (B) HOCL (C) CLH3O

(10) The soft drinks contain_____acid.



(A) Carbonic (B) Acetic (C) Formic

(11) Acids that contain more water than the acid:
(A) Dilute (B) Concentrated
(C) None of these

(12) The formula of sulphuric acid is:
(A) HSO4 (B) H2SO4 (C) H2SO

(13) It is a weak alkali and used in the B manufacturing of fertilizers.
(A) Ammonia (B) Sodium hydroxide
(C) Calcium hydroxide

(14) The formula of sodium carbonate is:
(A) Mg (OH)2 (B) Na2CO3 (C) NaHCO3

(15) A _____ is a substance formed by the neutralization of an acid by a base:
(A) Salts (B) Bases (C) Acids

| ANSWER KEY | | | |
|---|---|---|---|
| 01 | | 02 | |
| 03 | | 04 | |
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## SHORT QUESTIONS AND ANSWER

**Q1: Define the term acid annd base.**

Ans: Acid:

The term acid is dderived form the latin word which means sour.

**Base:**

All oxides of metal that dissoclve in water, neutralize

an acid to produce salt and water are commonly known as bases.

**Q2: Writhe Salient features of acids.**

(1) All acid have a sour taste.
(2) Acid ture blure litmus to red.
(3) Acid react with certain metal and give out hydrogen gas.
(4) Acids react with bases to form salt and water.
(5) Acids are electrolytes.

**Q3: Write Salient feature of bases.**

Ans: Salient Feature of bases:
(1) All bases have a bitter taste.
(2) Bases turn red litmus to blue.
(3) Bases have slippery touch.
(4) Bases react with acid to form salt water.
(5) Bases are electrolytes

**Q4: Write the names and Formulae of four weak and four strong acids.**

Ans:

**Q5: Define dilute and concentrated acid.**

Ans: Dilute acids are those that contain more than the acid. while concentrated acid are those that are in pure form.

**Q6: Define basicity of acids.**

Ans: The number of replaceable hydrogen atoms in the molecule of an acid is called the basicity of an acid. i.e HCL contains one replaceable hydrogen atom. It is called monbasic acid.

Q7: Define acidity of bases.

Ans: It is defines as thhe umber of replaceable hydroxyl group (OH) Present inonwe molecoule of the base. let us understant it with the help of example. sodium hydroxyde (NaoH) contains one hydroxyl group that can be replaced Thus its acidity is one. It is said to be



monoacid.

**Q8: What is Salt? Write properties of salts.**

Ans: The neutral compound that is formed when acids and bases react together is called salt.

☆ **Properties of Salts:**

(1) Salts are typical compounds that neither contain the hydorgen nor the hydroxylion.
(2) Salts are generally solid with high melting and biolinng points.
(3) Salts are usually water soluble.
(4) Salts solutionn conduct electricity.

**Q9: How are salts formed?**

Ans: when acids and bases mix together the wsalts are formed.

**Q10: What is neutralizationn reaction?**

Ans: It is a reaction between an acid and base wher in acids lose their acidic character i.e their acidity is destoyed. Salt and water are formedd as a result in these reactions.

**Q11: Define the term indicator.**

Ans: such substances that give different colours with acid and a base are called indicators.

## LONG ANSWER QUESTIONS

**Q1: Describe the uses of Acids.**

Ans: (I) Ascorbic acid present in citrus fruits like oranges and lemons is a source of vitamin C.
(II) Hydrochloric acid is used for:
(III) Hydrochloric acid is used for:
(a) making metal chlorides.
(b) cleaning metals before coating them with tin or zinc
(C) making glue.
(d) making aquaregia (a mixture of concentrated HCl and hno3). it dissolves noble metals like gold and

platinum.

(e) cleaning kitchen sink and sanitaryware. (Dilute form of acid is used.)

(iv ) Nitric acid is used for:

(A) Manufacturing drugs, dyes, paints and explosives.

(B) In petroleum refining.

(C) In batteries used in vehicles i.e. Cars, trucks, buses and tractors etc.

Sulphuric acid, nitric acid and hydrochloric acid find a great use in industries. Besides their use in the manufacturing of chemicals they are also used in metallurgical operations.

**Q2: Describe the uses of Bases/ Alkalies.**

Ans:

We have already read that both the metals and non-metals react with oxygen. When metals react with oxygen, they form basic oxides, e.g. Magnesium, a metal reacts with oxygen to form magnesium oxide.

$$2Mg + O_2 \longrightarrow 2MgO$$

(Magnesium) (Oxygen) (Magnesium oxide)

All oxides of metals that dissolve in water neutralise an acid to produce salt and water are commonly known as bases.

Some metal oxides dissolve in cold water, other oxides dissolve in water on heating. Some oxide like CuO, do not dissolve in water.

Similarly, sodium burns in air to form sodium oxide, a white powdery substance.

$$4Na + O_2 \longrightarrow 2Na_2O$$

(Sodium) (Oxygen) (Sodium oxide)

When dissolved in water, sodium oxide forms sodium hydroxide that has a soapy touch.

Both magnesium oxide and sodium oxide dissolve



in cold water. Oxides of many other metals also dissolve in water to form their respective hydroxides, e.g.

**Activities:**

(1) Discuss the terms Acid and Bases.

Also discuss the uses of acid and bades in industries with students.

(2) Give the chemical formulae of the followings

Note for Teacher

Solve these activites yourself.

| CHAPTER-08 | HOW SOUND IN PRODUCED? آواز کیسے پیدا ہوتی ہے؟ |
|---|---|

## EXERCISE

**CHOOSE THE CORRECT ANSWER:**

(1) Sound is a form of_____.
(a) Wave (b) Energy (c)Speaker

(2) Sound is produce by_____body.
(a) Vibrating (b) Stationary (c) Not

(3) A peculiar sound is produced and the prongs of the_____begin to vibrate.
(a)Vilion (b) Turning fork (c) Both

(4) Whenever a body is vibrating, it produces a disturbance in surrounding.
(a) Air (b) Fire (c) Water

(5) Sound travels from one of a_____.
(a) Medium (b) Space (c) Both

(6) The series of compressions and rarefactions is known as_____.
(a) Light (b) Water waves (c) Sound waves

(7) Sound waves are_____.
(a) Longitudinal (b) Latitudinal (c) Not

(8) Our ear can hear only those sounds whose frequency is between 20Hz to_____.
(a) 200 Hz (b) 2000 Hz (c) 20000 Hz

(9) The_____ is different persons and it also vibrate with the age.
(a) audible range (b) ultrasonic range (c) Not

(10)The velocity V of the sound can be calculated by the formula:
(a) $V = \frac{S}{T}$ (b) $V = \frac{t}{s}$ (c ) both

(11) The velocity of sound in air at O°c is_____.



(a)310m/s (b) 320 m/s (c) 330 m/s

(12) The velocity of sound in water is
(a) 1400 m/s (b) 1450 m/s (c) 1475 m/s

(13) _____enables us to distinguish between a
(a) Loudness (b) Pitch (c) Quality

((14) The sound heard after reflection from a surface is called no_____.
(a) Loudness (b) Pitch (c) Echo

(15) The maximum beat frequency that a human ear can detect is_____beats per second.
(a) 5 (b)6 (c)7

| ANSWER KEY | | | |
|---|---|---|---|
| 01 | | 02 | |
| 03 | | 04 | |
| 05 | | 06 | |
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| 13 | | 14 | |
| 15 | | | |

## Short Answer Question

**Q1: What is sound?**

Ans: Sound is a form of energy.

Q2: How is sound produced?

Ans: Sound is produced by a vibrating body. Whenever a sound is produced, the vibrations of the sound body can be seen or felt, For example a metallic vessel is struck with a sporn. It start giving out sound and ther be felt by touching it gently with bond.

**Q3: What is audible freequency range?**

Ans. Our ear can hear only those soounds whose

requecny is between 20Hz to 20,000 H2 This called audible frequency range.

**Q4: What is diffenence between musical sound and noise sound?**

Ans.

| Noise sound | Musical sound |
|---|---|
| (1) It appears anpleasent affect to ear. | (1) It appears sweet affect to ear. |
| (2) Noise depends upon intensity | (2) Musical sound depends on intensity, loud, pitch and quality |
| (3) Noise effect hearing and mental alertness | (3) Musical sound haring effect on patients |

## LONG ANSWER QUESTIONS

**Q1: Discuss characteristics of sound in detail.**

**Ans: CHARACTERISTICS OF SOUND:**

We hear different sounds all around us. Some of these, like the sound from a flute, a piano, and a sitar and the voice of cuckoo are pleasant to hear while the cawing of a crow, the bleating of sheep, the howling of winds, the ratting sound of road rollers or trucks are sounds which are jarring to hear. The former of these sounds are called musical sounds while the latter are known as noise. In musical sounds there is a regularity in the variation of frequency and amplitude. Noise on the other hand has abrupt changes in amplitude and frequency and there is no regularity in the variation of frequency. For this reason we shall confine our studies to musical sounds. A musical sound has the following characteristics (a) Loudness (b) Pictch (c) Quality or timbre.

LOUDNESS:

Loudness of sound depends upon the intensity of the sound waves. In density of sound waves is defined as the energy carried by the sound waves through a unit area placed



perpendicular to the direction of propagation of waves per second. Loudness enables us to distinguish between a faint and a loud sound. It is actually a sensation of human consciousness; However the loudness of sound depends upon the following factors.

PITCH:

We often hear the whistle of a train, the cry of a baby, the chatter of a child and the talking of a man or woman. Some of these sounds are shrill and some are flat. This property of the sound by virtue of which we can distinguish between a shrill sound and the flat sound is called the pitch of the sound. The pitch of the sound depends upon the frequency of the sound. The greater the frequency, the higher the pitch and vice verse. This can be demonstrated by an activity described below.

**ECHO:**

The sound heard after reflection from a surface is called an Echo: In a normal human ear the effect or the sensation of sound persists for 1/10th of a second after the sound has ceased. If some sound enters the ear within this interval of time it merges with the previous sound and does not appear to be separate. To hear an echo it is, therefore necessary that the time elapsed between the production of a sound and the hearing of its echo is equal to, or more than. 1/1 Oth of a second. For clarity the sound should be loud and of short duration such as clapping of hands or hitting two pieces of wood together.

**QUALITY OR TIMBRE:**

If different musical instrument like violins, flutes, sitars and cymbals are being played simultaneously in a hall it is not difficult to identify the sound of each one of these. This property of the sound by virtue of which it is possible to identify a sound of the same. Loudness and pitch but originating from different instruments is called quality or timbre.

**Q2: Describe reflection of sound with experiment.**

Ans: REFLECTION OF SOUND:

As already described waves are reflected at the surface separating the medium, in which the wave travels, from some other medium at which the wave is incident. Standing near a cliff if we clap then, after sometime, we hear the reflection of the clap. This is due to the fact that the sound wave travels in all directions and when they come across another surface the sound waves undergo reflect the sound heard. This can be demonstrated by a simple experiment as described below:

Take a long PVC pipe and cut it into two equal parts. Hold the two parts against a smoth surface. Place a watch at the open and of one tube and ask a student to place his ear against the open end of the second tube. Tell the student to slightly move the rube sideways till clear ticking of the watch is heard. Place a big cardboard sheet between the two tubes so that the sound does not reach the ear through any other. Measure the angles that the two tubes make with the normal at the point of incidence as shown in Fig. Repeat the experiment by changing the angle of incidence. It will be found that in all cases the angle of reflection is equal to the angle of incidence.

Q3: What is meant by interference of sound?

Ans: INTERFERENCE OF SOUND:

We have already discussed the interference of waves. As sound also travels in the form of waves, it must also exhibit interference. That is when two sound waves of the same frequency and amplitude pass through the same region of space at the same time, then at the place where the compression of one sound wave falls on the compression of the second wave, we get an intense compression. Also we get an intense rarefaction if the rarefactions of the two waves coincide. The results in a louder sound. However, if the compression of one wave falls on the rarefaction of the second wave we hear no



sound or a very faint sound. The former is called constructive interference while the later is termed destructive interefence. This can be demonstrated by an activity given below.

**Q4: Discuss resonance in sound waves.**

**Ans: RESONANCE OF SOUND WAVES:**

We have already discussed the resonance phenomenon in waves detail in the earlier article. Here we describe an activity to show resonance in sound waves.

A simple apparatus for demon starting resonace is shown Fig: 9, A long vertical tube is partially dipped in water contained in a beaker. A vibrating tuning fork is held near the upper end of the tube. The length of the pair column is adjusted vertically by moving the tube out of the water. The sound waves generated by the tuning are reinforced when the length of air column corresponds to one of the resonant frequencies of the tube. The arrangement can be used to determine, velicity of sound in air.

Whenever a sound wave comes across a barrier it is reflected back in the same medium. In this process, the reflected waves interact the incident waves and produce stationary waves. When this happens we get a lounder sound. The loud sound indicated that the inflected waves are in resonance with the incident waves produced by the tuning fork. In stationary waves those points there the disturbance in maximum are called antinodes. Two antinodes can not exist consecutively but must be separated by an antipode or a node.

**Activities.**

(1) What dows the figure show? discuss with your science teacher

(2) Wrte few lines about these figure.

Note:

Do these activities teacher himself.

| CHAPTER-09 | OPTICAL INSTRUMENT |
|---|---|

## EXERCISE

**(A) TICK THE CORRECT THE ANSWER.**

1. Tick the_____enables us to study very ting organisms
   (a) Microscope (b) Telescope (c) camera
2. A_____is a piece of transparent material.
   (a) lens (b) fibre (c) Not
3. A_____lens is thick at the centre and thin at the Edges.
   (a) convex (b) concave (c) both
4. A_____ lens is thinner at the centre and thicker at the edges.
   (a) convex (b) concave (c) Not
5. The nature and position of an image formed by a lens can be calculated by_____
   (a) Thin lens formula (b) Magnification
   (c) camera
6. A_____is basically a light proof container blackened inside to absorb stray light.
   (a) Magnifying glass (b) camera (c) Human eye
7. The ordinary camera has a_____Situated at the fornt.
   (a) convex lens (b) concave lens (e) Not
8. Optically speaking the human eye functions in much the same manner as a_____
   (a) Microscope (b) lens (c) camera
9. The eye ball is nearly_____in Structure .
   (a) spherical (b) square (c) oval
10. The diameter of eye ball is about_____
    (a) 2.5cm (b) 2.8cm (c) 3.6cm
11. The farthest distance at which at which an eye can see object clearly is called the_____.
    (a) farnet (b) near point (c) back point



12. Short sightedness can be corrected by_____
    (a) concave denses (b) convex lenses (c) both
13. The power of a convex lens of socm of focal length with be_____
    (a) +2 (b) -2 (c) 4
14. A_____is simply a single biconvex lens of a short focal length.
    (a) Magnifying glass (b) compound microscope
    (c) telescope
15. The eye an camera are similar because the image formed in both is_____
    (a) real, inverted and small (b) real, erect and small
    (c) virtual erect and small.

| ANSWER KEY | | | |
|---|---|---|---|
| **01** | | **02** | |
| **03** | | **04** | |
| **05** | | **06** | |
| **07** | | **08** | |
| **09** | | **10** | |
| **11** | | **12** | |
| **13** | | **14** | |
| **15** | | | |

## SHORT ANSWER QUESTIONS

**Q1**: **What is lens?**

Ans. A lens is a piece of transparent material, such as glass or plastic that refacts light in a regular way. These are bounded by one or two spherical surfaces.

**Q2**: **Name type of lens.**

(1) Convex lens
(2) Concave lens

**Q3**: **What is thin lens formula?**

Ans. the meture and positon of an image formed loy a

can also be calculated from the following formula.

$$\frac{1}{F}=\frac{1}{P}+\frac{1}{P}$$

Here P is the distance of the object form the lens of the distance of the image from the lens, and F is the focal length lens (Fig. 8)

This is called thin lens formula.

**Q4: Name the defects of eye.**

Ans. Short sightedeness (Myopia):

Long singhtedness (Hypermetropia).

ASTIGMATISM:

Lock of accommodation (Presbyopia):

**Q5: What is compound microscope?**

Ans. A single convex lens acts as magnifying glass but if it is too powerfyl the image obtained is indistinct.

If however, two convex lensess are used a highly magnicfied, clear and ditanct image can be obtained. Tis the the reason why it is called a compound microscope.

## LONG QUESTION AND ANSWER

**Q1: Write a detail note on Optical instrument.**

Ans: Millions of people wear spectacles to see clearly and to read without any difficulty. Cameras are used for photography. Magnifying glasses are used to study small objects. Projectors are used to show films on the screen microscopes enables to study very tiny organism and with the help of a telescope we can clearly observe far distant objects, planets, stars and galaxies. All these optical instruments have one thing in common, that is, they all use lenses utilizing there fraction of light.

A lens is a piece of transparent material, such as glass or plastic that refracts light in a regular way. These are bounded by one or two spherical surfaces. Two main



types of spherical lenses are generally used. These are convx lens and concaves lens.

**Q2: Explain the functions of human eye.**

**Ans: Human Eye:** Optically speaking the human eye functions in much the same manner as a camera. The eye ball is nearly spherical in structure with a diameter of about 2.5cm. The eye ball consists of three layers namely (1) sclera (2) Chorids (3) Retina enclosed in a cavity filled with a fluid called the viterious humour. The whole structure of the eye is pulled into various positions by muscles attached around the eye ball. The camera, but the front part pf it called the cornear is transparent.

The cornea allows the light to center and the aperture of this camera is determined by the pigments middle layer of the eye called the choroids which form a coloured Curtain called the iris which is just in frond of the lens. This curtain is muscular and when it contracts, the pupil which is an opening in the centre of the iris, enlarges and more light can enter. It contracts in bright light and dilates in dim light. Its diameter varies from about 2 mm! day light to about 6 mm in darkness. Its diameter is thus automatically adjusted to control the amount of light entering the lens of the eye. A transparent and flexible convex lens is held just behind the iris and its focal length can be altered by the pressure of the ring- shaped flair muscles surrounding it (fig: 10). The process of changing the shape of the lens to see nearly or far away objects clearly is called accommodation, (fig: 11) The rays of light from an object are focused and converged by the lens on the the sensitive internal layer of the eyeball called the Retina which is situated at the back of the eye chamer. The retina is a nerve Issu sensitive to light.

**Q3: What are defects of a human eye? How are they removed?**

**Ans: SHORT SIGHTEDNESS (MYOPIA):**

A short sighted person can see near object clearly but distant objects are not seen clearly. The reason for this defect is either the focal length of the eye lens is too short or the eye ball is too elongated. This means That light rays from a distaff object are focused in front of the retina. This defect can be corrected by wearing spectacles (or contact lenses) with concave lenses. These lenses diverge the rays of light so that the eye lens can foucs the image clearly on the retina (Fig: 11 and 12)

**Long Sightedness (Hypermetropia):**

A long sighted person ca: distant objects clearly but can not see near objects distinctly, reason for this defect is either the focal length of eye lens is too or the eye ball is too short. This means that light rays from near of are focused behind the retina. This defect can be corrected by we spectacles (or contact lenses) with convex lenses as these lenses converge rays so that the eye lenses can focus the image on the retina clearly (Fig 13 and 14)

**ASTIGMATISM**

If the cornea, or the surface of the eye, is not perfectly spherical the eye has different focal points in different planes and an object is not focused clearly on the retina. Astigmatism is corrected by asymmetrical lenses which have different radii of curvature in different planes.

**Lack of Accommodation (Presbyopia):**

At old age the eye lens loses I its elasticity and ability to change its shape and the ciliary muscles weaken resulting in a lack of accommodation. This kind of long S sightedness is called presbyopia. This defect can be corrected by convex lenses. However, for looking at



distant objects one will have to use concave lenses.

This is the reason that old people use spectacles with bi-focal lenses, i.e. convex part in the lower side to see near objects and concave part in the upper side to see the distant objects Fig 15.

**Q4: Describe the construction of Compound microscope and astronomical Telescope.**

Ans: COMPOUND MICROSCOPE:

A single convex lens acts as magnifying glass but if it is too powerful the image obtained is indistinct. If however, two convex lenses are used a highly magnified, clear and distinct image can be obtained. This Is the reason why it is called a compound microscope. The lens close to the object is called the objective and its focal length is short. The lens close to the eye is called the eye-piece. Its focal length is greater than the focal length of the objective.

The object to be viewed is placed between F and 2F of the objective lens, inverted on the stage of the microscope. The mirror at the base reflects light on the object. In most compound microscopes two or more objective lenses of different focal lengths are mounted on a rotating disc called the nose-piece. One objective lens is used at a time (Fig. 14.). The objective lens produced an inverted, enlarged and real image ,, which acts as the object for the second lens; I.e. the eye piece. This image is focused within the focal length of the eye piece resulting in an erect, h. This image can finally be seen by the eye. The focusing of the final image is achieved by mounting the eye-piece in a tube that can be adjusted up and down with the help of a geared wheel (Fig 18):

Each Objective lens has a different power of magnification. Different magnification can be obtained by

changing the objectives or the eye-piece or both.

**REFRACTING TELESCOPE:**

An astronomical refracting Telescope consists of two convex lenses. The lens towards the object is called the objective lens. It has a long focal length. The lens nearer the eye is called the eye-piece. It has a short focal length. (Fig 20) Since the stars are so distant, the rays of light coming from them will be almost parallel and are focused to a point by the objective lens at its principal focus and form the image, I of the start. It is real, inverted and diminished. The eye-piece 4 is adjusted so that the image obtained from the objective is formed at the focal length of the eye-piece, w of a very large magnification. The image is inverted with respect to the object but for astronomical purpose it does not matter.

**Activities:**

(1) Write five lines about the figure given below:
(2) Draw the human eye neat and clean in the givenbox.
(3) Describe the difference between microscope adn telescope with the help your science teacher,

Note:

Solve these activeties teacher himself.



| CHAPTER-10 | NATURE OF LIGHT AND ELECTROMAGNETIC SPECTURUM روشنی کی نوعیت اور برقناطیسی طیف |
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## EXERCISE

A. Tick the correct answer.

(1) Light is a form of
(a) Energy (b) Power (c ) Force

(2) _____ in the middle of seventeenth century proposed that light consists of minute
particle, called corpuscles.
(A) Foucault (b) Newton (c ) Einstein

(3) _____ proposed an alternative theory known as wave theory of light.
(a) Huygen (b) Newton (c ) Foucault

(4) In the later half of _____Hugen's theory got wide acceptance.
(a) 18th century (b) 19th century (c) 20th century.

(5) Waves in different media propagate with different _____and different wave length.
(a) Speeds (b) Sound (c ) Light

(6) ____were formed when crests and thoughts cancelled each other.
(a) Light bands (b) Dark bands (c ) Not

(7) Max plank concluded that radiation was emitted in the form of tiny_____.
(a) Packets of energy (b) Packets of heat
(c ) Packets of Sound

(8) Einstein called these packets of energy_
(a) Positron (b) Photon (c) Not

(9) The shortest wavelength visible to the human eye is violet with_____per cm.

(a) 20000 waves (b) 25,000 waves
(c) 27,000 waves.

(10) The longest visible wavelength is red colour with about_____per cm.
(a) 14286 waves (b) 17862 waves
(c) 15281 waves

(11) The _____ is a arc of spectral colours formed across the sky during rainfall,
(a) Photo (b) Dispersion ( c ) Rainbow

(12) Light consists of_____ waves:
(a) electromagnetic (b) Ultraviolet (c) Not

(13) When electron jumps back to orbits corresponding to lower energy it _____ energy.
(a) Emits (b) Radioate (c ) Not

(14) The frequency of photon is _____ to the energy difference.
(a) Proportional (b) Not proportional
(c) Reciprocal

(15) The velocity of electromagnetic waves is the same as the velocity of_____.
(a) Heat (b) Sound (c ) Light.

| ANSWER KEY | | | |
|---|---|---|---|
| 01 | | 02 | |
| 03 | | 04 | |
| 05 | | 06 | |
| 07 | | 08 | |
| 09 | | 10 | |
| 11 | | 12 | |
| 13 | | 14 | |
| 15 | | | |



## SHORT QUESTION AND ANSWERS

**Q1: Define nweton corpuscular theory of light.**

Ans. Newton in the middle of seventeenth century proposed that light consist. of minute perticles, called corpuscles which on emission from the source of light travel along straight line with great speed. THis is known as corpusscular theory.

**Q2: Define wave theory of light.**

Ans. In the later half of 19th century Huygen's theory got wide acceplance christain huygen by contrast, believed that light travelled as waves like ripples on water pond.

**Q3: Define quantum theory of light.**

Ans. In 1905, Max plank while studying heat radiated from a hot body, come to the conclusion that radiation was emitted in the form of tiny packets of of energy.

**Q4: What is dispersin?**

Ans. Th phenomenon of spreading out of light into its constituent colours is called dispersion of light.

**Q5: What is rainbow?**

Ans. the rainbow is a are of spectra colours formed across th sky cluring or after rainfall in the morning or evening. It is seen when th sun is at the back of the observer and the sun rays fall obliquely.

**Q6: What is spectrum?**

Ans. A bond of colour formed is called a spectrum.

## LONG QUESTIONS AND ANSWERS

**Q1: Describe the different theories of light according to its nature.**

Ans. Diffenent theories of light accoding to its nature:

**(1) Newton's corpuscular theory of light:**

newton in the middle of seventeeth century proposed that light consists of minute particles, called corpuscles which on emission from the source of light

travel along straight line with great speed. When these particles enter the eye, they create the senstion of sight on interacting with the retina of the eye. This is known as corpuscular theory. It explains the formation of shadows and propagation along straight forward manner. It also explains the phenomenon of reflection by arguing that reflection of light particles from a surface takes place in the same as the reflection of a rabber ball form a hard surface

**(2) Wave theory of lgiht:**

IN the later half of 19th century Huygen's theory got wide acceptance. Christian Huygen by contract, believed that light travelled as waves like ripples on water pond. It was known during those days that a medium was essential for the propagation of waves, therefore it was which enable the propagation of light waves through spacek.

Waves in different media propagate with different speed and different wave lengths bend chifferently. It was argued by Huygen that the waves of light were so tiny that there was no visible distortion in typical mirrors an lenses and in the formation of shadows. In this manner the wave theory of light explained the rectilinear propagation of light, formation of shadow.

**(3) Quantum theory:**

In 1905, Max plank while studying heat radiated from a hot body, came to the conclusion that radiation was emitted in the form of tiny packets of energy. This assumption was then used by Einstein to explain the experimental observaitn that when the light is shone on to a metal surface electrons are emitted from it. Einstein concluded that the physical nature of light was not that of a wave but of little packets of light energy "Proton".



**Q2: Describe dispersion of light with experimet?**

Ans. The fact that sunlight consists of different colours was first investigated by Newton with the help of the following experiment. A beam of sunlight was allowed to enter a dark room through a hole in the window. A Prism waves placed in the path of the beam of light. A band of various colours was produced on the wall. This band of colours is konwn as a solar spectrum and the phenomenon of speading out of light into its constituent colours is called dispersion of light.

**Q3: How is rainbow formed? Discuss.**

Ans: The rainbow is a are fo spectral colours formed across the sky during or after rainfall in the morning or evening. It is seen when the sun is at the back of the observer and the sun rays fall obliquely. The rain drops behave like prism and white light entering the raindrops is spilt up into colours refraction.

**Q4: Write a defail note on Green house effect.**

Ans: The major portion of energy which the earth receives from the sun is obsorbed by the atmosphere and surface of the earth giving rise to heating of gases of the atmosphere and the water of the surface. The earth then becomes warm and radiate energy mostly in the form of infrared waves of longer wavelength. Dust and gas moecules sealer some light back to space. The small amount of water vapou and carbondioxide in the atmosphere is transparent to visible light but opaque to infrared radiation. THe results in the trappin of heat energy in the lower past of the atmosphere. An analogous effect takes place in green houses where the glass of a gree house allows light to pass through and heat the enclosed ground. Since glass in relatively opaque to

infrared radiation, the heat is trapped in the green house. Sometimes the gree house effect is so great that we can fell it i.e. so wnter it is much warmer at night in the presence of thick cloud layess. If such layers dissipate and clear air moves in the temperature of the surrounding is sure to drop as the ground radiates its heat energy unhinndered into space. We know that due to atmospheric pollution the agone layer is being damaged day by day. As result the amount of rdiation penetrating the atmosphere is increasing which is accelerating the green house effect.

**Activities**

(1) What does the figure show? Discuss in detail

(2) Solve this activity teacher himself.