EXPERTS CREATIVE

SCIENCE

(Class Notes and Key for success JKBOSE/CBSE)

For Class 8TH

(W. M. Bhat)

A NOTE ON THE AUTHOR

Mr Wali Mohammad Bhat, is a highly acclaimed and prolific figure in the literary circles across the valley. His laurels and rich accomplishments bear testimony to the fact that he has enriched the different facets of life. This many sided genius is a state and national awardee and has a vast experience in the academic endeavors.

It is a matter of great pleasure for our institution that we are presenting his booklet for the aspiring readers across the valley. The booklet, strictly designed in accordance with the syllabus, has been unarguably his labour of love for the students who are terribly stuck in the quagmire of uncertainty in the form of the worst clampdown. The author has sprinkled this creative and painstaking effort with comprehensible and lucid scientific terminology and for the immense benefits of some slow learners the booklet is laden with colourful diagrammatic representations. We hope these illustrations will impart a cosmetic touch to the understanding of students and will go a long way in facilitating and promoting scientific culture among students.

We are grateful and indebted to the writer for writing this booklet and which will cater to the needs of our needy students. Wishing all the best to our readers!

With warm regards

Headmaster
Govt. High School,
Aglar-Shopian

A MESSAGE FROM THE AUTHOR

It has given me an overwhelming joy that I am coming up with one more booklet for our desired readers. With the outbreak of this virulent pandemic and its sudden foray into precious human lives, the sociopolitical and economic milieu of our country has changed. The world is witnessing a seismic turbulence with education sector being the worst hit. To meet the demands and growing concerns of our hapless readers this special booklet on my part will allow its readers to initiate themselves into the world of scientific culture. The empirical nature of science makes it increasingly essential to come up with some dynamism and innovation. I have been unceasingly diligent in my efforts to let it be more appealing and equally informative. The booklet has been filled with colorful illustrations so that students' senses are exercised and their understanding awakened. I owe this effort on my part to my well wishers more especially to K.A. Tantray and Zubair Yousuf Lone who have prompted me to do something special for the scourged sections of valley having least access to technological sophistications during this pestilence. I wish my readers a happy and joyful reading of this booklet and I hope they will make me proud in every aspect. I just hope they will go a long way in scripting new episodes of life.

Suggestions for improvement are always welcome.

Wishing you a great success

Sincerely yours.

W.M. Bhat
Master,
Govt. High School, Aglar-Shopian
Email ID: wmbhat@gmail.com

INDEX

Chapter No. 1

MICROORGANISMS

(Friend and Foe)

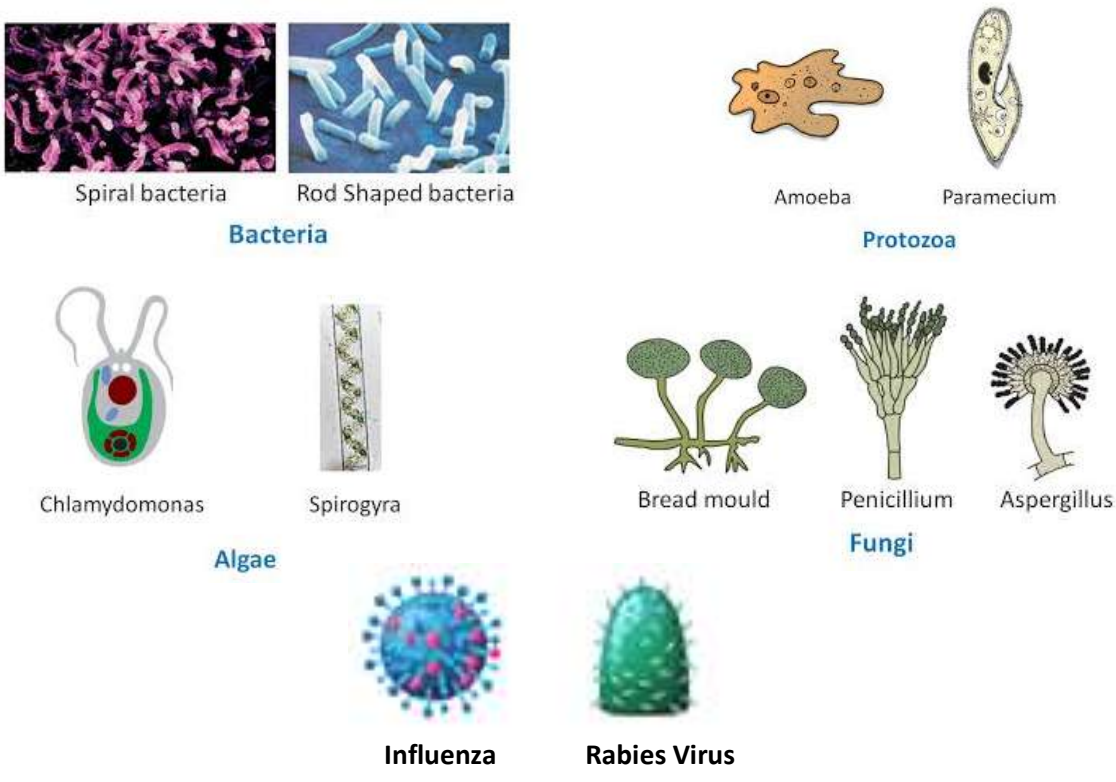
Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What are Microorganisms and what are their types?

Ans: **Microorganisms**:- The organisms which are small and cannot be seen with naked eye but can only be seen under a microscope are called Microorganisms. They exist in all types of habitats. Microorganisms may be either single celled like bacteria, protozoa etc or multi-cellular like algae, fungi.

Types/Groups of Microorganisms:- The various groups of Microorganisms are

(i) Bacteria (ii) Fungi (iii) Protozoa (iv) Algae (v) Virus



Q.2. What are beneficial aspects of bacteria?

Ans: **Usefulness or Beneficial aspects of Bacteria**:- Microorganisms play an important role in our lives. Some of them are beneficial in many ways as under

i. They are used in the production of antibiotics like penicillin etc.
ii. They are used in the production of Diary products like, Curd, Cheese etc.
iii. They are used in the production of bakery products like bread and cakes.

iv. They are used in the production of Alcoholic beverages like wines, beers etc.
v. They are used in the production of enzymes.
vi. They are used in the decomposition of organic matter.
vii. They are used in the tanning of leather.
viii. They are used in the production of organic acids.
ix. They are used in the production of food yeast.
x. They are also used in cleaning up the environment e.g. organic wastes like vegetable peels, remains of animals etc.

Q.3. What are harmful effects of Microorganisms?

Ans: **Harmful effects**:- Microorganisms are harmful in many ways

i. Some microorganisms called pathogens cause a large variety of diseases in plants, animals and human beings.
ii. Some microorganisms spoil food, clothing, leather etc.
iii. Microbes also cause water pollution i.e, death of aquatic life in water resources.

Q.4. Name some diseases caused by Microorganisms in humans.

Ans: The common diseases caused by microbes are

A. **Viruses**:- Common cold, Influenza, Rabies, Smallpox, Measles, Fever, AIDs, Mumps etc.

B. **Bacteria**:- Cholera, Tuberculosis, Typhoid, Pneumonia, Tetanus, Leprosy, Fever etc.

C. **Protozoa**:- Malaria, Amoebic dysentery, Sleeping sickness, Black fever etc.

D. **Fungi**:- Ringworm, Athlete's Foot, Skin Sore etc.

Q.5. Name some common plant diseases caused by Microorganisms.

Ans: Several microorganisms cause diseases in plants like Wheat, Rice, Potato, Sugarcane, Orange, Apple and others as under:

i. Black Rot of Cabbage → Bacteria
ii. Late Blight of Potato → Fungi
iii. White Rust of Mustard → Fungi
iv. Rice blast of Rice → Fungi
v. Rust of Wheat → Fungi
vi. Yellow Vein Mosaic of Bindi → Virus

Q.6. Define Food poisoning, Antibodies, Pathogens, Vaccine, Microscope.

Ans: **Food Poisoning**:- Food poisoning also called Food borne illness is an illness caused by eating contaminated food as a result of secretions or

toxic substance produced by some microorganisms in our food like bacteria, viruses and parasites.
The symptoms of Food poisoning are:
(i) Nausea (ii) Vomiting (iii) Watery or Bloody diarrohea
(iv) Abdominal pain and cramps (v) Fever

Antibodies:- Antibodies, also known as immunoglobulins are the Y shaped proteins produced by the immune system to help or stop intruders from harming the body. They find the invader/intruder/antigens in the body, stick to them and destroy them.

Pathogens:- The disease causing microorganisms are called as Pathogens or harmful bacteria e.g. bacteria like Salmonella, Listeria, E.Coli, Viruses, Fungi, Parasites.

Vaccine:- Vaccine is a substance used to stimulate the production of antibodies and provide immunity against certain diseases. They are prepared from weakened or killed forms of microbes or its toxins. Vaccines protect against many life threatening diseases like Measles, Polio, Tetanus, Meningitis, Influenza, Typhoid, Diphtheria, Cervical Cancer, Hepatitis etc.

Microscope:- Microscope is an optical instrument which enables us to see very small objects like microorganisms.

Q.7. What is Food preservation? Name different types of Food Preservation.

Ans: **Food Preservation**:- Food preservation is the process or treating and handling food to stop or slow down food spoilage, loss of quality, edibility or nutritional value and thus allow for longer food storage.

Methods of Food Preservation:- (i) Dehydration/Drying
(ii) Pickling i.e. Food preserved in vinegar. (iii) Smoking
(iv) Canning (v) Bottling (vi) Refrigeration
(vii) Sterilization (viii) Pasteurization (ix) Chemical preservation or chemical additives like Acetic acid, Lactic acid or benzoic acid.

Q.8. What is Nitrogen Fixation?

Ans: **Nitrogen Fixation**:- The process of conversion of atmospheric nitrogen into combined form i.e. Nitrates or Nitrites Ammonia through chemical and especially biological action of bacteria like Rhizobia.

The nitrogen gas of air can be fixed i.e. converted into nitrogen compounds by certain nitrogen fixing bacteria present in the soil e.g.

Rhizobium bacteria present in the nodules of leguminous plants like pea and beans, by blue green algae and by lightning.

Q.9. What is Nitrogen cycle? Or Explain briefly N_2 Cycle.

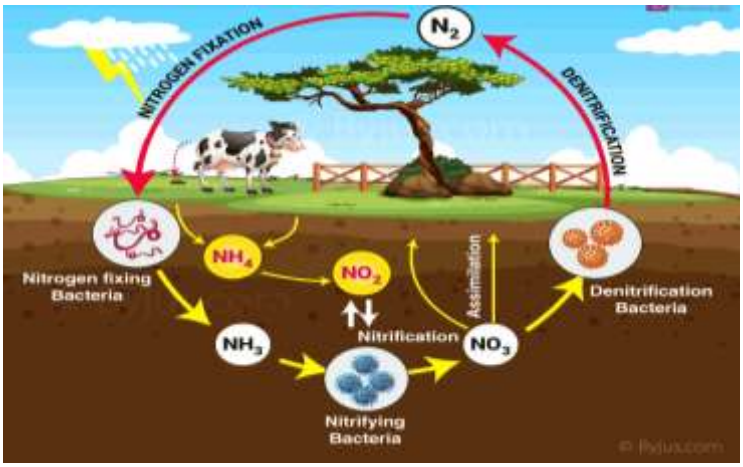
Ans: **Nitrogen Cycle**:- The atmosphere has 78% nitrogen. The nitrogen fixing bacteria present in air, soil and root nodules of leguminous plants, blue green algae and lightning in the sky fix i.e. convert free nitrogen gas of air into compounds of nitrogen which go into soil.

The plants in the soil convert the compounds of nitrogen into plant proteins and other organic compounds for their body development.

Animals feeding on plants convert plant proteins into animal proteins and other organic compounds to make up their body. On one hand after death and decay of plants, animals and other animal excretions get decomposed and converted in simple compounds of nitrogen by certain bacteria and fungi present in the soil. All the simple compounds of nitrogen formed in this way go back into soil.

On the other hand some compounds of nitrogen formed from decay of dead plants, animals and their excreta are decomposed by denitrifying bacteria present in the soil to form nitrogen gas which goes back freely into the atmosphere again.

Conclusion:- Thus the circulation of nitrogen element through living things (Plants and animals) and non-living things/environment (air, soil and water) is called nitrogen cycle in nature.



Q.10. What are carriers? Name two most common carriers and the diseases spread by them.

Ans: **Carrier**:- The insect or the animal which transmits disease causing microorganisms to human without itself suffering from them is called a carrier.

The two most common carriers of disease cause microorganisms or microbes are:

(i) Housefly (ii) Mosquito

Diseases spread by Houseflies:-

(i) Cholera (ii) Tuberculosis (TB)

(iii) Typhoid (iv) Diarrhea

Diseases spread by Mosquitoes:- (i) Malaria

Q.11. What are major groups of microorganisms?

Ans: Major groups of microorganisms:

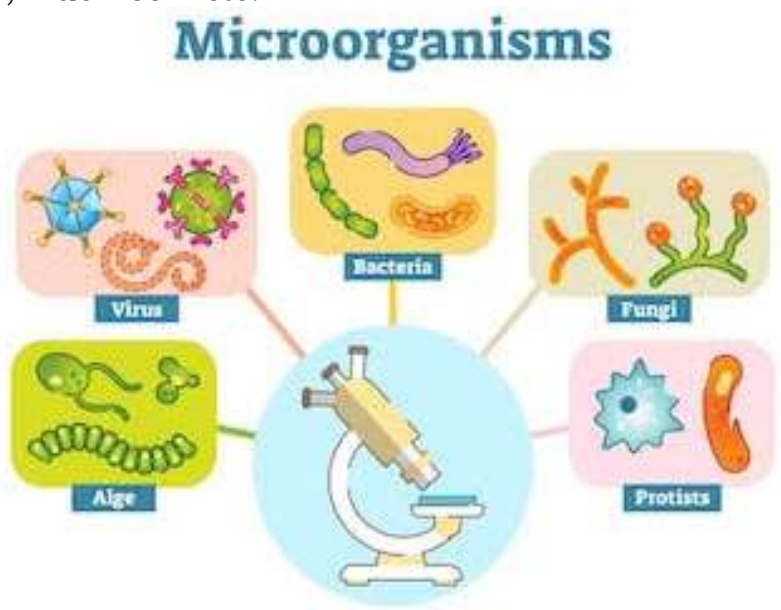
i. **Bacteria**:- Bacteria are very small single celled microorganisms which have cell walls but do not have an organized nucleus and other structures. e.g. Lactobacillus bacteria, Rhizobium bacteria. They are both autotrophic as well as heterotrophic in their mode of nutrition. They are omnipresent.

ii. **Viruses**:- Viruses are the smallest microorganisms which may be plant, animal or bacterium. They are much smaller than bacteria and do not show most of the characteristics of living things. They do not respire, feed, grow, excrete or move on their own but only reproduce if they enter a living body. e.g. C. Cold virus, HIV etc.

iii. **Protozoa**:- Protozoa are a group of single celled microorganisms which are classified as animals. They are found in ponds, lakes, dirty water drains, rivers, damp soil etc e.g. Amoeba, Paramecium, Entamoeba, Plasmodium etc.

iv. **Algae**:- Algae is a large group of simple plant like organisms. They contain chlorophyll and produce food by photosynthesis like plants but do not have roots, stems, leaves e.gh. chlamydomonas, Spirogyra, Blue green algae, Diatoms, Seaweeds. Some of the algae are unicellular but most of them are multi cellular.

v. **Fungi**:- Fungi are a group of plant like organisms which do not have chlorophyll. They are heterotrophic e.g. Yeast, Moulds, Pencellium, Mushroom etc.



TEXTUAL QUESTIONS

Q 1. Fill in the blanks:

Ans. (a) Microorganisms can be seen with the help of a **microscope.**

(b) Blue green algae fix **nitrogen** directly from air to enhance fertility of soil.

(c) Alcohol is produced with the help of **yeast.**

(d) Cholera is caused by **bacteria**

Q2. Tick the correct

Ans. (a) Yeast is used in the production of

(i) Sugar (ii) **Alcohol**

(iii) Hydrochloric acid (iv) Oxygen

(b) The following is an antibiotic

(i) Sodium bicarbonate (ii) **Streptomycin**

(iii) Alcohol (iv) Yeast

(c) Carrier of malaria-causing protozoan is

(i) **Female Anopheles mosquito** (ii) Cockroach

(iii) Housefly (iv) Butterfly

(d) The most common carrier of communicable diseases is

(i) Ant (ii) **Housefly**

(iii) Dragonfly (iv) Spider

(e) The bread or idli dough rises because of

(i) Heat (ii) Grinding

(iii) **Growth of yeast cells** (iv) Kneading

(f) The process of conversion of sugar into alcohol is called

(i) Nitrogen fixation (ii) Moulding

(iii) **Fermentation** (iv) Infection

Q3. Match the organisms in Column I with their action in Column II.

Ans.

	Column I		**Column II**
(i)	Bacteria	**(e)**	**Causing cholera**
(ii)	Rhizobium	**(a)**	**Fixing nitrogen**
(iii)	Lactobacillus	**(b)**	**Setting of curd**
(iv)	Yeast	**(c)**	**Baking of bread**
(v)	A protozoan	**(d)**	**Causing malaria**
(vi)	A virus	**(f)**	**Causing AIDS**

Q4. Can microorganisms be seen with the naked eye? If not, how can they be seen?

Ans. Micro-organisms are too small to be seen through naked eyes. They can be seen with the help of a magnifying glass or microscope.

Q5. What are the major groups of microorganisms?

Ans. Refer to Q.No.11 – Conceptual Questions

Q6. Name the microorganisms which can fix atmospheric nitrogen in the soil.

Ans. i. Rhizobium Bacterium ii. Blue-green algae

Q7. Write 10 lines on the usefulness of microorganisms in our lives.

Ans. Refer to Q.No.02 – Conceptual Questions

Q8. Write a short paragraph on the harms caused by microorganisms.

Ans. Refer to Q.No.03 – Conceptual Questions

Q.9. What are antibiotics? What precautions must be taken while taking antibiotics?

Ans. **Antibiotics**:- Antibiotics are drugs or chemicals derived from living matter or microorganisms used to kill or prevent the growth of other microorganisms e.g. Ampicillin, Penicillin, Chloramphenicol, Amoxicillin, Tetracycline, Terramycin etc.

Precautions to be taken while using antibiotics:

(i) Antibiotics should be taken under the supervision of a well-qualified doctor.

(ii) Course (intake) of antibiotics should be completed as per the prescription given by the doctor.

(iii) Antibiotics should be taken in the right amount and at the right time. A wrong dose of antibiotics makes the drug ineffective. Also, excessive consumption of drugs may kill the useful bacteria present in our body.

Important points to remember:

1. Father of Bacteriology:- Louis Pasteur
2. Alga used as Food:- Red Alga Porphyra
3. Antibiotics have no effect on virus:- Because they do not have metabolism of their own.
4. Size of smallest bacterium:- 0.2 - 0.3μm
5. Size of largest bacterium:- 15mm in length and 1.5μm in diameter.
6. Who discovered penicillin:- Alexander Fleming – 1929
7. Vaccine for small pox was invented by:- Edward Jenner in 1798.
8. Fermentation: The conversion of sugar into alcohol with the help of microorganism is called Fermentation.
9. Causative of Anthrax:- Bacillus anthracis
10. Discovery of Bacillus anthraces:- Robert Koch in 1876.
11. Discovery of Fermentation:- Louis Pasteur in 1857
12. Pasteurization:- Process of heating milk (upto 70^0C), followed by rapidly cooling.
13. Name two chemical preservatives:-
    (i) Sodium metabisulphite
    (ii) Sodium benzoate used to preserve foods → Jams, Jellies, Juices and squashes
    (iii) Citric Acid:- used to preserve confectionary sweets.

Chapter No. 2

COAL & PETROLEUM

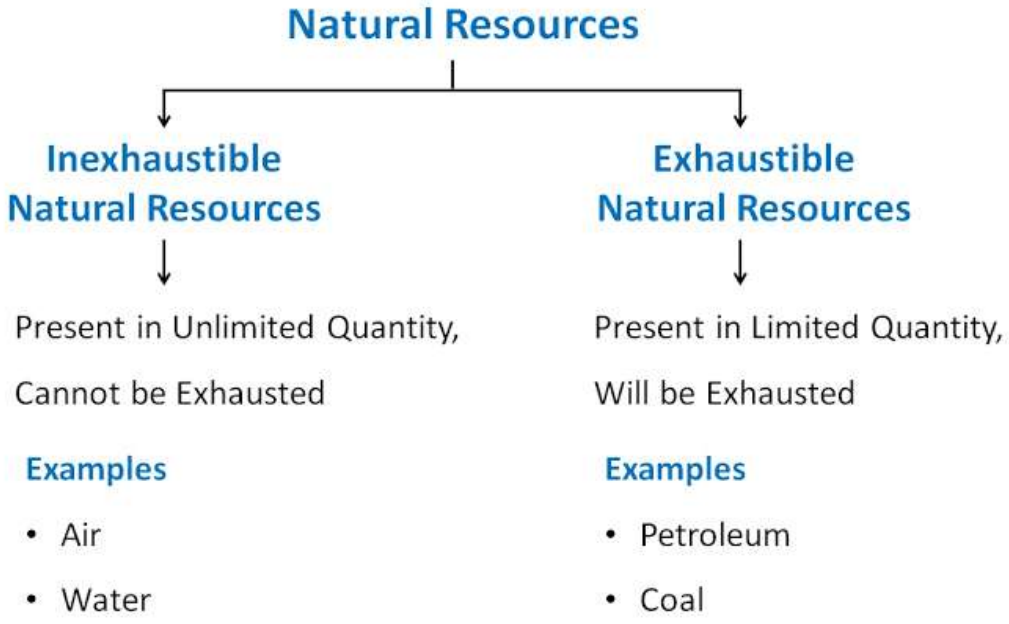
Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is a resource? Explain main groups of resources.

Ans: **Resource**:- Anything in the environment which can be used for the benefit of human beings directly or indirectly is called a resource. Resources may be manmade or natural. All the natural resources can be classified into two main groups as under:

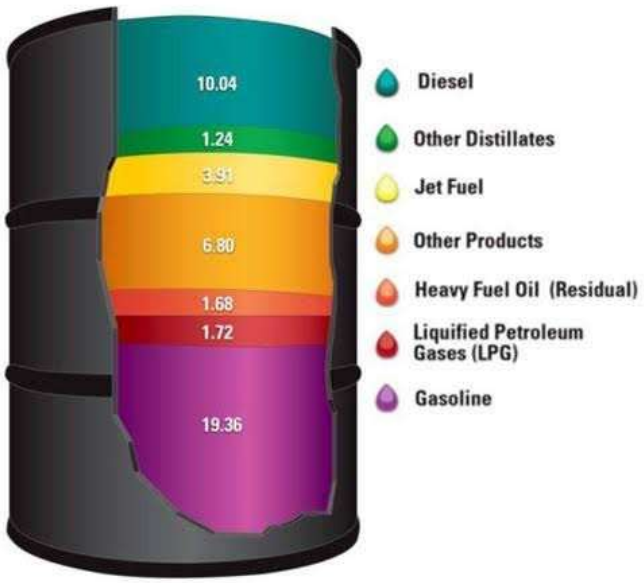
i. **Inexhaustible Natural Resources:-** The term inexhaustible means something "which cannot be used up completely". Those natural resources which are present in unlimited quantity in nature and are not likely to be exhausted by human activities are called inexhaustible natural resources e.g. Sunlight, Air, Water, Soil etc.

ii. **Exhaustible Natural Resources:-** The term exhaustible means something "Which are present in a limited quantity in nature and can be exhausted/finished by human activities" are called exhaustible natural resources e.g. Coal, Petroleum, Natural gas, Minerals, Forests, Wildlife etc.

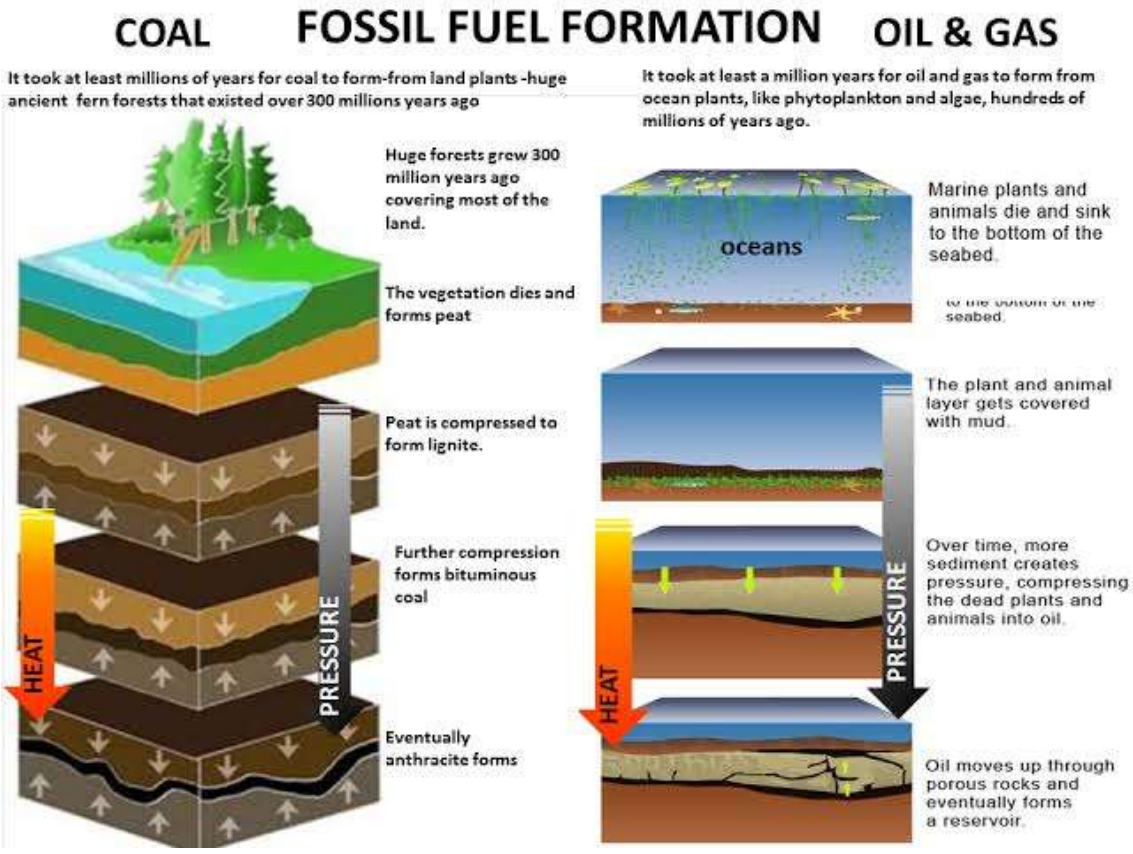


Q.2. What are Fossil fuels or Fossils? How are they formed?

Ans: **Fossil Fuels:-** The natural fuels formed from the remains of prehistoric plants or animals buried under the earth millions of years ago are called Fossil fuels or Fossils. e.g. Coal, Petroleum and Natural Gas.



Formation of Fossil Fuels:- Fossil fuels like Coal, Petroleum and Natural gas were formed from the dead remains of living organisms like plants and animals buried under the earth millions of years ago. When these living organisms died were gradually buried deep in the earth and got covered with sediments like mud and sand. In the absence of air, the chemical effects of heat, pressure and bacteria converted these remains of plants and animals into fossil fuels.



Q.3. What is Coal? How was coal formed? What are its uses?

Ans: **Coal:-** Coal is a hard, black, combustible mineral that mainly consists of Carbon. Coal is found in deep coal mines under the surface of the earth.

General Resources of Coal in India:- Coal is found in abundance in India more especially in Bihar, West Bengal, Orissa, M.P. and J&K.

Formation of coal:- Coal was formed by the decomposition of large land plants and trees buried under the earth about 300 million years ago. Due to natural processes like earthquakes, volcanoes and floods, the dense forests on the earth were buried under the surface of earth. Due to high pressure and high temperature inside the earth and in the absence of air, the wood of buried forest plants and trees were slowly converted into coal.

Carbonisation:- The slow process by which the dead plants buried deep under the earth have become coal is called carbonization.

Uses of coal:- Coal is mainly carbon. When heated in air, coal burns and produces mainly carbon dioxide with a large amount of heat energy.

The important uses of coal are

i. It is used as fuel in homes and industry.
ii. It is used as fuel at thermal power plants to produce electricity.
iii. It is used to make coal gas also used as industrial fuel.
iv. It is used to make coke.
v. Coal was used as a fuel to make steam to run steam engine of trains.
vi. It is also used as a source of organic chemicals.

Products of coal:- The various useful products obtained by processing the coal when heated strongly in closed retorts in the absence of air are Coal gas, coal tar and coke.

Q.4. What is coal gas and what are its uses?

Ans: **Coal Gas:-** The coal gas is a gaseous fuel which is obtained by the strong heating of coal in the absence of air during the processing of coal to get coke. It is mixture of methane and hydrogen with some carbon monoxide.

Uses:-

i. Coal gas is used in industries situated near the coal processing plants.

ii. Coal gas is used for lighting purposes (in street lighting)

Q.5. What is Coal Tar? What are its uses?

Ans: **Coal Tar:-** Coal tar is a thick, black liquid having an unpleasant smell which is obtained by heating coal in the absence of air. Coal tar is a mixture of 200 carbon/organic compounds. The most useful carbon compounds include benzene, toluene, naphthalene, anthracene, phenol and aniline. The various compounds present in coal tar are separated by fractional distillation.

Uses:-

i. Compounds or products obtained from coal tar are used as starting materials for manufacturing a large number of substances.

ii. The products obtained from coal tar are used to make synthetic dyes, perfumes, paints, varnishes, pesticides, photographic materials.

iii. Coal tar is used for medaling the roads.

Q.6. What is Coke? What are its uses?

Ans: **Coke:-** Coke is a tough and porous black solid substance prepared by heating coal in the absence of air. It is a pure form of carbon and is obtained as a black residue while processing/heating of coal.

Uses:-

i. Coke is used as a reducing agent in the extraction of metals like iron, zinc etc.

ii. Coke is also used in the manufacture of steel.

iii. It is also used as a fuel because it is smokeless.

iv. It is used in the manufacture of graphite.

v. It is used in the manufacture of calcium carbide for producing acetylene.

Q.7. What is petroleum? How was petroleum formed?

Ans: **Petroleum:-** Petroleum is a dark coloured, thick crude oil found deep below the ground in certain areas. It has an unpleasant order. The name petroleum means rock oil i.e. petra means rock and oleum means oil. Petroleum is a complex mixture of compounds called hydrocarbons.

Petroleum is a natural resource and is also called crude oil or mineral oil and is obtained from deep oil wells.

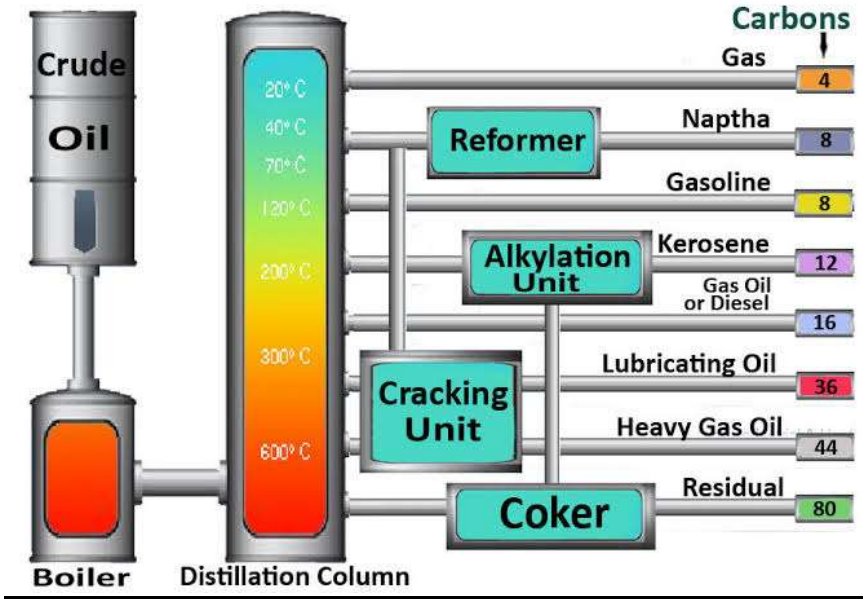
Sources of crude oil/petroleum in India:- Gujarat, Assam, Bombay High in Mumbai, Godavari and Kaveri basins.

Formation of petroleum: Petroleum was formed by the decomposition of the remains of tiny plants and animals buried under the sea million years ago. It is believed that the tiny plants and animals died and got covered with mud and sand under the sea. Due to high pressure, heat action of bacteria and in the absence of air, the dead remains of these plants and animals were slowly converted into petroleum. The petroleum thus formed got trapped between two layers of impervious rocks i.e. non porous rocks forming an oil deposit.

Q.8. What is refining of petroleum or simply refining?

Ans: **Refining:** The process of separating crude petroleum oil into more useful fractions or products is called refining.
The separation of petroleum into different fractions is done by the process of fractional distillation. In the process the fractions of petroleum having different boiling points are collected separately.

Products/Fractions of petroleum:- The various useful fractions obtained by the refining of petroleum are Petroleum gas, Petrol, Kerosene, Diesel, Lubricating oil. Paraffin wax and Bitumen.



Q.9. Uses of petroleum products:

i. **Petroleum gas:-** Petroleum gas used in the form of LPG is used as fuel in homes, hotels, restaurants and industries.

ii. **Petrol:-**
   a. It is used as a fuel in light motor vehicles.
   b. It is also used as a solvent for dry-cleaning.

iii. **Kerosene oil:-**
   a. It is used as a fuel in wick stoves and pressure stoves to cook food.
   b. It is also used in lanterns for lighting purposes.
   c. Special grade of Kerosene oil is used as aviation fuel in Jet aeroplanes.

iv. **Diesel:-**
   a. It is used as a fuel in heavy motor vehicles.
   b. It is also used as fuel in electric generators to produce electricity.
   c. It is also used to run water pumps for irrigation purposes.

v. **Lubricating oil:-** It is used for lubrication in machines and car engines.

vi. **Paraffin wax:-** It is used for making candles, Vaseline, ointments, wax paper and grease.

vii. **Bitumen:-**
   a. It is used for road surfacing.
   b. It is also used for water proofing the roofs of buildings.
   c. It is also used for black paints.

Q.10. What is Natural gas? What are the advantages of using CNG as fuel?

Ans: **Natural gas:-** Natural gas is a very important fossil fuel. It consists mainly of methane (95%) with small quantities of ethane and propane. Natural gas is formed under the earth by the decomposition of vegetable matter lying under water by bacteria in absence of air, just like coal and petroleum. When natural gas is compressed by applying pressure, it is called Compressed Natural Gas (CNG).

Advantages of CNG as fuel:-

i. It does not cause air pollution.
ii. It is a clean fuel because it does not produce any smoke on burning.
iii. It does not leave any solid residue on burning.

Sources of Natural gas in India:- Tripura, Rajasthan Maharashtra, Krishna-Godavari delta.

Uses of CNG:-

i. It is used as domestic fuel.
ii. It is used as fuel in thermal power to generate electricity.
iii. It is used as fuel in cars, buses.
iv. CNG is used as a source of hydrogen gas needed to manufacture fertilizers.
v. It is used as a starting material for manufacture of a number of chemicals called Photochemical.

Q.11. What are the advantages of using LPG as fuel?

Ans: **Advantages of LPG:-** LPG is considered to be a better fuel because of the following reasons.

i. LPG has a high calorific fuel (about 50 KJ/g)
ii. It burns with a smokeless flame i.e. it does cause pollution.
iii. It does produce any poisonous gas on burning.
iv. It is easy to handle and convenient to store.
v. It undergoes complete combustion.
vi. It is very neat and clean fuel.

Q.12. Explain why fossil fuels are exhaustible natural resources?

Ans: Fossil fuels are considered exhaustible natural resources because it took many hundred years to convert dead plants and animals into fossil fuels. Fossil fuel reserves are limited in quantity for the use of human activities.

Q.13. Name important industrial minerals available in J&K.

Ans:

i.	**Borax:-**	Pagga Valley in Ladakh
ii.	**Cement Stone:**	Wuyan (Kmr), Reasi & Basholi in Jammu
iii.	**China Clay:**	Chakhar Tikri, Jangalgali (Jmu)
iv.	**Gypsym:**	Ramban, Batote, Gool Gulab Garh, Baramula, Anantnag
v.	**Graphite:**	Karnah, Malogam (Kmr), Kishtwar (Jmu)
vi.	**Mica:**	Doda, Ramban & Reasi
vii.	**Sulphur:**	Anantnag, Khrew, Pagga Valley, Rajouri
viii.	**Marble:**	Dragmula, Zirhama, Thatri
ix.	**Asbestos:**	Kargil
x.	**Slate:**	Ramsu, Banihal, Ramban, Baramula

Q.14. What are petrochemicals? Name important petrochemicals.

Ans: **Petrochemicals:-** Those chemicals which are obtained from petroleum and natural gas are called petrochemicals e.g. Methyl alcohol, Ethyl alcohol, Formaldehyde, Acetone, Acetic acid, Ethylene, Benzene.

Uses: Petrochemical are very important and used to manufacture useful materials like Detergents, Polyester, Nylon, Acrylic, Plastics viz

Polyvinyl chloride (PVC), Synthetic rubber like rubber drugs, Dyes, Perfumes, Fertilizers, Insecticides and Explosives.

TEXTUAL QUESTIONS:

Q.1. What are the advantages of using CNG and LPG as fuels?
Ans. Refer to Q.No. 10 & 11 –Conceptual Questions

Q.2. Name the petroleum product used for surfacing of roads.
Ans. Bitumen, a petroleum product, is used for surfacing roads.

Q.3. Describe how coal is formed from dead vegetation. What is this process called?
Ans. Refer to Q.No. 03 –Conceptual Questions

Q.4. Fill in the banks.
Ans. (a) Fossil fuels are **coal**, **petroleum** and, **natural gas**.
(b) Process of separation of different constituents from petroleum is called **refining**.
(c) Least polluting fuel for vehicles is **compressed natural gas (CNG).**

Q5. Tick True/False against the following statements.
Ans. (a) Fossil fuels can be made in the laboratory. (F)
(b) CNG is more polluting fuel than petrol. (F)
(c) Coke is almost pure form of carbon. (T)
(d) Coal tar is a mixture of various substances. (T)
(e) Kerosene is not a fossil fuel. (F)

Q.6. Explain why fossil fuels are exhaustible natural resources.

Ans. Fossil fuels require millions of years to form from the dead vegetation and animals that get buried deep inside the Earth. They require high temperature and pressure for their formation, which cannot be provided in the laboratory. Thus, fossils are limited. Therefore, the use of fossil fuels at this rate will lead to their exhaustion.

Q.7. Describe characteristics and uses of coke.

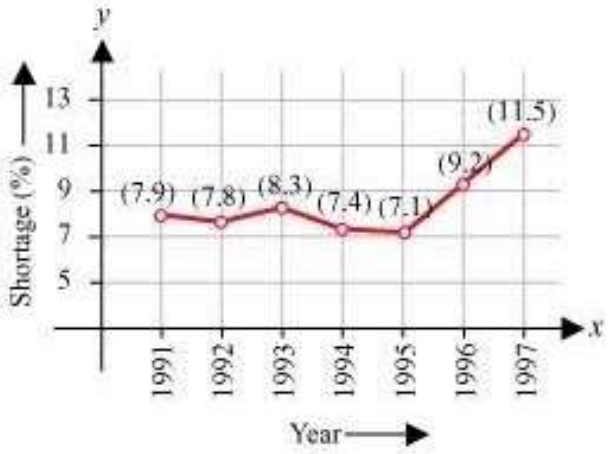
Ans. Refer to Q.No. 06 –Conceptual Questions

Q8. Explain the process of formation of petroleum.

Ans. Refer to Q.No. 07 –Conceptual Questions

Q9. The following Table shows the total power shortage in India from 1991–1997. Show the data in the form of a graph. Plot shortage percentage for the years on the Y-axis and the year on the X-axis.

S. No.	Year	Shortage (%)
1	1991	7.9
2	1992	7.8
3	1993	8.3
4	1994	7.4
5	1995	7.1
6	1996	9.2
7	1997	11.5



Q10. What are exhaustible natural resources?

Ans. Refer to Q.No. 01 –Conceptual Questions

Q11. What are inexhaustible natural resources?

Ans. Refer to Q.No. 01 –Conceptual Questions

Q12. Why natural gas is called a clean fuel?

Ans. Refer to Q.No. 10 –Conceptual Questions (Advantages of CNG)

Q13. What are the uses of coal?

Ans. Refer to Q.No. 03 –Conceptual Questions

Important points to remember:

1. Petroleum is also called – Black gold.
2. **PCRA:** Petroleum Conservation Research Association
3. **Tips for Minimising the wastage of Petrol & Diesel.**
   i. Drive the vehicle at constant speed.
   ii. Switch off the vehicles engine at jams & traffic lights.
   iii. Ensure correct air pressure in the tyres of vehicle.
   iv. Ensure regular maintenance of the vehicle including engine.
4. **Petrol Refinery:** The plant where petroleum is processed to separate its constituents.
5. **First time use of coal gas:** For street lighting in London in 1810, New York in 1820
6. **World's first oil well:** Pennsylvania USA in 1859.
7. **To Save Petrol & Diesel:** Coal and petroleum resources are limited. So we should use them judiciously.
8. **Biggest coal producing state:** Bihar
9. **Highest Calorific Value:** Hydrogen i.e. 150 KJ/gram
10. **Calorific Value of Fuel:** The amount of heat evolved in Kilo Joules when one gram of fuel is burnt completely is called calorific value. Calorific value of Hydrogen > CNG > LPG > Kerosene, Petrol, Diesel > Coal
11. **Destructive distillation:** Heating of coal to a high temperature i,e. above 1000^0C in absence of air.

Chapter No. 3

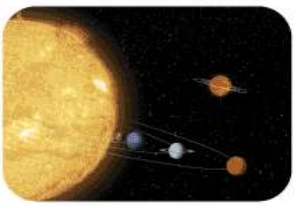
STARS AND THE SOLAR SYSTEM

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What are Heavenly Bodies/Celestial Bodies?

Ans: **Celestial Bodies**:- The objects which exist in the sky or in outer space e.g. the stars including Sun, the planets including the earth, satellites including moon, asteroids, comets and meteoroids are called celestial bodies or heavenly bodies.

(1) Stars



(2) Planets

(3) Satellites

(4) Comets

(5) Asteroids

(6) Meteors and meteorites

(7) Galaxies

Note:- We can see some shining pearl like structures twinkling in the sky on a clear and cloudless night. We can also see some bright objects not twinkling called as planets. They revolve round the sun like our earth. Moreover moon is also visible in the sky at night.

Q.2. What is universe? Define Astronomy.

Ans: **Universe:-** The vast and limitless space around our earth with all its heavenly bodies is called universe.

Astronomy:- The science that deals with the study of the universe is called Astronomy and the scientists who study the universe are known as Astronomers.

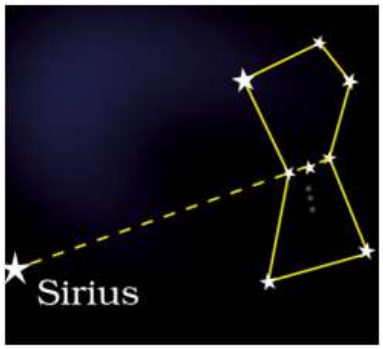
Q.3. Define briefly stars.

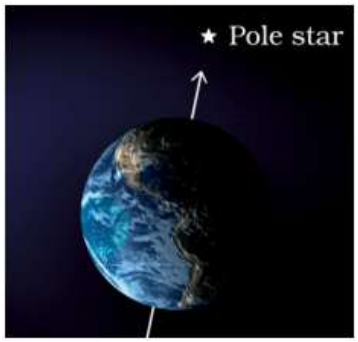
Ans: **Stars:-** Stars are very big heavenly bodies (like Sun) that are extremely hot and have light of their own. They consists of very large quantities

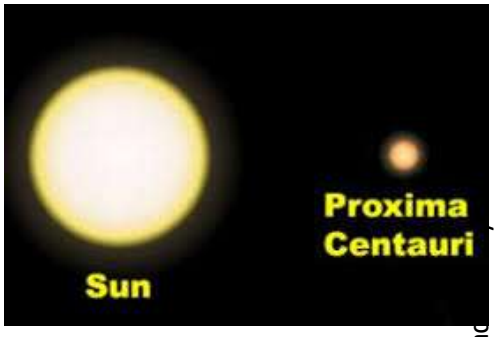
of gases mostly hydrogen and helium. The light radiated by them makes them visible and shine. Stars are much larger than earth and some are even larger than Sun but appear small and dim because they are very very far away from us.

Our sun is also a star and is nearest to our earth. The sun looks much bigger and brighter because of its closeness to the earth. However the brightest star in the sky is SIRUS. The star nearest to earth after sun is Proxima Centauri.

All stars except Pole star appear to move in the sky around the earth from East to West.







Q.4. Why are stars not visible during daytime?

Ans: **Reason:** During daytime, the light from the Sun is so bright and strong that it suppresses the light coming from other stars and hence, they are not visible to us.

Q.5. Why do stars emit light? Or How do the stars emit light?

Ans: **Reason:** All stars, including the Sun are giant balls of hydrogen gas. The core of stars has very high temperature I,e. about 02 million to 05 million degree Celsius. At such a high temperature the hydrogen gas atoms fuses, joins and melts to form a heavier gas called as Helium, with the liberation of heat and light energy. That is why stars emit light.

Q.6. More information about size and distances of Sun from Earth.

Ans: **Distance:** Sun → 150 million Kms from Earth (15 crore Km)
Diameter of Sun: 1400,000 Kms (Aprox.) [109 times the diameter of Earth]
Mass of Sun: 300,000 times heavier than Earth
Speed of light emitted by Sun: $3x10^5$ i.e, 300000 Kms/Sec
Time of light to reach earth: 8.3 minutes = 8.3 light minutes.

Q.7. Define light year and light minute.

Ans: **Light Year:** The distance travelled by the light at a speed of 03 lac Kms/Sec in one year (365 days) is called light year. Thus

01 light year = 365 days x Speed of light/Sec
=365 x 24 x 60 x 60 = 9460,000,000,000 Km
=9.46 x 10^{12} Km

Light Minute:- The distance travelled by the light at a speed 03 lac Kms/Sec in one minute is called a light minute. Thus

01 light minute = 300000 Kms x 60 Sec = 18000,000 Km
= 18 x 10^{6} Kms

Q.8. How far is Sun, Proxima centauri and Sirius (stars) from the earth in Kms.

Ans: **Sun =** 8.3 light minutes = 8.3 x 18 x 10^{6} Kms = 149400000 Kms = 14.94 x 10^{7} Kms.

Proxima Centauri = 4.3 light years.
= 9.46 x 10^{12} x 4.3 = 40.678 x 10^{12} Kms

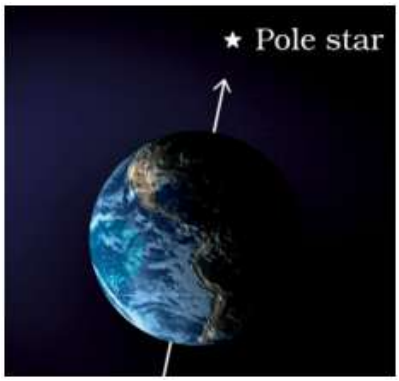
Sirius: = 8.7 light years
= 82.302 x 10^{12} Kms

Q.9. Why do the stars appear to move from east to west?

Ans: **Reason:** All stars except Pole star appear to move in the sky around the earth from east to west (because the earth rotates itself about north south axis from west to east) due to relative motion. i.e. the earth which moves from west to east, makes us feel as if stars were moving from east to west.

Q.10. Why does the Pole star (Polaris or Dhruva Tara) not change its position in the sky?

Ans: **Reason:** The Pole star is situated in the direction which is directly above the geographic north pole of the earth's axis. Thus its position relative to earth does not change and hence it appears stationary.



Q.11. What are constellations OR Nakshatras? Name some important constellations.

Ans: **Constellations:** Constellation or Nakshatras means a group of stars whose outline forms a recognizable figure or shape or pattern. All the stars of a constellation always remain together. About 88 constellations are known at present. Each constellation has been

given a name of the object to which it closely resembles. Following are some important constellations.

i. **Ursa Major (SAPT Reshi):** Ursa Major constellation consists of 07 bright stars arranged in the form of a dipper resembling somewhat a big bear. It is also called Great bear/Big bear or Sapt Reshi in hindi. This constellation can be clearly seen in the month of April in the northern parts of sky in the early part of night.

ii. **Ursa Minor (Laghu Sapt Rishi):** Ursa Minor constellation also consists of 07 stars arranged very close in the form of an outline of a ladle or kite resembling a little bear. It is also called a little bear or Dhruva tara in hindi or Laghee Sapt Reshi because at the tail of this constellation is a star of average brightness called Pole Star or Polaris or Dhruva Tara. This constellation can be clearly seen in the month of July in the northern sky.

iii. **Orion or (Hunter or Mriga or Vyadha):** The Orion or Hunter constellation of 07 or 08 bright stars arranged in the form of an outline of the body resembling a hunter. In Orion constellation (From great Orion name of a legendary hunter) also called as Vyadha, 03 upper stars are supposed to form the head and shoulders, lower 02 stars form the feet and 03 stars in the middle to form the belt of a hunter. This kind of constellation can be seen in the sky during winter.

Q.12. What is Moon? What are the phases of moon?

Ans: **Moon:** The moon is a natural satellite of the earth. Its surface is rough and made of very large creators and very high mountains. It has no air and no water and hence has no life on it. The moon revolves around the earth on a definite regular path – the moon's orbit. The gravitational pull of earth is 06 times that of moon, hence the earth

pull holds the moon in its orbit. The moon completes one revolution around the earth in 27.3 days.

Phases of the moon: The moon is non luminous body. It only shines when the light of the sun falls on its surface. The moon can only be seen when the light reflected from it reaches to the earth. Only that part of moon which reflects the sunlight towards the earth is visible to us.
Each day the shape of moon is different.

On observing the moon continuously every night for a month, it is found that there is one day when moon cannot be seen in the night. This day is known as New Moon day or Amavasya (very dark night). On this day, the moon lies between the Sun and the earth. Thus the reflected light from the moon does not reach the earth, hence it is not visible.

On the next day, only a small curve like moon called the Crescent Moon appears in the night sky. The crescent goes on increasing every day till on the 15th day, the full bright face of the moon is visible. This day is called as Full Moon Day or Purnima. On this day the earth is between the Sun and the Moon. This gradual increase in the bright disc of the moon is called WAXING of the moon.

After full moon the bright face of moon goes on decreasing every night. This gradual decrease in the bright disc of moon is called WANING of the moon. This waxing and waning of the disc of the moon is called as Phases of Moon.

Q.13. What are Satellites? What are their types?

Ans: **Satellites:** A celestial or a heavenly body which revolves around a planet is called a satellite. e.g. Moon revolves round the planet Earth.
Out of eight planets of the solar system except Mercury and Venus, all 06 planets have one or more satellites. These satellites revolve around the planets due their gravitational pull.

Kinds of satellites:

i. Natural satellites, like Moon
ii. Artificial or Manmade satellites:
   a. SPUTNIK made by Russia on 04-10-1957 sent into space
   b. ARYABHATTA made by India on 19-04-1975 weighing 360Kg revolves round the earth 16 times in a day. BHASKARA, APPLE, ROHINI, INSAT & IRS etc.

Q.14. Define Asteroids, Comets, Meteors, Meteorites.

Ans: **Asteroids:** The small heavenly bodies or small rocky bodies which round the sun in the wide space of orbits of the planets Mars & Jupiter in the solar system called Asteroids or Minor planets.
The Asteroids are composed of rocks and iron and are much smaller than a planet. More than 3000 asteroids have been detected till date. The first asteroid was discovered by an Italian Scientist G. Piazzi in 1801. It is the largest asteroid with diameter.

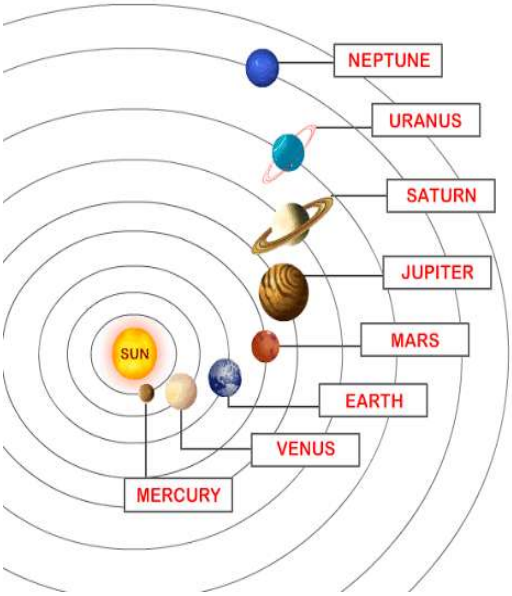
Comets: Comets are very small celestial objects made of gas and dust which revolve around the sun in highly elliptical orbits and become visible only when they come close to sun. A comet appears as a bright ball of light in the sky with a long glowing tail pointing away from the sun. Comets are also members of solar system.
A comet named Halley 's Comet appears after every 76 years and was last seen in 1986.
Another comet named Temple Tuttel was seen on 17-11-1998 which appears after every 32-33 years.

Meteors: The bright star like objects which appear suddenly in the sky and then for a few moments glow with a brilliant white flash of light i.e, streak of light falling towards the earth and finally disappear are called Meteors.
They are commonly known as shooting star or falling star.
Most of meteors are small and burn up completely on entering the earth's atmosphere and fall on the earth in the form of dust.

Meteorite: Sometimes a meteor is too big and does not burn up completely on entering the earth's atmosphere and a piece of it lands on the earth unburnt.
This unburnt piece or simply a piece of unburnt meteor, which reaches the surface of the earth is called a meteorite.

Q.15. What is a Solar System? Explain Solar System.

Ans: **Solar System:** Solar means the Sun. Thus solar system means Sun and its family of objects which revolve around it. In other words, the solar system consists of the Sun, the eight planets – their satellites or moons and millions of smaller celestial objects such as asteroids, comets and meteorites. The Sun is at the centre of the solar system and all other objects are revolving around it in fixed elliptical paths called orbits.



The eight planets of the solar system in order of their increasing distances from the Sun are as under:

i.	Mercury	ii.	Venus	iii.	Earth
iv.	Mars	v.	Jupiter	vi.	Saturn
vii.	Uranus	viii.	Neptune		

However, all these planets except Mercury & Venus have natural satellites or moons around them.

Q.15. What are planets?

Ans: **PLANETS:** The word "planet" is from Greek word "Planete" meaning wonderer. A planet is a heavenly body which revolves around a star like Sun along a definite circular or elliptical path called orbit. Moreover each planet rotates around its own axis also. The planets have no light of their own but shine because of reflection of light of Sun.
The eight planets of the solar system in order of their increasing distances from the Sun are:

i. Mercury ii. Venus
iii. Earth iv. Mars
v. Jupiter vi. Saturn
vii. Uranus viii. Neptune

However all these planets except Mercury & Venus have natural satellites or moons around them

i. **MERCURY (BUDH):** Mercury is the first and the closest planet next to the Sun. It is the smallest planet of our solar system. It has no moon and is very hot during the day. It has no life on it and appears like a bright star in the sky and is commonly called Morning or Evening Star. Its surface has many holes called creaters.

ii. **VENUS:** Venus is the second planet from the Sun and is the closest planet to the Earth. It has no moon and is very hot planet even hotter than Mercury. It has very high percentage of cloudy atmosphere of Co_2. No life is possible on Venus. Venus is the brightest planet except the Moon because it shines all heavenly bodies. Venus differs from al other planets as it rotates from east to west about its axis, where as all other planets rotate from west to east, about their axis.

iii. **EARTH (PRITHVI):** Earth is the third planet from the Sun. The earth appears to be a blue and green ball due to reflection of sunlight from water and land on its surface. Earth our home is the only planet known to have an atmosphere containing free oxygen, Co_2, 71% of water and 29% of earth on its surface. Earth is the densest planet in the solar system and the largest and most massive of the four rocky planets. The earth is the only planet in the solar system on which life exists on account of correct distance from the Sun, correct temperature and the presence of air, water and soil.

The earth rotates or spins on its axis and also revolves or moves around the sun in an elliptical orbit. The earth takes one year i.e, 365 ¼ days to complete one revolution around the sun. The earth completes one rotation about its own axis in 24 hours. The earth rotates on its axis and revolves around the sun in the tilled position throughout which causes different seasons on the earth.

The earth has only one natural satellite called Moon.

iv. **MARS:** Mars is the 4^{th} planet from the Sun in our solar system. It appears red because of iron oxide dust covers its surface. It is also called Red Planet. It has very thin layer of atmosphere as compared to Earth. It has two moons namely Phobos and Deimos. The life is not possible on Mars because of thin layer of atmosphere, no oxygen, insufficient amount of water and very cold conditions.

v. **JUPITER (GURU):** Jupiter is the largest planet of our solar system. Because of its thick atmosphere of hydrogen, which reflects most of the sunlight falling on it, it is the brightest of all planets in the sky after Venus. It is composed of hydrogen and helium. It has about 63 known moons. It has also two faint rings around its equatorial plane. Very low temperature and very high gravitational pull does not support life on this planet.

vi. **SATURN (SHANI):** Saturn is the sixth planet from the Sun in our solar system and similar in composition to Jupiter. The special feature of Saturn is that, it is surrounded by three flat rings composed of chunks of ice of many kilometers thick. It has 48 moons of which Titan is the largest moon in the solar system. Life is not possible on Saturn because of extremely low temperature.

vii. **URANUS:** Uranus is the seventh and third largest planet of our solar system. Its atmosphere is made up of hydrogen and methane only. It is a cold gas giant believed to consist of a mixture of gas and ice around a solid core. Life is not possible on this planet because of extremely low temperature. This planet was discovered by an English astronomer William Herschel in 1781, with the help of a telescope. So far 21 satellites or moons have been discovered around it.

viii. **NEPTUNE:** It is the eighth planet in the order of distance from the Sun. This planet was discovered by Urbane Jean Joseph Liverier, a French astronomer in 1846. Its atmosphere is found to contain hydrogen and methane. So far 21 moons have been discovered around it. No life is possible on this planet because of extremely low temperature. Neptune has four unstable rings and most of its surface is covered with ice. The Neptune planet can be seen as a tiny blue green speck even by using the most powerful telescope on the earth.

Q.16. Differentiate between Star and Planet.

Star	Planet
A star has its own light. That is why stars twinkle at night.	A planet does not have its own light. A planet does not twinkle.
A star is a ball of gases.	A planet is made of rocks and metals.
Stars produce their own energy due to the fusion of hydrogen.	Planets do not produce their own energy. They have to depend on Sun's energy.
Stars appear to move from east to west in the sky.	Planets appear to rotate from the west to east except Venus in the sky.
Stars have enormous mass.	Planets have insignificant mass compared to the stars.

Q.17. Differentiate between Galaxy and Constellation.

Galaxy	Constellation
A galaxy is a cluster of billions of stars.	Constellation is a cluster of limited stars.
Shape of a galaxy does not resemble a recognizable shape or pattern	Shape of constellation resembles a recognizable shape or pattern of an animal or object.
There are billions of galaxies in the sky.	There are only 88 constellation known in the sky.

Q.18. Differentiate between Planet and Satellite.

Planet	Satellite
Planet is heavenly body which revolves around the sun and rotates at its axis.	Satellite is a heavenly body which revolves around its planet and rotates on its own axis.
It has a bigger size.	It has a smaller size.

TEXTUAL QUESTIONS:

Q1. Fill in the blanks by choosing correct words from the following list:
(Meteorite, Pluto, moon, planets, universe, core, comet, constellation)

(i) The branch of science which deals with the study of **Universe** is called astronomy.
(ii) The unburnt part of the meteor which reaches the earth is called **Meteorite**.
(iii) The heavenly bodies which revolves around the sun are called **Planets**.
(iv) The heavenly bodies which revolves around the planets are called **Moons**.
(v) The orbit of **Pluto** is not in the same plane as that of the other planets.
(vi) A heavenly body with long tail, moving around the sun in an elliptical path is called **Comet**.
(vii) In the **Core** of the sun, hydrogen gas fuses with the liberation of the energy.
(viii) A group of stars which resembles an animal or some other known object is called **Constellation**.

Q2. Statements given below are incorrect. Write correct statements.
(i) Halley's comet visits our solar system after 26 years.
Ans. Halley's comet visits our solar system after 76 years

(ii) Helium gas contains most of the atmosphere of the sun and the stars.

Ans. Helium gas constitutes most hydrogen gas.

(iii) Pole Star is nearest to our solar system.

Ans. Pole Star is a part of constellation.

(iv) Astronomers have divided the sky into 68 constellations.

Ans. Astronomers have divided the sky into 88 constellations.

(v) Meteors on burning leave behind gold, dust and light.

Ans. Meteors after burning disappear.

(vi) The orbit of Neptune is different from the orbits of the other planets in the solar system.

Ans. The orbit of Pluto is different from the orbits of the other planets in the solar system.

(vii) Mars is the second planet nearest to the sun.

Ans. Venus is the second planet nearest to the sun.

(viii) Moon revolves around the earth in 21 ½ days.

Ans. Moon revolves around the earth in 27 $\frac{1}{3}$ days.

Q3. Answer the following questions:

(i) What is universe? Name six different kinds of heavenly bodies found in the universe.

Ans. The universe is the vast unimaginable space composing many heavenly bodies such as, planets, stars, sun,constellations, comets, meteors etc.

(ii) With reference to the average distance of the sun, state:

(a) The serial number of the planet earth.

Ans. The serial number of planet earth is 3.

(b) The average distance of the earth from the sun.

Ans. The average distance of the earth from the sun is 149.6.

(c) The time in which sunlight reaches the earth.

Ans. Sunlight takes 8 minutes to reach the earth.

(iii) (a) Name the natural satellite of the earth.

Ans. Moon is the natural satellite of the earth.

(b) In how many days does the satellite complete one revolution around the earth.

Ans. Moon is the satellite of the earth. It completes one revolution in 27 $\frac{1}{3}$ days.

(c) In how many days does the satellite rotate around its own axis.

Ans. Moon takes 27 days to rotate on its own axis.

(d) How does the gravity of this satellite compare with the earth.

Ans. The gravitational pull of moon is one-sixth that of the earth.

(e) State the maximum temperature on the day side and minimum temperature on the night side of this satellite.

Ans. On the day side of the moon, the temperature as high as 110^0C and on night side of the moon the temperature could be as low as -150^0C.

(iv) What do you understand by the following terms?

(a) New moon

Ans. After the completion of one revolution around the earth the moon comes in between the sun and the earth and is not visible at that time. Hence we see darkness, and this is called the new moon day. It is formed before the crescent.

(b) Full moon.

Ans. When the earth comes in between the moon and the sun, the moon appears to be full with bright light, this is called full moon day. It appears on the fifteenth day from the new moon day.

(v) (a) Define solar system.

Ans. Refer to Q.No.15 – Conceptual Questions

(b) Name all the planets in the solar system in the order of their distance from the sun.

Ans. Following are the names of the planets as per their distance from the sun:

1. Mercury 2. Venus 3. Earth 4. Mars 5. Jupiter 6. Saturn 7. Uranus 8. Neptune

Earlier Pluto was the ninth planet, which is now said to be vanished from the solar system.

(vi) (a) How many moons mars have?

Ans. Mars have 2 moons.

(b) Write the names of these moons.

Ans. Photos and Deimos are the two moons of the Mars.

(vii) What is comet? Why does a comet develop a tail while approaching the sun?

Ans. The bright 'Star like' object with a long tail approaching the sun in a highly elliptical orbit is called Comet. It is a small icy celestial body. The nucleus of comet consists of solid frozen ice, gas and dust. When the comet approaches the sun, the particles within the nucleus get deflected due to heat radiations of the sun and it increases when it reaches close to the sun giving rise to a tail like structure.

(viii) What is star? What makes the star give about vast amount of energy?

Ans. A star is a giant ball of hydrogen gas with a bright light and heat. Due to the fusion of hydrogen gas, a heavier gas, i.e., Helium, is formed which lubricates a huge amount of heat and energy. So this is due to the fusion of hydrogen gas that the star gives about a vast amount of energy.

(ix) (a) How are meteors different from stars?

Ans. Differences between meteors and stars are as under:

Meteors	Star
Consists of rock metals and dust.	Consists of hydrogen and helium
Produces heat and light energy due to the earth atmosphere.	Produces heat and light energy due to fusion of hydrogen
Meteors are very small pieces of rocks.	Stars are extremely big.
Meteors last for few seconds.	Stars last for billions of years.

(b) How are meteors different from meteorites?

Ans. Meteors are shooting stars that produce heat and light energy due to the friction of earth's atmosphere. The unburnt piece of a meteor, which reaches the surface of earth is called meteorite. Its size is from size of small pebbles to several tons of rock and metal.

INTEXT QUESTIONS: (Test yourself Page No. 190)

Q1. What are celestial bodies? Name any three celestial bodies.

Ans. Refer to Q.No. 01 – Conceptual Questions.

Q2. Why do you classify the sun as star?

Ans. Stars emit heat and light due to the fusion of hydrogen. Sun also emits a huge amount of light and energy due to the fusion of hydrogen and the formation of helium gas. Hence sun is called a star.

Q3. Why do the stars appear like point objects?

Ans. The stars appear like point objects because they are very far away from us i.e., earth, on which we live. It is only the sun which appears bigger to us because it is nearest to earth.

Q4. What is a constellation? How does a constellation differ from a star?

Ans. A group of stars which forms a recognizable pattern or shape is called a constellation. A star is a giant ball of hot gases like hydrogen or helium, while as constellation is a group of stars.

Q5. Name a star which appears stationary from the earth. In which constellation is it situated?

Ans. Pole star appears stationary from the earth. It is situated in Ursa Minor constellation.

Q6. What is "a light minute"? How many light minutes is the earthy from the sun? Express this distance in kilometres.

Ans. The distance travelled by the light at a speed of 300,000km/s in one minute (60 seconds) is called a light minute.

1 light minute = 300,000 km/s x 1 minute
= 300,000 km/s x 60s
= 1800000 km = 18 x 10^6 km

Q7. How much time is involved from one new moon to another new moon as seen from the surface of the earth?

Ans. 29 ½ days of time is involved from one new moon to another new moon.

Q8. In how much time does the moon complete one rotation about its own axis?

Ans. Moon completes one rotation about its own axis in $27\frac{1}{3}$.

INTEXT QUESTIONS: (Test yourself Page No. 197)

Q1. What is a planet? How many planets revolve around the sun?

Ans. A solid heavenly body which revolves around the sun in well-defined orbit is called Planet. Recent studies say that there are eight planets revolving around the sun.

Q2. Name the planet which:

(i). Is nearest to the sun?

Ans. Mercury is nearest to the sun.

(ii). Is Farthest from the sun?

Ans. Neptune is the farthest planet from the sun.

(iii). Supports life?

Ans. Earth supports life.

Q3. Name the planets which:

(i). Revolves around the sun from east to west?

Ans. Venus and Uranus are the planets which revolves around the sun from east to west.

(ii). Intersects the orbit of another planet?

Ans. Pluto intersects the orbit of Neptune, however Pluto is no longer classified as a planet.

Q4. Name one planet that was predicted before its discovery?

Ans. Pluto was predicted as a planet before its discovery.

Q5. Name the planet having:

(i). Largest number of moons?

Ans. Jupiter has the largest number of moons. It has 63 moons or satellites.

(ii). A system of number of rings?

Ans. Saturn has a system of number of rings.

Q6. What is the solar system? Name all the planets of solar system in the increasing order of distance from the sun?

Ans. Refer to Q.No. 14 – Conceptual Questions.

Important points to remember:

1. **1st person to land on Moon**: Neil Armstrong on 21-07-1969.
2. **Time taken by Moon to revolve about its own axis**: $27\frac{1}{3}$ days.
3. **Gravitational pull of the Moon** = 1/6th of the earth.
4. **Maximum temperature of the day side on the moon** = 110^0C.
5. **Minimum temperature of night side of the moon** = -150^0C.
6. **Agency in India for the development of Space Science**: ISRO
7. **Hottest Planet**: Venus
8. **Smallest Planet**: Mercury
9. **Biggest Planet**: Jupiter
10. **Time taken by Mercury for one revolution around Sun**: 88 days.
11. **Time taken by Venus for one revolution around Sun**: 225 days.
12. **Time taken by Earth for one revolution around Sun**: 365 ¼ days.
13. **Time taken by Mars for one revolution around Sun**: 687 days.
14. **Time taken by Jupiter for one revolution around Sun**: 11 ¾ years.
15. **Time taken by Saturn for one revolution around Sun**: 29 ½ years.
16. **Time taken by Uranus for one revolution around Sun**: 84 years.
17. **Time taken by Neptune for one revolution around Sun**: 165 years.
18. **No. of stars to be viewed by naked eye**: 3000 stars.
19. **Unit of Measuring the distance of stars from the earth**: Light years
20. **Diameter of Earth**: 12800 Kms.
21. **Circumference of Earth**: 40000 Kms
22. **Mass of earth**: 5.98 x 10^{24}Kg.

Chapter No. 4

CONSERVATION OF PLANTS & ANIMALS

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What do you mean by conservation of plants and animals?

Ans: The term conservation means the process of keeping and protecting something from damage. So the conservation of plants and animals means that they must be conserved/protected in their natural habitat in which they are found.

Q.2. Define Biosphere, Wildlife, Biodiversity and Ecosystem.

Ans: **Biosphere:** Biosphere is that part of the earth in which living organisms exist or which supports life. It includes both land surface of the earth, atmosphere of the earth as well as water bodies like rivers, ponds, lakes and oceans on the earth.

Wildlife:- The term wildlife means all the animals and plants which are found naturally in the forests and other natural habitats. The term wildlife is commonly used for wild animals and bird.

Biodiversity: The term biodiversity means biological variety. Biodiversity refers to the variety of organisms, plants, animals and microorganisms found in a particular area or habitat.

Ecosystem: An ecosystem is a system which includes all the living organisms i.e, plants, animals and microorganisms of an area and their physical environment i.e, soil, air and water in which they live.

OR

An ecosystem is a self sustaining unit of living world made up of various communities of living organisms like plants, animals and microorganisms along with non-living components like soil, air, water and minerals of the region.

Q.3. What is deforestation and what are its causes?

Ans: **Deforestation:** The clearing of forests i.e, the cutting down of forest trees over a wild area is called deforestation.

Causes of deforestation: The deforestation takes place because

i. Forests are cut down to obtain wood for using as fuel, for making furniture, doors, windows etc.
ii. The forest trees are cut down to obtain wood for making paper.
iii. The forests are cut down to get land for building houses, factories, roads and dams etc.
iv. Some natural causes like forest fires and severe droughts.

Consequences of deforestation:

(i) Soil erosion
(ii) Loss of biodiversity
(iii) Floods and droughts
(iv) Climate change due to global warming
(v) Disruption of water cycle


Global Warming


Pollution


Drought


Desertification

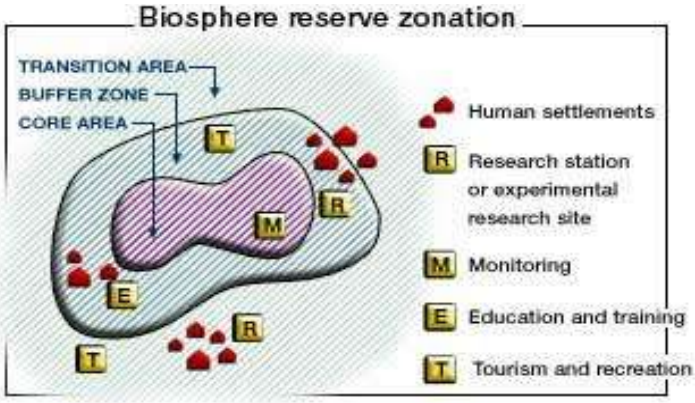

Animal & Plant Life Affected


Shortage of food


Flooding of Rivers

Q.4. Define Biosphere Reserve. Name Biosphere Reserves of India.

Ans: **Biosphere Reserve:** A biosphere reserve is a large, protected area of land by law meant for the conservation of wild life, biodiversity and the traditional life style of the tribal people living in the area. A biosphere reserve is a very large conservation area consisting of three zones namely inner most zone called core zone, middle zone called buffer zone and outer most zone called transition zone.



The names and location of some of the biosphere reserves of India are given below.

i. Great Nicobar Biosphere Reserve Andaman and Nicobar.
ii. Kaziranga Biosphere Reserve Assam.
iii. Sunderbans Biosphere Reserve West Bengal
iv. KANHA Biosphere Reserve M.P.
v. PACHMARHI Biosphere Reserve M.P.

Q.5. Define Flora and Fauna.

Ans: **Flora & Fauna:** The plants that grow naturally in a particular area are called Flora of that area. And the animals which live naturally in a particular area are called Fauna of that area. In other words the plants and animals of a particular area are called Flora & Fauna of that area. e.g. Teak, Jamun, Fern, Mango & Arjun are the Flora of Pachmarhi Biosphere Reserve and Cheetah, Wolf, Leopard, Blue bull etc are the examples of Fauna of the Pachmarhi Biosphere Reserve.

Q.6 What is a species? Define Endemic Species.

Ans: **Species:** A species is a group of same kind of organisms which can interbreed to produce fertile offspring e.g. Human, Tiger, Cow, Cat etc.

Endemic Species: Endemic Species are those species of plants and animals which are found exclusively in a particular area i.e. they are restricted to a certain area e.g. Sal and Wild Mango are two examples of the endemic flora/endemic plants of the Pachmarhi Biosphere reserve.

While as Giant squirrel, Flying squirrel and Bison are the three examples of endemic fauna/endemic animals of the Pachmarhi Biosphere Reserve area.

Q.7. Define Wildlife Sanctuary. Name some wildlife sanctuaries of India.

Ans: **Wildlife Sanctuary:** The term sanctuary means a "place of safety". So wildlife sanctuary means the place where wild animals remain safe. A wildlife sanctuary is a protected area of land which is created for protection of wild animals in their natural habitat/environment like forests.

Some of the threatened wild animals which are protected and preserved in our wildlife sanctuaries are Black Buck, White Eyed Back, Elephant, Golden Cat, Pine headed duck, Gharial, March Crocodile, Python, Rhinoceros etc.

Wildlife Sanctuaries of India:

i. Sanjay Gandhi Wildlife Sanctuary - Maharashtra
ii. Mudumalai Wildlife Sanctuary – Tamilnadu
iii. Bharatpur Bird Sanctuary – Rajasthan
iv. Sultanpur Lake Bird Sanctuary – Haryana
v. Dandeli Wildlife Sanctuary – Karnataka
vi. Thattekad Bird Sanctuary – Kerala
vii. Satkosia Basipalli Wildlife Sanctuary – West Bengal
viii. Dachigam Wildlife Sanctuary – J&K

Q.8. What is a National Park? Name some National Parks?

Ans: **National Park:** A National Park is a relatively large area of scenic beauty protected and maintained by the government to preserve flora and fauna i.e, plants and animals, landscape, historic objects of the area and places of scientific interest and provide human recreation and enjoyment.

National Parks in India

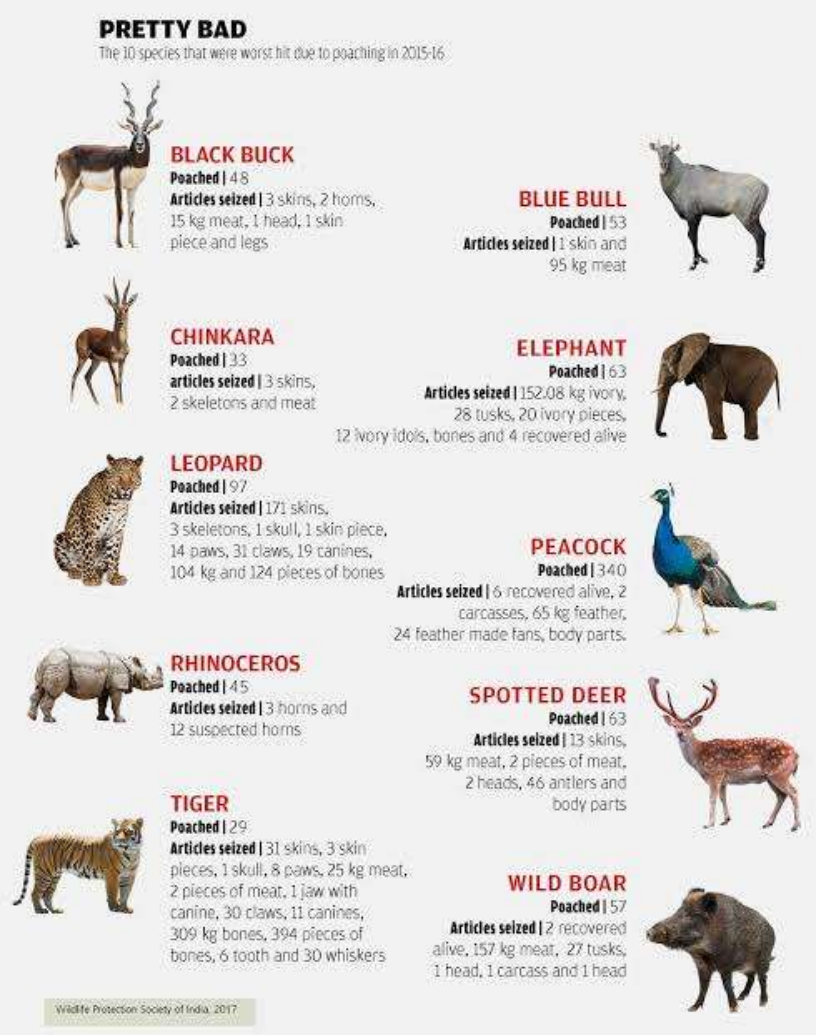
National Parks of India:

i. Corbelt National Park - Uttrakhand
ii. Kanha National Park – Madhya Pradesh
iii. Rathambore National Park – Rajasthan
iv. Gir National Park – Gutarat
v. Kaziranga National Park – Assam
vi. Sunderbans National Park – West Bengal
vii. Dachigam National Park – Jammu & Kashmiri
viii. Satpura National Park – Madhya Pradesh

Q.9. Define Extinct Species and Endangered Species.

Ans: **Extinct Species:** The species which no longer exist anywhere on the earth are called Extinct Species. In other words extinct species are those which have died out completely e.g, Dinosaur, Dodo, Cave Lion, Caspian tiger and Irish Tiger.

Endangered Species: The species which are facing the risk of extinction are called endangered species. In other words endangered species are animals and plants which are on the verge of vanishing from the earth e.g. tiger, Snow Leopard, Great Indian Rhinoceros, Asiatic Lion, Desert Cat, Lion-tailed Macaque, Kashmiri Stag



Q.10. What is Recycling of paper? Why should be paper saved? Prepare a list of ways by which you can save paper?

Ans: **Recycling of Paper:** The term recycling of paper, means to process the waste paper to make new paper so that it can be used again e.g. paper can be recycled from old news paper magazines, books, note books and packaging materials after removing ink from them.

Need to save paper: We should save paper to save the forest trees. Paper is made from wood pulp that is produced from the wood of forest trees. It has been estimated that 17 full grown trees are needed to make 1 ton of paper.

Paper can be recycled five to seven times for use. We should save, reuse and recycle the paper to save trees/forests, chemicals, water and the energy needed during the manufacturing of paper.

List of ways to save paper:

i. Write on both sides of paper.
ii. Leave less margin and do not leave any blank paper/space.
iii. Use chalk and slate for rough work.
iv. Make toys, caps, envelops out of used paper.

Q.11. What is Reforestation? Why is it necessary?

Ans: **Reforestation:** The planting of trees in an area in which forests were destroyed is called Reforestation. The term reforestation means to cover again with forest by planting new trees.

Forests are called green wealth of a country. If we have to retain our "green wealth" for future generation, then planting of more trees (reforestation) is the only way.

Q.12. Explain how deforestation leads to reduced rainfall.

Ans: Deforestation leads to reduced rainfall because it leads to reduction in natural recycling of moisture from the soils. This recycling takes place through vegetation and returns back in the form of rainfall. This is because the water holding capacity of the soil is dependent on the number of trees.

TEXTUAL QUESTIONS:

Q1: Fill in the blanks:

Ans (a) A place where animals are, protected in their natural habitat is, called a **sanctuary.**
(b) Species found only in a particular area are known as **endemic**.
(c) Migratory birds fly to far-away places because of **climatic** changes.

Q2. Differentiate between the following.

(a) Wildlife sanctuary and biosphere reserve
(b) Zoo and wildlife sanctuary
(c) Endangered and extinct species
(d) Flora and fauna

Ans. Wildlife sanctuary and biosphere reserve.

a. Wildlife sanctuary and biosphere reserve

Wildlife Sanctuary	Biosphere Reserve
It is an area within which animals are protected from possible dangers such as hunting. Their habitat is, also conserved in this area.	It is a large protected area constructed for the conservation of biodiversity.
It provides protection and suitable living conditions to wild animals.	It helps in the conservation of various life forms such as plants, animals and micro-organisms.
Pachmarhi sanctuary is a wildlife sanctuary.	Pachmarhi biosphere reserve is a popular biosphere reserve.

b. Zoo and Wildlife sanctuary

Zoo	Wildlife Sanctuary
It is facility in which animals are kept for public exhibition	It is an area within which animals are protected from possible dangers such as hunting. Their habitat is, also conserved in the area
It is an artificial habitat.	It conserves the natural habitar of the animals,.

c. Endangered and Extinct species

Endangered species	Extinct species
It is a population of species that is on the verge of becoming extinct.	It is a population of species that no longer exists. Hence, it is extinct.
Tiger, snow leopard, great Indian rhinoceros, Kashmiri Stag etc. are examples of endangered species.	Dodo, Dinosaur, Cave Line, Irish Tiger etc. are examples of endangered species.

d. Flora and Fauna

Flora	Fauna
It refers to all living plants in a particular area.	It refers to all living animals in a particular area.
Sal, teak, mango etc form the flora of Pachmarhi biosphere reserve.	Leopard, Wolf, Wild dog, etc form the fauna of Pachmarhi biosphere reserve.

Q3. Discuss the effects of deforestation on the following.

(a) Wild animals
(b) Environment
(c) Villages (Rural areas)
(d) Cites (Urban areas)
(e) Earth
(f) The next generation

Ans: i. **Wild life:-** Deforestation will lead to the extinction of many wild animals and plants. Plants and trees in a forest provide food and

shelter to wild animals and thus cutting of trees destroy the natural habitat of wild animals and thus they would become endangered.

ii. **Effect on environment:** Deforestation decreases the level of oxygen in the environment (atmosphere), rainfall and soil fertility. Deforestation leads to the shortage of wood and other forest products. It leads to global warming. As a result there are increased chances of natural calamities like floods and draught.

iii. **Effect on villages:** Most of the agricultural practices are performed in rural areas i.e villages. Deforestation leads to soil erosion which makes soil infertile and desertification. The deforestation thus causes loss of land property in villages besides loss of crop production. As a result the villagers will face a great economic loss.

iv. **Effect of deforestation on cities and urban areas:** In cities and urban areas there are many factories and more automobiles which makes or increases air pollution. So deforestation will pollute the air to a great extent and hence affects the health of the people living in the said areas.

v. **Effect on Earth:** Deforestation leads to the increase of natural calamities like flood and drought. Deforestation leads to increase in temperature of earth's atmosphere leading to global warming. Deforestation cause frequent flooding of rivers leading to loss of life and property.

vi. **Effect on next generation:** Deforestation leads to the climatic changes which have a great effect on the next generations. The environment becomes polluted. So the next generation would not be as prosperous as previous one. Since forests are called green wealth of a nation. Therefore deforestation leads to loss of green wealth for future generation.

Q.4. What will happen if

a. We go on cutting trees

b. The habitat of animal is disturbed

c. The top layer of soil in exposed?

Ans: a. If we go on cutting trees continuously, rainfall and the fertility of the soil will decrease. Hence there are increased chances of natural calamities such as floods and draught.

b. If the habitat of an animal is disturbed, the wild animals and birds do not get enough food and starve to death. In this way many animal and bird species become extinct or vanish from that area.

c. If the top layer of the soil is exposed, the lower, hard and rocky layer of soil gets exposed. This lower layer of soil has less humus and is less fertile. Plants and crops do not grow well in this less fertile soil. Gradually the fertile land gets converted into a desert, called as desertification.

Q5. Answer in brief:

(a) Why should we conserve biodiversity?

(b) Protected forests are also not completely safe for wild animals. Why?

(c) Some tribals depend on the jungle. How?

(d) What are the causes and consequences of deforestation?

(e) What is Red Data Book?

(f) What do you understand by the term migration?

Ans. (a) **Biodiversity** refers to the number and variety of various life forms such as plants, animals, and micro-organisms in an area. Plants and animals depend on each other for survival. This means that the destruction of either of the two will affect the life of the other. Hence, we need to conserve biodiversity to maintain the balance of nature.

(b) **Protected** forests are not completely safe for wild animals because people who live near or adjacent to forests use resources from forests to fulfil their own requirements. In this process, wild animals are, killed and sold for lucrative amounts of money.

(c) **Tribals** gather food, fodder, and fallen branches of trees from forests. Hence, they depend on forests for their daily requirements.

(d) **Causes & consequences of deforestation**:

(Refer to Q.No.03 – Conceptual Questions)

(e) **Red Data Book** is a source book that maintains an international list of all endangered animal and plant species. This book is, maintained by IUCN (International Union for Conservation of Nature and Natural resources).

(f) **Migration** refers to the movement of an organism or a group of organisms from its natural habitat to another place at a particular time every year. Organisms migrate from one place to another to avoid inhabitable climatic conditions or for breeding.

Q.6. In order to meet the ever-increasing demand in factories and for shelter, trees are being continually cut. Is it justified to cut trees for such projects? Discuss and prepare a brief report.

Ans. No. It is not at all justified to cut trees to meet the ever increasing demands of human population. Forests are the habitat of several organisms including wild animals. They provide us with good quality air as they give out O_2 and absorb the harmful Co_2 gas from the atmosphere. In the process, they prevent the excessive heating of the atmosphere. They prevent soil erosion and natural calamities such as floods and droughts. They, increase the fertility of the soil and help conserve biodiversity. The cutting of forests to meet the demands of growing human population will lead to global warming, soil erosion, greenhouse effect, droughts, floods, and many more problems. The destruction of forests will disturb the balance of nature. Hence, forests must be conserved.

Q7. How can you contribute to the maintenance of green wealth of your locality? Make a list of actions to be taken by you.

Ans. I can help in maintaining the green wealth of my locality by taking care of the plants and trees growing in or around my locality. I can plant more and more trees. I can also encourage the people in my locality to plant more trees by informing them about the importance of growing trees. I can make young children aware of the effects that deforestation has on our environment and on our planet. I can also ask them to water the plants daily, which will take very little of their time. I believe planting new trees is as important as taking care of the existing trees.

Q8. Explain how deforestation leads to reduced rainfall.

Ans. Deforestation is the removal of trees or other vegetation from an area for industrial, agricultural, or other purposes. Plants or trees absorb Co_2 from the atmosphere. If plants are destroyed, then the level of Co_2 in the atmosphere will rise. The high levels of Co_2 in the atmosphere will trap more heat radiations, leading to global warming. This increase in temperature of the Earth will disturb the natural water cycle. As a result of disruption in the water cycle, there will be a change in the rainfall pattern. The reduced amount of rainwater can cause droughts.

Q9. Find out about national parks in your state. Identify and show their location on the outline map of India.

Ans. One of the national parks located near Delhi is the Corbett National Park.

Q10. Why should paper be saved? Prepare a list of ways by which you can save paper.

Ans. Refer to Q.No.10 – Conceptual Questions

Q11. Complete the word puzzle.

Down

1. Species on the verge of extinction.
2. A book carrying information about endangered species.
5. Consequence of deforestation.

Across:

1. Species which have vanished.
3. Species found only in a particular habitat.
4. Variety of plants, animals and microorganisms found in an area.

Ans. Down

1. ENDANGERED 2. RED DATA BOOK 5. DROUGHT

Across

1. EXTINCT 3. ENDEMIC 4. BIODIVERSITY

Important points to remember:

1. **Zoo**: A large garden or park where many types of wild animals and birds brought from different parts of the country and the world are kept in cages or enclosures and protected thereof in an artificial habitat is called a zoo.

2. **Global Warming:** The gradual increase in the overall temperature of earth's atmosphere due to greenhouse effect caused by the increased level of Co_2 in the atmosphere is called global warming.

3. **Desertification:** The process by which fertile land becomes desert is called desertification.

4. **Zones of Biosphere Reserve:**
   i. **Core -** Devoted to strict protection of wild life.
   ii. **Buffer Zone:** Only limited human activity i.e, Research and environmental education study.
   iii. **Transition zone:** Non destructive human activities like settlement/houses of tribals, cultivation of crops etc.

5. **Cause of global warming:** Increase of Co_2

6. **Date of project tiger law:** April 1973

7. **Soil Erosion:** Removal of top layer of soil

8. **Cause of Drought**: Increase in temperature on earth

9. **Illegal hunting of animal is called :** Poaching

10. **First reserve forest of India:** Satpura National Park

11. **total area of forest land in J&K:** 20230 Sq.Km

Chapter No. 5

FOOD PRODUCTION AND MANAGEMENT

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. Define Agriculture, Horticulture, Apiculture, Pesiculture, Sericulture and Animal husbandry.

Ans: i. **Agriculture:** The term agriculture is derived from two Latin words 'agar' which means field and 'culture' which means to cultivate. In broad sense, agriculture is the study of cultivation of land, breeding and management of plants and animals that are useful to mankind.

ii. **Horticulture:** It is the branch of agriculture which deals with the study of growing vegetables, fruits and flowers.

iii. **Pisciculture:** Pisciculture is the practice of keeping and rearing of fish on a large scale for its production. It is a flourishing industry in our country.

iv. **Apiculture:** Apiculture is the practice of keeping and rearing of honey bees on large scale to get honey and wax. The place used for rearing honey bees is called an Apiary.

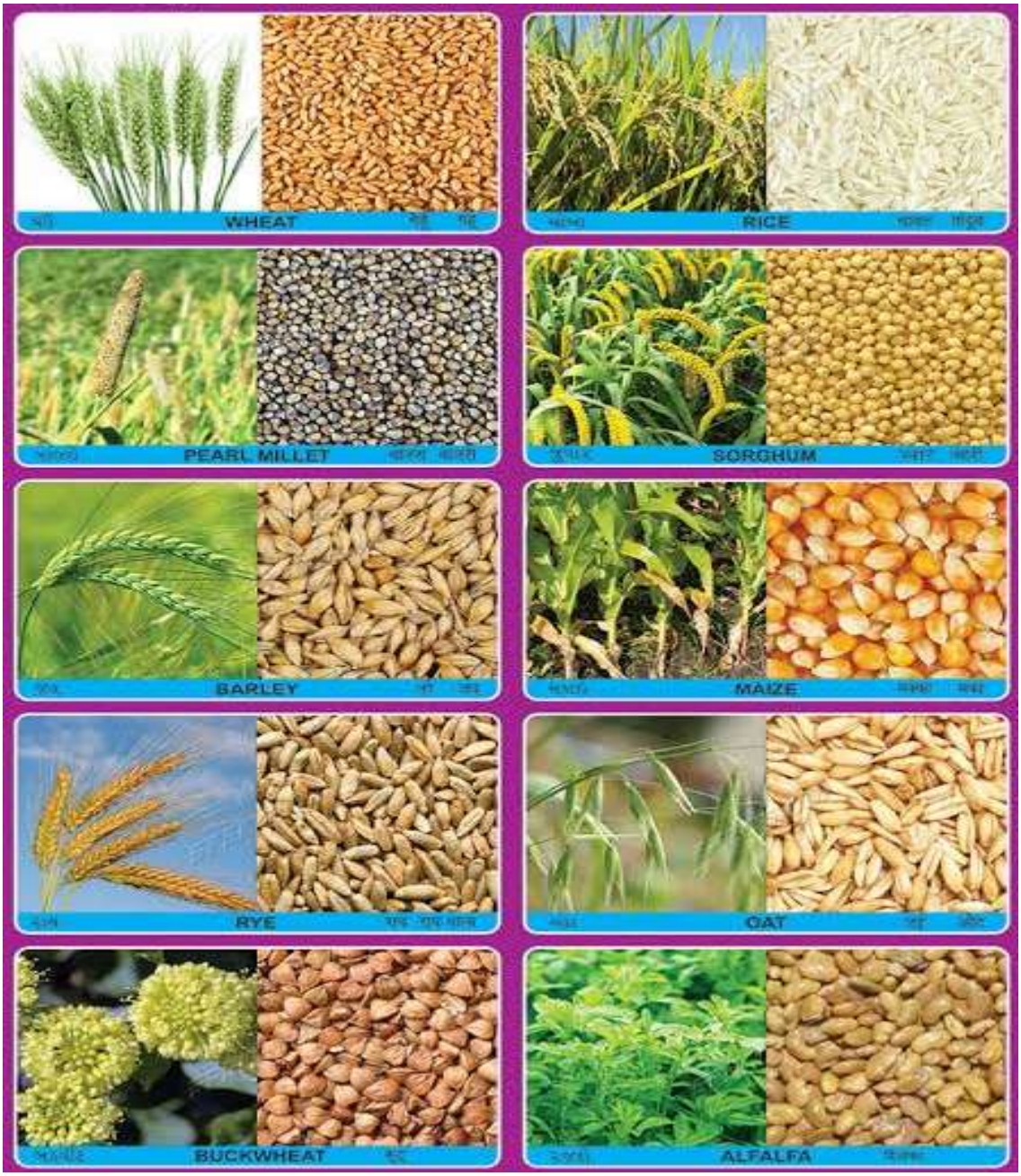
v. **Sericulture:** Sericulture or Sericulture or silk farming is the cultivation or rearing of silk worms to produce silk on large scale.

vi. **Animal Husbandry:** The branch of agriculture which deals with the feeding, shelter, health and breeding of domestic animals is called Animal Husbandry.

Q.2. What is a crop? What are the types of crops?

Ans: **Crops:** Plants of same kind grown and cared in the fields on a large scale to obtain foods like cereals (Wheat, rice, maize) pulses, vegetables and fruits etc are called crops or Fasal. The various crops grown in India are:

i. **Cereal crops:** Wheat, Paddy, Maize, Millet, Barley etc.
ii. **Pulses:** Gram (Chana), Peas, Beans etc.
iii. **Oil seeds:** Mustard, Groundnut, Sunflower etc
iv. **Vegetables:** Tomato, Cabbage, Spinach, Carrot etc
v. **Fruits:** Banana, Grapes, Apple, Orange, Mango etc

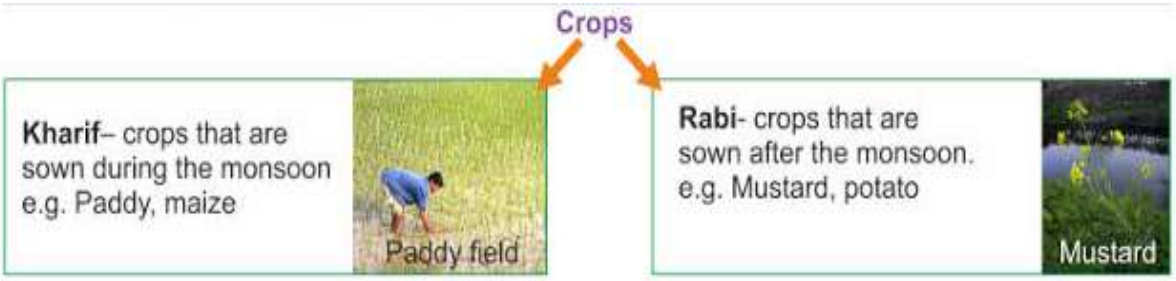


Q.3. What are the types of crops?

Ans: **Types of crops:** Based on the seasons in which they grow well, all the crops are categorized into two main groups.

i. **Kharif Crops:** Those crops which are grown or sown in the rainy season between June and October are called Kharif Crops. These crops are dependent upon the south western monsoon. e.g. Paddy, Maize, Millet (Bajra, Jawar), Soyabean, Groundnut, Pulses.

ii. **Rabi Crops:** Those crops which are grown/sown in winter season between October and March and are not dependent upon the monsoon are called Rabi crops e.g. Wheat, Mustard, Gram, Peas, Linseed, Gram etc.



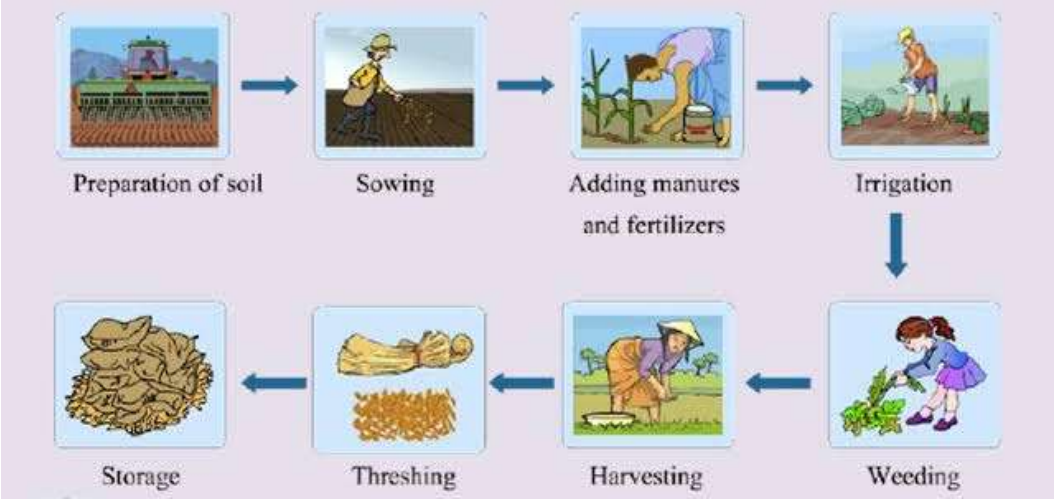
iii. **Zaid Crops:** Those crops which are grown in the summer season between March & June are called Zaid crops e.g. Moong, Cucumber, Watermelon, Bitter goard, Brinjal, Tomato, Raddish.

Q.4. What do you mean by agriculture practices? What are the different agriculture practices performed by a farmer to produce a good crop?

Ans: **Agriculture Practices:** The various tasks performed by a farmer to produce a good crop are called Agriculture practices.

The various agricultural practices which are carried out at various stages of crop production are

i.	Preparation of soil	ii.	Sowing
iii.	Adding Manure & Fertilizers	iv.	Irrigation
v.	Removal of weeds	vi.	Crop protection
vii.	Harvesting	viii.	Storage of food grains



Q.5. Name different kinds of crops grown in India?

Ans: **Crops of India:**

i. **Cereals/Grain crops:** Rice, Wheat, Maize, Barley, Bajra, Jawar, Ragi
ii. **Fibre crops:** Cotton, Jute
iii. **Pulses:** Grams, Red gram, Peas, Beans
iv. **Oil Seeds:** Mustard, Groundnut, Sunflower etc.
v. **Root Crops:** Sweet Potato
vi. **Tuber Crops:** Potato, Tapioca
vii. **Sugar Crops:** Sugar Cane, Beetroot
viii. **Plantation Crops:** Coffee, Tea, Rubber, Coconut

ix. **Vegetables:** Potato, Tomato, Brinjal, Cabbage, Onion, Spinach, Lady Finger, Radish, Beetroot, Turnip, Green Beans.

x. **Fruits:** Apple, Banana, Orange, Grapes, Guava, Mango, Papaya, Pineapple, Pomegranate, Mulberries, Cherry, Apricots

xi. **Flowers:** Rose, Jasmine, Marigold, Balsam

Q.6. Define Poultry, Live stock, Domestication, Heeding & Dairying.

Ans: i. **Poultry:** Poultry is the practice of keeping and breeding of useful animals like hens, ducks etc which provide meat and egg.

ii. **Live Stock:** Live Stock is a collective term assigned to all those animals which have been domesticated for the benefit of human beings.

iii. **Domestication:** The keeping and taming of animals for specific use as a pet or on a farm is known as domestication.

iv. **Heeding:** Heeding means the proper care and management of animals i.e, to provide food, shelter, cleaning and caring to animals for their good health of animals.

v. **Dairying:** An establishment where milk and cream are kept and butter and cheese are made is called Dairying and the business of dairy is called Dairying.

Q.7. What is soil? How is prepared for sowing the seeds of the crop?

Ans: **Preparation of soil:** The upper layer of earth is called Soil. The crop plants are grown in soil. Soil provides minerals, water, air, humus and fixes firmly to the plants.
The soil is prepared for sowing the seeds of the crop by ploughing, leveling and manuring.

Ploughing: The process of loosening and turning the soil is called ploughing or tilling.

Leveling: The ploughed soil is leveled by pressing it with a wooden leveler/iron leveler so that the top soil is not blown away by wind or drained off by water.

Manuring: Manuring means adding manure to the soil. It is done to increase the fertility of the soil before seeds are sown into it.

Q.8. What is sowing? What are the methods of sowing?

Ans: **Sowing and its methods:** The process of scattering or putting seeds in the ground soil for growing the crop plants is called sowing. Seeds are sown in the soil either by hand or by seed drill.

a. **Sowing by hand:** The sowing of seeds by hand or manually is called broadcasting. In this method seeds are taken in hand and gradually scattered in the entire ploughed field.

b. **Sowing with seed drill:** In this method a seed drill is tied to back of the plough and seeds are put into funnel of the seed drill. When the plough makes furrows in the soil, the seeds are released (from seed drill), and sown in the soil furrows at the correct depth and correct intervals.

Q.9. What is Manuring? Differentiate between manures and fertilizers.

Ans: **Manuring:** The deficiency of plant nutrients and organic matter in the soil made by adding manures and fertilizers to the soil is called manuring.

FERTILIZER	MANURE
A fertilizer is an inorganic salt	Manure is a natural substance obtained by the decomposition of cattle dung, human waste and plant residues
A fertilizer is prepared in factories	Manure can be prepared in the fields
A fertilizer does not provide any humus to the soil	Manure provides a lot of humus to the soil
Fertilizers are very rich in plant nutrients like nitrogen, phosphorus and potassium	Manure is relatively less rich in plant nutrients

Q.10. What is irrigation?

Ans: **Irrigation:** All the crops need water for their growth. The amount of water in the soil is not constant and sufficient throughout the year. It is therefore necessary to supply water to the crop plants in the fields periodically.

The process of supplying water to crop plants in the fields is called irrigation.

Sources of irrigation: Water is supplied to crops for irrigation from different sources like Rivers, Canals, Wells, Tube wells, Dams (Reservoirs), ponds and Lakes. Rain is also a source of irrigation.

Q.11. What is weeding? What are different methods of weeding? What are weeds? Name different weeds. What are weedicides?

Ans: **Weeds:** The unwanted plants or wild plants which grow along with a cultivated crop are called weeds. The growth of weeds in the fields is harmful because they consume a lot of fertilizer, water, sunlight and space meant for the crop plants and reduce the crop yield and lower the quality of food grains.

Some common weeds found in wheat and rice fields are

a. Wild oat
b. Grass (Ghass)
c. Amaranthus (Chaulai)
d. Chenopodium (Bathuae)

Weeding: The process of removing weeds i.e, unwanted plants from a crop field is called weeding. Various methods of weeding are as:

i. Removal of weeds by pulling them out with hands.
ii. Removing of weeds by using a trowel Khurpa.
iii. Destroying the weeds by spraying special chemicals called weedicides.

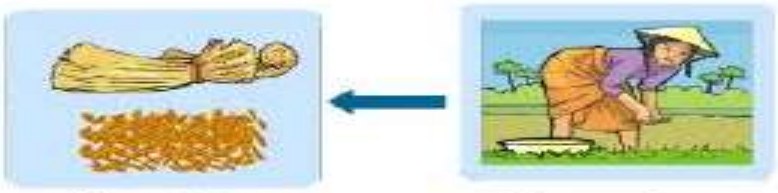
Weedicides: The poisonous chemical which are used to kill weeds in the fields are called weedicides. e.g, 2, 4-D, MCPA and Butachlor, Simazine etc.

Q.12. What is Harvesting, Threshing and Winnowing?

Ans: **Harvesting:** Harvesting is the process of cutting and collecting the matured crop from the fields. This may be done either by hand or with a sickle or with machines known as combines or harvesters.
The harvesting is followed by threshing and winnowing.

a. **Threshing:** The process of beating out the grains from the harvested crop plants or chaff is called threshing. Threshing is done either by walking over the spreaded harvested crop in an area by various cattle like bullocks, buffaloes and camels or motorized machine called thresher.

b. **Winnowing:** The grains mixed with chaff and hay are cleaned by the process called winnowing. Winnowing means to separate grain from chaff and hay with the help of wind.



Q.13. What is preservation and storage of food grains?

Ans: **Storage of food grains:** The seeds/food grains like wheat, rice etc obtained by harvesting the crops are dried in the sunshine before storing, to reduce their moisture. The food grains are then filled in gunny bags tightly stitched and stored in godowns. The food grains are also stored in clay pots, wooden boxes, big stores away from the reach of rats, worms, moisture and other harmful organisms.

Q.14. Name three food materials obtained from animals.

Ans: **Food from animals:** The food provided by animals consists of milk, eggs, meat and fish.

i. Milk yielding animals: Cow, Buffalo and Goat
ii. Meat yielding animals: Goat, Sheep, Fish and Chicken
iii. Egg yielding animals: Hen and Duck.

TESTUAL QUESTIONS:

I. Name the Following:

1. Five requirements essential for obtaining good crop production.

Ans. Five requirements essential for obtaining good crop production are:

i. Right kind of soil,
ii. Good quality seeds,
iii. Required amount of water,
iv. Protection from weeds, and
v. Proper implements.

2. Two types of fertilizers:

Ans. Nitrogen and Potash fertilizers.

3. Some chemicals used to protect crops from insects, pests and weeds.

Ans. Insecticides such as malathion, dimecron, and polythion (Insects), Pesticides such as parathion, malathion, BHC (Benzene Hexachloride) (Pests) and Weedicides such as simazine (Weeds).

4. Some animal products.

Ans. Milk, egg, meat, honey, fish oil are some animal products.

5. Members of a colony of a bee.

Ans. Workers; which are sterile females, Drones; which are fertile males, and a queen which is a fertile female.

II. Fill in the blanks.

1. A **weedicide** is used to remove the weeds from the soil.
2. A **clod crusher** is used to trowel the soil by breaking the lumps of soil after preliminary ploughing.
3. Kharif crops are sown during the months of **June and July.**
4. **Paddy** seeds are not sown directly into the soil.
5. Rabi crops are harvested during the months of **March and April.**
6. The practice of taking the seedlings from the nursery to the field is known as **transplanting** field.
7. Pearls are used in **jewellery.**
8. Honey contains ***17%*** water and ***78%*** sugar with minerals.
9. The hen-houses are called ***pens.***
10. Murrah Jaffarabadi are well known breeds of ***buffaloes.***

III. Answer the following figure in only one word or in figure:

1. What is the process of turning and loosening the soil called?
Ans. Tilling or Ploughing.

2. Which implement is used for tilling soil?
Ans. Plough

3. Which implement is used for breaking up the large lumps of soil?
Ans. Clod Crusher

4. What is the implement used for sowing called?
Ans. Seed Drill and Broadcaster

5. What is the top part of the drill called?
Ans. Seed Bowl

6. What is an egg-laying bird called?
Ans. Brood Hen

7. Name the members of the bee colony.
Ans. Workers, Drones and Queen

8. Which material is used to cover the floor of a hen-house?
Ans. Straw.

9. Which is the common food of poultry chicken?
Ans. Grains

10. Which bee is responsible for laying eggs?
Ans. Queen bee

IV. Give the scientific reasons for the following:

1. Grains, pulses, vegetables and fruits should be used in our daily life?
Ans. Our body needs essential elements for proper growth and maintenance. These elements can be obtained from grains, pulses, vegetables and fruits. These elements together make a balanced diet which is essential to make our body healthy.

2. The soil should be loosened before seeds are sown?
Ans. The soil should be loosened before seeds are sown so that to ventilate the roots and roots of the young plant can penetrate it easily.

3. Seeds should be sown at a proper depth in the soil?
Ans. Seeds should be sown at a proper depth in the soil so that they can germinate more easily.

4. Fruits and vegetation should be washed thoroughly before eating?

Ans. Fruits and vegetation should be washed thoroughly before eating because they have a coating of pesticides or certain chemicals that can be harmful for us.

5. Grains are dried thoroughly before they are stored?

Ans. Grains should be dried before they are stored because wet or moisten seeds spoil when kept in storage places.

V. Answer the following questions:

Q1. What are the requirements of farming which would lead to high yields of crops?

Ans. Refer to Q.No. 04 – Conceptual Questions

Q2. What is tilling? How is it done?

Ans. Loosening or turning over of soil by a plough before sowing seeds is called tilling. It is done by a plough made of wood and iron driven by animals. Tractors are also used for tilling the fields.

Q3. Write a short note on the process of sowing?

Ans. Refer to Q.No. 06 – Conceptual Questions

Q4. What are manures? Discuss their important types?

Ans. Manures are organic materials which supply all the elements a plant needs in small elements. The manures add organic matter to the soil which increases water-holding capacity in sandy soil and drainage in clayey soil.

Important Types of Manures:

Farmyard Manure (FYM): It is the most valuable manure made from the organic matter such as remnants of straw, leaves and excreta of cattle. It is commonly applied to the soil to make it fertile and soft.

Green Manure: It is made from the leaves of green plants. This improves the physical structure as well as soil fertility.

Compost Manure: It is a rotten mixture of all the cattle shed wastes and all the available refuse.

Q5. What is a fertilizer? Explain its importance.

Ans. A chemical fertilizer is a salt or an organic compound containing the necessary plant nutrients like nitrogen phosphorus or potassium, to make the soil more fertile. Some examples of fertilizers are Urea, Ammonium Sulphate, Superphosphate, Potash and NPK.

Q6. What are broadcasting and transplanting?

Ans. The method by which seeds are sown by scattering in hand or by a broadcaster is known as *broadcasting*. The practice of taking the seedlings from the nursery to the main field is known as *transplanting.*

Q7. What is the difference between manure and fertilizer?

Ans. Refer to Q.No. 09 – Conceptual Questions

Q8. Why are weeds harmful? What is used to remove them?

Ans. Weeds are harmful because they grow around the crops and use their nutrients as their food for growth thus reduce the growth and yield of crops. Weeds are removed either manually or by spraying weedicides like simazine or 2,4-D (2, 4-dichlorophenoxy acetic acid).

Q9. What are insecticides? Give examples.

Ans. Insecticides are insect killing chemicals to protect crops from harmful insects. For example, malathion, dimecron and polythion.

Q10. How do insecticides protect crops?

Ans. Insecticides protect plants by killing insects or pests as well as their larvae around crops without affecting crops.

Q11. Which are the two main seasons in India for cultivating crops?

Ans. In India there are two main seasons for cultivating crops: Kharif season in which crop is sown in June and July and harvested after monsoon season, and Rabi season, in which crop is sown in October to December and harvested in March or April.

Q12. Name some harvest festivals of India?

Ans. Pongal, Baisakhi, Holi, Diwali, Nabanya and Bihu are some harvest festivals of India.

Q13. Name four factors responsible for the improvements of crops.

Ans. Plant breeding, Soil improvement, Protection from pests and weeds and Storage are the four factors responsible for the improvements of crops.

Q14. Write short note on the process of harvesting.

Ans. Refer to Q.No. 12 – Conceptual Questions

Q15. Why does a farmer rotate crops in the field?

Ans. Because rotation of crops add minerals of the soil. It makes the soil more fertile to produce more crop yield.

Q16. What do you understand by mixed crops?

Ans. The method of growing crops together to save time and labour is known as mixed crops. Crops like ground and crops are grown together and are called mixed crops.

Q17. Why are fields sometimes allowed to remain fallow?

Ans. Fields are sometimes allowed to remain fallow to increase the humus and micro-organisms in the soil so that to replenish the nutrients of the soil.

Q18. List the importance of fish in our lives.

Ans. Fish form the major source of animal protein. Fish liver oil is rich in vitamin A and vitamin D. Fish is highly nutritious and easily digestible food.

Q19. What is the nutrient value of honey?

Ans. Honey contains 17% water and 78% 0f sugar with minerals and enzymes which help in digestion of food.

Q20. How are domesticated animals useful to us?

Ans. Domesticated animals are useful to us because they provide many things for our day to day life. Such as, Cows, goats, sheep etc. provide milk and meat. Horses and camels are used to carry loads. Hens provide eggs and meat.

***INTEXT QUESTIONS* (WORKSHEET: 6.1)**

Q1. Name various sources of food.

Ans. Plants like vegetables, fruits etc. and animals like sheep, goat, hen etc. are the various sources of food.

Q2. What are various sources of plant nutrients?

Ans. Rice, wheat, maize, pulses, spinach, fruits etc. are the various sources of plant nutrients.

Q3. Differentiate between farmyard manure and green manure?

Ans. Refer to Q.No. 04 – Textual Questions

Q4. What are the advantages of sea manures?

Ans. Sea manures help the soil to become porous so that exchange of gas can take place easily.
It also enhances the number of microbes that are useful in large numbers in the soil.

Q5. Name two fertilizers supplying nitrogen, phosphate and potash.

Ans. Super phosphate, potash and NPK

Q6. Name any two irrigation systems in India?

Ans. Sprinkler system and drip system are two modern irrigation systems in India.

Q7. What are weeds? How do they affect crops?

Ans. Refer to Q.No. 11 – Conceptual Questions

Q8. Name any two insecticides.
Ans. Refer to Q.No. 09 – Textual Questions

Q9. Name two harvest festivals.
Ans. Pongal and Baisakhi.

Q10. Name two main crops raised in India. Also mention their time of harvesting.
Ans. Paddy and Vegetables. They are harvested in October.

Q11. Name a machine which is used for harvesting.
Ans. Combine is used for harvesting.

Q12. Name the cereals grown in India.
Ans. Refer to Q.No. o2 – Conceptual Questions

Q13. Differentiate between agriculture and horticulture.
Ans. Agriculture is the study of science and art of production of plants while as horticulture is the science and art of growing fruits, vegetables, flowers and some ornamental plants.

Q14. Why is soil ploughed?
Ans. Soil is ploughed so that the roots of the young plants can penetrate it easily.

Q15. Name the methods of ploughing.
Ans. Ploughing can be done either by Ploughs driven by animals or by tractors.

Q16. Why do farmers raise seedlings in nursery?
Ans. Farmers raise seedlings in nursery so that they are not damaged so that to transfer them to the main field in right time.

***INTEXT QUESTIONS* (WORKSHEET: 6.2)**

Q1. What is plant breeding?
Ans. The technique which involves the cross-breeding (hybridization) between two varieties of plants to obtain a new and better adapted variety, in terms of higher yield, resistant pests and diseases and maturing in shorter duration is known as Plant Breeding.

Q2. How is plant breeding performed?
Ans. Plant breeding is performed by the process of cross-pollination. Anther of one plant is removed and pollen of another plant is dusted over the stigma of this plant and the process is repeated several times to yield an improved variety of stock.

Q3. What is crop rotation? What are its advantages?

Ans. The growing of crops in between two crops alternately to replenish the minerals of the soil is known as crop rotation. It increases the soil fertility and replenishes the minerals of the soil.

Q4. Name two leguminous crops.

Ans. Maize and groundnut.

Q5. What are the advantages of mixed cropping?

Ans. Mixed cropping helps the products and waste products of one crop to be utilized by another crop.

Q6. Name two crops which are grown together.

Ans. Groundnut and cotton.

Q7. Define field fallow.

Ans. To increase the humus of the soil and to promote the growth of micro-organisms to replenish the nutrients of the soil, the field is left uncultivated for one season this is known as Field fallow.

Q8. Write the important features of a good storage structure.

Ans. Important features of good storage structure:

1. It should be easy to clean.
2. It should be waterproof.
3. It should protect the grains against variation in temperature and humidity.
4. It should be located at a convenient place so that transportation becomes easy.
5. It should be well protected from rodents.
6. It should be convenient for regular check-up of stored food materials.
7. It should be convenient for the use of pesticides and also for the control of other microorganisms.

INTEXT QUESTIONS (WORKSHEET: 6.3)

Q1. What is livestock?

Ans. A farm where domesticated animals are kept, raised for use and profit.

Q2. Name any four poultry birds.

Ans. Hen, duck, turkey and geese

Q3. What is a broody hen?

Ans. An egg laying bird is called a broody hen.

Q4. Name any two breeds of:
(a) Cows and (b) buffaloes

Ans. (a). Sahiwal and Sindhi
(b). Murrah and Jaffarabadi

Q5. Why is fishery flourishing in India on a large scale?
Ans. Fishery is flourishing in India on a large scale because it provides many useful things that are widely used in world and also brings more economy.

Q6. Name any four fish.
Ans. Catla, Labeo, Barbus and Tuna Cod.

Q7. Give any two uses of honey.
Ans. It helps in digestion of food. It increases immunity.

Q8. Give any two uses of wax.
Ans. It is used to make candles. It used in ointments and Vaseline

Q9. Give any four points for care of animals.
Ans. Proper care, proper food, proper shelter and protection.

Important points to remember:

1. Important Canals in Kashmir:
   a. Martand Canal
   b. Zainagir Canal
   c. Lalkhul (Pohru)
   d. Dadi Khul (Lidder)
   e. Sumbal Khul (sukhnag)
   f. Nani Khul (Vishu)
   g. Awantipora Khul (Lidder)
   h. Zainapora Khur ((Vishu)
   i. Rishipur Canal

2. Important Canals in Jammu:
   a. Ranvir Canal
   b. Pratap Canal
   c. Kathua Canal
   d. Tawi Canal
   e. Dudhar Canal
   f. Pargol Canal
   g. Ujh Canal
   h. Basantpur Canal
   i. Raigarh Canal
   j. Ravi Canal

3. **Hoe:** Hoe is an agricultural implement or tool which is used to remove weeds, loosening and turning the soil.

4. **Food obtained from animals rich proteins:** Eggs, Chicken, Cheese, Milk, Fish, Meat

5. **Govt agency FCI:** Responsible for purchasing grains from farmers, safe storage and distribution.

6. **Important sheep in J&K:** Marino sheep – Ladakh

7. **Important Goats in J&K:**
   i. Pashmina Goat – Ladakh
   ii. Kangan Goat – Kashmir
   iii. Beetal Goat – Jammu,. Milk yielding

8. **Important Indian breeds of Buffaloes:**
   i. Murrah – Punjab
   ii. Surti – Kerala
   iii. Jaffrabadi – Gujarat
   iv. Nili – Punjab
   v. Nagpuri – M.P.
   vi. Mehsana – Gujarat

9. **Insecticides:** It is a chemical used to kill the plant pests i.e, organisms attacking plants e.g, DDT, BHC etc.

10. **Name two pests:** Locusts, Grasshoppers

11. **What are combines?**
The mechanized harvesters are called combines. These do harvesting and threshing simultaneously.

12. **Fallowing:** To leave the field uncultivated.

13. **Lodging:** Fast and strong winds accompanied by rains result in the fall of crop plants at the grain maturation stage is called lodging.

14. **Nursery:** Seeds sown in small plots to get seedlings for transplantation in the field is called nursery

15. **Agricultural tools or implements commonly used:**

i.	Spade	ii.	Shovel	iii.	Sickle
iv.	Axe	v.	Hoe	vi.	Trowel
vii.	Seed drill	viii.	Combines	ix.	Khurpa

Chapter No. 6

SOUND

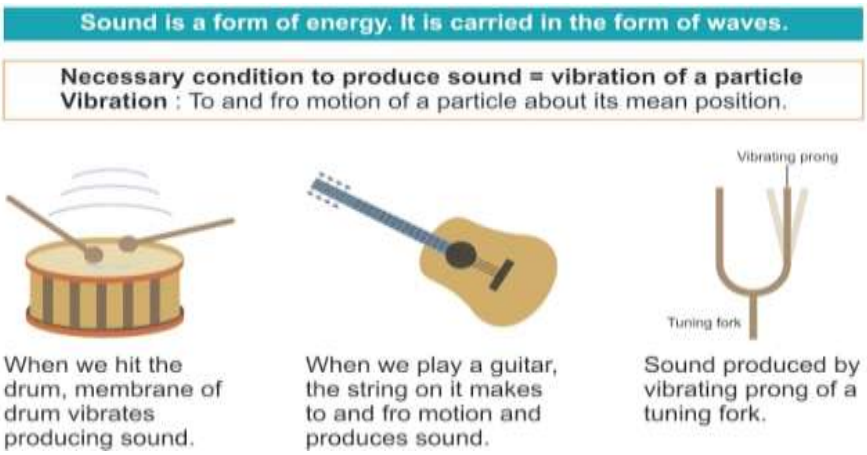
Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is sound? How is it produced?

Ans: **Sound:** Sound is a kind of energy which produces in us the sensation of hearing. Sound is produced by vibrating objects i.e, objects moving to and fro rapidly. e.g,

i. Sound is produced, when a sitar string vibrates.

ii. Sound of school bell is produced by the vibrations of iron or brass plate when it is hit by a hammer.



Q.2. What is vibration? What is a wave? What are the types of wave?

Ans: **Vibration:** Vibration means a kind of rapid to and fro motion of an object.

Propagation of sound: Sound needs a medium (solid, liquid or gas) for its transmission When an object vibrates back and forth in the medium "air", then the molecules of air close to this object also start vibrating back and forth with the same frequency. These vibrating air molecules pass on their motion to the next layer of air molecules due to which they also start vibrating back to forth.

This process goes on and ultimately all the air molecules around the vibrating object vibrate back to forth. The vibrating air falls on our ears and finally our ears feel these air vibrations as sound. In this way sound transmits in the medium and this is called propagation of sound.

Wave: A wave is a disturbance in a medium due to repeated periodic motion of particles about their mean position, such that the disturbance in handed over from one particle to the other without the actual motion of the medium.

Types of waves:

i. **Mechanical/Elastic waves -** It needs medium.
ii. **Electromagnetic waves:** It propagates in vacuum e,g. light

Q.3. What are the types of mechanical or elastic waves? Or Define transverse and longitudinal waves.

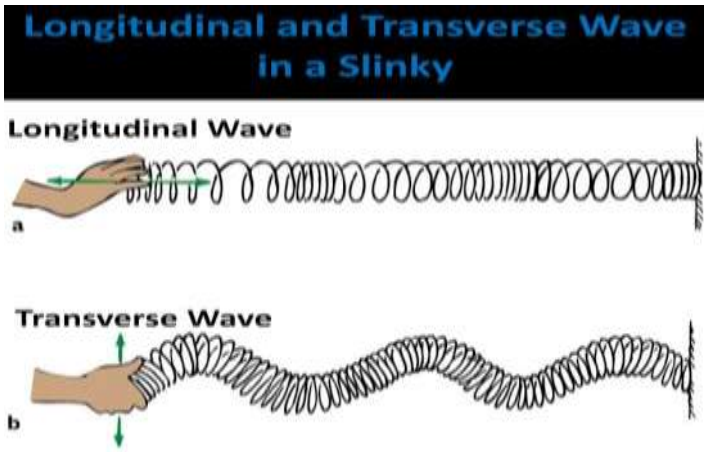
Ans: **Transverse waves:** A wave in which the movement of molecules or displacement of particles of the medium is perpendicular to the direction of propagation of wave is called transverse wave. e.g,

i. Electromagnetic waves
ii. Vibrations of string of guitar
iii. Vibrations of Tabla membrane
iv. Ripples on the surface of water

A transverse wave travels in the form of crests and troughs and can be seen ina slinky string.

Longitudinal waves: A wave in which movement of molecules or displacement of particles of the medium are parallel to the direction of propagation of wave is called longitudinal wave. e.g. Sound waves, ultra sound waves, seismic P waves.

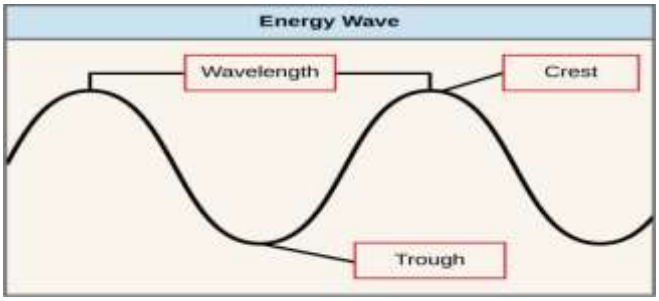
A longitudinal wave travels in the form of compressions and rarefactions and can be seen in a slinky string.



Q.4. Define Crests, Troughs, Compression and Rarefaction.

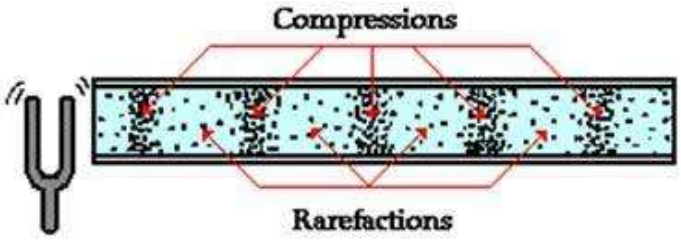
Ans: i. **Crests:** Crests are the elevations in a wave i.e, the position of the maximum displacement in the positive (viz above the mean position) direction e.g, transverse wave.

ii. **Troughs:** Troughs are the depressions in a wave i.e, position of the maximum displacement in the negative direction (viz below the mean position) e.g, transverse wave.



iii. **Compression/Condensation:** These are the regions in a medium where density is high i.e, the distance between any two consecutive particles is more than the normal distance.

iv. **Rarefaction:** These are the regions in a medium where density is low i.e, the distance between any two consecutive particles is more than the normal distance.



Q.5. Define characteristics of waves.

i. **Wavelength (λ-Lambda):** The distance between two consecutive crests or troughs is called the wavelength of a transverse wave.

OR

The distance between two consecutive compressions or rarefactions is called the wavelength of a longitudinal wave. It is denoted by letter Lambda λ.

Unit: the S.I. unit of λ is metre (m) and the C.G.S. Unit is (cm)

ii. **Frequency (V-nu):** The number of waves passing through a point of the medium in one second is called frequency of the wave. In other words the number of vibrations made per second by a vibrating body is called frequency of the vibration.

Unit: the S.I. unit of V is S^{-1} or Hertz (Hz)

iii. **Time period:** The time taken by a wave to travel a distance equal to its wavelength is called time period of the wave.

OR

The time taken by a particle of the medium to complete one oscillation or vibration is called the time period.

$$\therefore T = \frac{1}{V} \text{ or } V = \frac{1}{T}$$

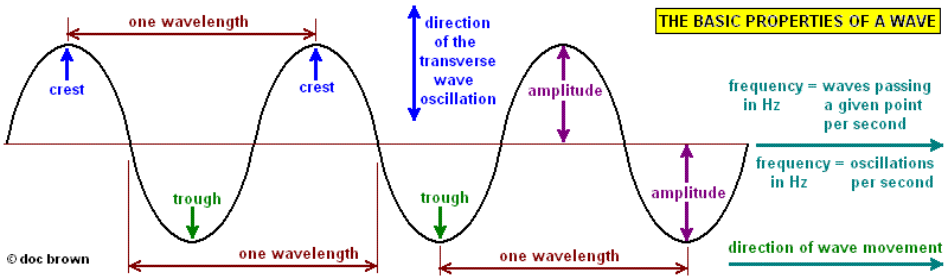
iv. **Amplitude:** The maximum displacement of a particle of the medium from its mean position is called the amplitude

v. **Speed/velocity of wave:** The speed of wave in a medium is the distance travelled by the wave in one second is called speed or velocity of the wave.

$$\boldsymbol{u = \frac{Distance\,travelled}{Time} = \frac{\lambda}{T}}$$

[∴ Distance travelled by a wave in T second is λ]

$$\therefore u = V\lambda$$



Q.6. Define the characteristics of sound.

i. **Speed of sound:** The speed of sound in different medium:- e.g.

a. Air = 340m/S
b. Water = 1500m/S
c. Iron or steel= 5000m/S

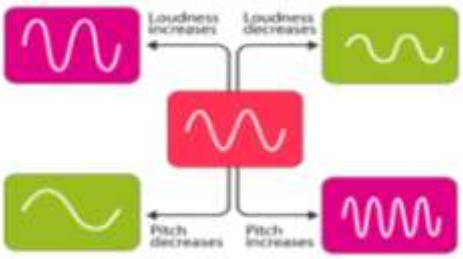
ii. **Supersonic speed:** Speeds greater than the speed of sound in air are called supersonic speeds. e.g. Supersonic Jet airplanes, a rifle bullet and space shuttle move at supersonic speeds.

iii. **Pitch:** Pitch is the characteristic of wave by which sound waves appear shrill or grave. It depends upon the frequency of the wave. i.e, higher the frequency, higher will be the pitch and vice versa. Frequency and hence the pitch of a female voice is more than that of a male voice and hence female voice is shrill and male voice is grave.

iv. **Loudness:** The loudness is a feeling of how strong a sound wave is at a place. The loudness is based on the amplitude of the vibration i.e, greater the amplitude of the vibrations, louder the sound will be. Generally loudness is measured in Decibel/Decibel dB.

v. **Quality:** Quality is that characteristics of sound by which we are able to distinguish two sounds of the same frequency and

intensity. Quality of a sound is also known as timbre. The quality of the sound depends on the shape of wave form and the number of overtones.



Q.7. What are Audible and Inaudible sounds? What are infrasonic and ultrasonic?

Ans: **Audible Sounds:** The frequency of sound to which human ear responds is 20 Hz to 20,000 Hz. Therefore this range is called audible frequency.

Inaudible Sounds: The frequencies of sound to which human ear cannot respond is less than 20 hertz and more than 20,000 hertz. There this range is called Inaudible Sounds.

Ultrasonics: The sounds having too low frequencies which cannot be heard by human ear are called infrasonics or infrasonic sounds e.g, Rhinoceros can produce infrasonic sounds having less than 20 Hz frequencies and can also hear infrasonic C sounds, Earthquakes, Whales, Elephants etc.

Ultrasonics: The sounds having too high frequencies which cannot be heard by humans i.e, having more than 20,000 Hz frequencies are called ultranonics e.g. sounds produced by Dolphins, Rats, Bats etc. These sounds are also called ultrasound.

Uses of Ultrasound:

i. Ultrasound is used as a diagonostic tool in medical science to investigate inside the human body.
ii. It is also used to study the growth of fetus inside the mother's womb.
iii. It is used in the treatment of muscular pain and a disease called arthritis.
iv. It is also used for locating undersea objects like a shipwreck, submarines and to measure the depth of the sea.

Q.8. What is noise and noise pollution? What are its causes and effect.

Ans: **Noise & Noise pollution:** The unpleasant or unwanted sounds which are not soft and are disagreeable to the human ears are called as

noise. The presence of loud sound in the atmosphere results in noise pollution.

Causes of noise pollution: Noise is produced by the irregular vibrations of the sound producing sources e.g,

i. Loud speakers of the markets, mosques, temples and others
ii. Generators
iii. Railway stations and trains
iv. Airports and aeroplanes
v. Crackers
vi. Music programmes
vii. Blowing horns of motor vehicles
viii. Barking of dogs

Effects of noise pollution:

i. The worst effect of noise pollution is deafness
ii. It raises the heartbeat
iii. It causes night blindness
iv. Lack of sleep
v. Anxiety
vi. Heart attack
vii. High blood pressure

Q.9. What are musical sounds or music? Name some music instruments.

Ans: The sounds which are pleasant to hear are called musical sounds or music. In other words music is the arrangement of sound of different frequencies called notes or swara in a way that it produces pliant effect on the ear.

Musical Instruments:

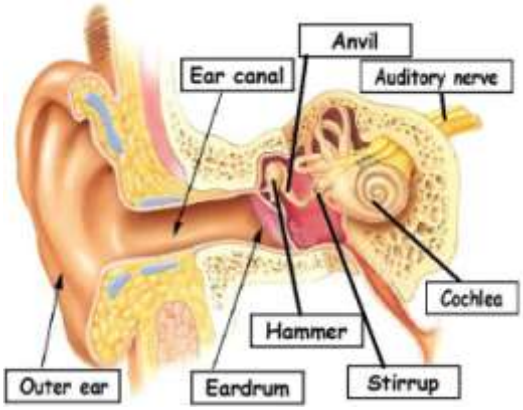
i. Stringed musical instruments e.g, Sitar, Violin, Guitar, Piano, Ektara, Sarangi
ii. Wind musical instruments: e.g, Flute/Bansuri, Trumpet etc.
iii. Membrane musical instrument: e.g, Tabla, Dholak, Drum, Dhapli etc.
iv. Plate type musical instruments: Cymbals (i.e, two concave brass plates) Bell used in temples, Noot-Matka

Q.10. How do humans hear sound through ears?

Ans: **Hearing of sound through ears:** The ears are the sense organs which help us in hearing sound. The human ear consists of Outer ear called Pinna, Middle ear and Inner ear.

The shape of the out part of the ear is like a funnel. When sound waves enter in it, it travels down a canal at the end of which is a thin, elastic, circular and stretched tightly membrane called Eardrum.

The eardrum gets vibrated by these sound waves and sends these vibrations through three connected bones. Moving fluid bends thousands of delicate hair like cells which convert the vibrations into nerve impulses. These nerve impulses are carried to the brain by the auditory nerve. In the brain, these impulses are converted into sound. In this way humans hear sound through ears.



TEXTUAL QUESTIONS:

Q1. Choose the correct answer.

Sound can travel through

(a) gases only (b) solids only
(c) liquids only (d) **solids, liquids and gases.**

Q 2. Which of the following voices is likely to have minimum?

(a) Baby girl (b) Baby boy
(c) **A man** (d) A woman

Q 3. In the following statements, tick 'T' against those which are true, and 'F' against those which are false.

(a) Sound cannot travel in vacuum. (T / F)

Ans. True

(b) The number of oscillations per second of a vibrating object is called its time period. (T / F)

Ans. False

(c) If the amplitude of vibration is large, sound is feeble. (T / F)

Ans. False

(d) For human ears, the audible range is 20 Hz to 20,000 Hz. (T/F)

Ans. True

(e) The lower the frequency of vibration, the higher is the pitch. (T/F)

Ans. False

(f) Unwanted or unpleasant sound is termed as music. (T / F)

Ans. False

(g) Noise pollution may cause partial hearing impairment. (T/F)

Ans. True

Q 4. Fill in the blanks with suitable words.

Ans. (a) Time taken by an object to complete one oscillation is called **time period.**

(b) Loudness is determined by the **amplitude** of vibration.

(c) The unit of frequency is **hertz (Hz).**

(d) Unwanted sound is called **noise**.

(e) Shrillness of a sound is determined by the **frequency** of vibration.

Q.5. A pendulum Oscillates 40 times in 4 seconds. Find its time period and frequency.

Ans: No. of Oscillations = 40

Time taken = 4 Sec.

Time period T = ?

Frequency

$$\left[\begin{array}{c} Since\ we\ know \\ Frequency = \frac{No.\ of\ Oscillations}{Time} \\ Time\ period = \frac{1}{Frequency} \end{array}\right]$$

i. ∴Time period = $\frac{1}{10}$ = 0.1 Second

ii. ∴Frequency = $\frac{40}{4}$ = 10Hz

Q.6. The sound from a Mosquito is produced when it vibrates its wings at an average rate of 500 vibrations per second. What is the time period of the vibrations?

Ans: Time period = ?

No. of vibrations = 500 i.e, Frequency = 500/Sec.

∴Time period = $\frac{1}{Frequency} = \frac{1}{500}$ = 0.002 Seconds.

Q 7. Identify the part which vibrates to produce sound in the following instruments.

(a) Dholak (b) Sitar (c) Flute

Ans. (a) **Dholak:** Stretched membrane

(b) **Sitar:** Stretched String

(c) **Flutes:** Air column

Q 8. What is the difference between noise and music? Can music become noise sometimes?

Ans. The sound that is pleasing to the ear is called music. For example, the sound produced by violins, pianos, flutes, pungs, etc. The sound that is unpleasing to the ear is called noise. Some examples of noise are as follows:

(i) Sound produced by horns of buses and trucks
(ii) Sound of electrical generators
(iii) Sound of a gun shot
(iv) Sound produced by jackhammers

Yes. Music can become noise when played at high volumes.

Q 9. List sources of noise pollution in your surroundings.

Ans. Refer to Q. No. 08 – Conceptual Questions (Causes of Noise pollution)

Q 10. Explain in what way noise pollution is harmful to humans.

Ans. Refer to Q. No. 08 – Conceptual Questions (Effects of Noise pollution)

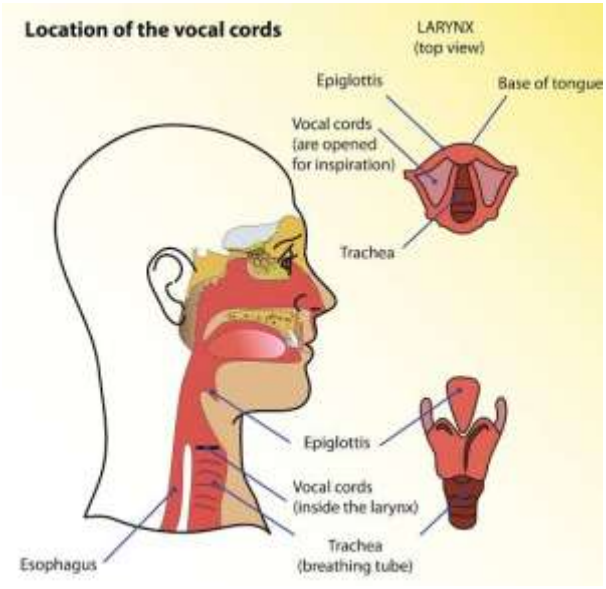
Q11. Your parents are going to buy a house. They have been offered one on the roadside and another three lanes away from the roadside. Which house would you suggest your parents should buy? Explain your answer.

Ans. There will be more noise in the house which is along the roadside. This is because noise produced by transportation vehicles may cause trouble to the residents. The intensity of noise decreases with the distance between the source and the listener. Hence, it is better to take the house that is three lanes away from the roadside.

Q.13. Sketch Larynx of human body & write its functions: Or How is sound produced by humans.

Ans: The human beings produce sound by using the voice box which is called Larynx situated in our throat at the top of wind pipe or trachea. The human voice box or larynx contains two ligaments known as vocal cords. The vocal cords are a kind of strings and produce sound by its vibrations.

The lungs pass a current of air between the two vocal cords and which makes them to vibrate. As a result of which sound is produced. Thus we can talk or sing.



Q.13. Lightening and thunder take place in the sky at the same time but lightening seen earlier. Why?

Ans: Speed of light i.e, $3x10^8$m/Sec is more than speed of sound i.e, 340m/S. So lightening is seen first, though taking place simultaneously in the sky at the same distance with thunder.

Important points to remember:

1. **Sound becomes harmful:** More than 80db
2. **Hearing impairment:** The disability to hear sound is called hearing impairment.
3. **Length of vocal cords in Man:** About 20mm
4. **Why sound waves are called Mechanical waves?**
   Ans: Sound waves are also called → Mechanical waves because it needs material medium to propagate.
5. **Speed of sound is different→** At different temperatures.
6. **Intensity of sound:** The amount of sound energy passing each second through unit area is called the intensity of sound.
7. **Reflection of sound:** The bouncing back of sound waves in the same medium after striking a hard surface is called reflection of sound.
8. **Echo:** The repetition of sound due to reflection of sound waves back towards its source is called Echo.
9. **Reverberation (Gonj):** The multiple reflections of sound from the walls, ceiling, floor of a hall is called Reverberations.
10. **Name two devices using multiple reflections of sound.**
    i. Megaphone ii. Stethoscope

Chapter No. 7

COMBUSTION AND FLAME

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is combustion? What are the types of combustion?

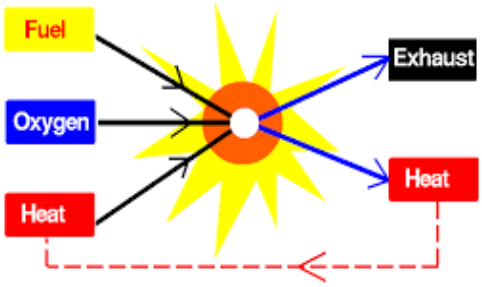
Ans: **Combustion:** A chemical process in which a substance reacts with oxygen of air to give heat and light is called combustion e.g.

i. **Combustion of Magnesium**: When magnesium ribbon burns, it combines with oxygen to form magnesium oxide and liberates heat and light

$2Mg + O_2 \rightarrow 2MgO + Heat + Light$

ii. **Combustion of charcoal**: When the charcoal burns, then the carbon (of which charcoal is made) combines with oxygen to form Co_2 and a lot of heat and a little light in the form of glow (of charcoal) is produced

$C + O_2 \rightarrow CO_2 + Heat + Light$



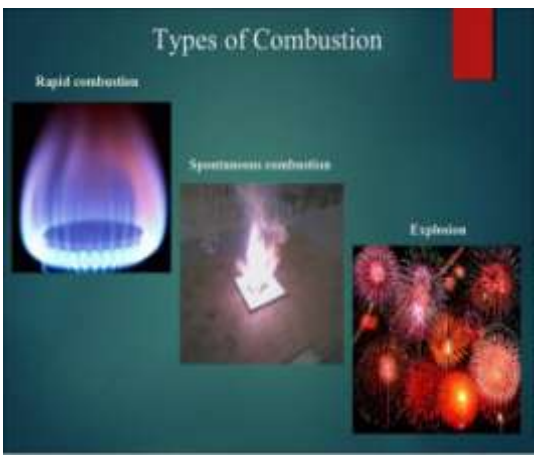
Combustion

Types of combustion: there are various types of combustion but the main three types of combustion are

i. **Rapid Combustion:** The combustion reaction in which a large amount of heat and light are produced in a short time is called Rapid Combustion e.g, (i) burning of cooking gas (LPG) (ii) Burning of Kerosene oil in a stove (iii) Burning of wax in a candle etc.

ii. **Spontaneous combustion:** The combustion reaction which occurs on its own without the help of external heat is called spontaneous combustion e.g, burning of white phosphorus on its own at room temperature, spontaneous combustion of coal dust etc.

iii. **Explosive Combustion/Explosion:** A very fast combustion reaction in which a large amount of heat, light and sound are produced is called explosive combustion or explosion e.g, explosion of crackers during festivals i.e, when a cracker is ignited with a burning matchstick, the chemicals present in the cracker undergo sudden and rapid combustion produce heat, light and large volume of gases which get heated simultaneously by the heat evolved in the reaction, expand rapidly thereby and produce a loud sound.



Q.3. What are combustible and non combustible substances?

Ans: **Combustible Substances:** Those substances which can burn are called combustible substances. In other words, those substances which can undergo combustion are called combustible substances e.g, paper, cloth, straw, LPG, CNG, Kerosene oil, Wood, Charcoal, Coal, Cow dung cakes, Petrol, Diesel, Alcohol, Matchstick, Magnesium ribbon. A combustible substance is also called as Fuel.

Wood Coal LPG Kerosene

Non combustible substances: Those substances which do not burn are called non combustible substances. In other words those substances which do not undergo combustion are called non combustible substances e.g, stone, glass, cement, bricks, soil, sand, water, iron nails, copper etc.

Water *Sand* *Glass* *Cement*

Q.4. What are the conditions necessary for combustion?

Ans: Conditions necessary for combustion:

i. Presence of combustible substance.
ii. Presence of supporter of combustion i.e, Air or Oxygen.
iii. Heating the combustible substance to its ignition temperature.

Q.5. Define Ignition temperature.

Ans: **Ignition Temperature:** The lowest temperature at which a substance catches fire and starts burning, is called its ignition temperature e.g, ignition temperature of paper is 233^{0}C. The ignition temperature of different substances are different.

Material	Ignition Temperature
White Phosphorus	35 degree Celsius
Petrol	246 degree Celsius
Kerosene	220 degree Celsius
Diesel	210 degree Celsius
Wood	300 degree Celsius
Coal	454 degree Celsius
Piece of paper	233 degree Celsius

Q.6. How do we control Fire? OR
What is fire fighting or extinguishing? How can be fire extinguished?

Ans: **Firefighting:** the process of extinguishing broken fire in house, an office, an office, a factory, an oil tanker, a petrol pumps or an electrical equipment or any other property is called fire fighting.

Any fire needs three main things namely fuel or combustible substance, air or oxygen and heat. If any of these three things is removed, then the fire will stop and fire will be extinguished. However the fire can be controlled in three ways.

i. By removing the fuel or combustible substance.
ii. By removing heat by cooling with water.
iii. By cutting off the air supply to the burning substances with Co_2 gas.

Q.7. What is fuels? What are the type of fuel? And what are characteristics of an ideal fuel?

Ans: **Fuel:** A material which is burnt to produce heat is called a fuel. A fuel is a very good source of heat energy. i.e, wood, coal, LPG etc. There are three types of fuels solid fuels, liquid fuels and gaseous.

i. Solid fuels: Wood, Charcoal, Coal, Coke, Cow dung cakes etc.
ii. Liquid fuels: Kerosene, Petrol, Diesel, Alcohol etc.
iii. Gaseous: Natural gas, Petroleum gas, Biogas, Coal gas etc.

Characteristics of ideal fuel:

i. It has a high calorific fuel.
ii. It burns easily in air at a moderate temperature.
iii. It has a proper ignition temperature.
iv. It does not produce any harmful gases or leaves any residue after burning.
v. It is cheap, readily available and easy to transport.
Examples LPG, CNG

Q.8. What is calorific value of fuels?

Ans: **Calorific value:** The efficiency of a fuel to produce heat/heat valve is expressed in terms of its calorific value. In other words the amount of heat produced by complete burning for the complete combustion of 01 kilogram of a fuel is called calorific value.

Unit of C. valve is kilojoules per kilogram. e.g.

When 1 kilogram of kerosene is burned completely, then 45000 kilojoules of heat energy is produced.
Similarly C.V. of LPG is 55000 Kj/Kg.
Calorific value of different fuels:

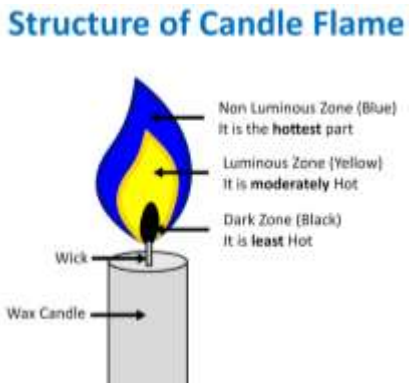
Fuel	Calorific Value (kJ/kg)
Cow dung cake	6000-8000
Wood	17000-22000
Coal	25000-33000
Petrol	45000
Kerosene	45000
Diesel	45000
Methane	50000
CNG	50000
LPG	55000
Biogas	35000-40000
Hydrogen	150000

Q.9. What is a flame? Write the structure of a flam.

Ans: **Flame:** A flame is a region where combustion or burning of a gaseous substance takes place e.g. some of the substances which burn by producing flame are LPG, Biogas, Wax in the form of a candle, camphor, magnesium, kerosene oil and mustard oil.

Structure of a flame: A flame consists of three zones or parts.

i. **Inner most zone** – Dark zone or black zone is least hot part of the flame.
ii. **Middle zone** – Yellow zone – bright & luminous with moderate temperature.
iii. **Outermost zone** – flue zone or non luminous zone where complete combustion of the fuel takes place with highest temperature. This part is the hottest part and is quite thin as compared to the middle part.



Q.10. What are the harmful effects by burning fuels?

Ans: **Burning of fuels leads to harmful products:** The burning of fuels produces harmful products which pollute the air around us. The important harmful effects produced by the burning of fuels are as follows:

i. The burning of fuels like wood, coal and petroleum products releases unburnt carbon particles in the air which can cause respiratory diseases like asthma.
ii. Incomplete combustion of fuels due to insufficient air produces a very poisonous gas called carbon monoxide. Excessive inhaling of *Co* gas can kill a person.
iii. Burning of fuels releases Co_2 into air in the environment. Increased percentage of Co_2 in air causes global warming.
iv. Burning of (coal, petrol and diesel produces 'So_2 'and '*No*' which goes into the air. These gases are suffocating and corrosive

gases and can damage our lungs. Besides these gases mix with rain to form acid rain which is very harmful for forests, aquatic animals and buildings.

Q.11. What is rusting? Can the process of rusting be called combustion?

Ans: **Rusting:** When iron is exposed to moist air, it gets coated with hydrated iron oxide This process is called rusting and the coating formed is called rust. Chemically rust is hydrated form of ferric oxide, Fe_2O_3. XH_2O. It is reddish brown in colour.

$$6Fe + 3O_2 \xrightarrow{3H_2O} Fe_2O_3 + 2Fe(OH)_3$$

$$Fe_2O_3 + xH_2O \longrightarrow Fe_2O_3.xH_2O(Rust)$$

Since rusting is also a very slow oxidation reaction. As such rusting can be also termed as slow combustion reaction.

TEXTUAL QUESTIONS:

1. **List conditions under which combustion can take place.**

Ans: Refer Q.No. 04 – Conceptual Questions

2. **Fill in the blanks.**

(a) Burning of wood and coal causes **Pollution** of air.
(b) A liquid fuel, used in homes is **Kerosene**.
(c) Fuel must be heated to its **Ignition Temperature** before it starts burning.
(d) The fire produced by oil cannot be controlled by **Water**.

3. Explain how the use of CNG in automobiles has reduced pollution in our cities.

Ans: CNG/Compressed natural gas is a smokeless and clean gas. It burns completely in air and does not produce any harmful gas. Thus pollution is reduced by CNG in our automobiles.

4. Compare LPG and wood as fuels

Ans: **Comparison of LPG and Wood as fuel:** LPG (liquefied petroleum gas) has high calorific value i.e, 5500 Kj/Kg and is neat and clean fuel. It burns completely with a smokeless flam and does not produce any poisonous gas.

While as wood has less calorific value i.e, 17000 Kj/Kg and is a dirty fuel. It does not burn completely and gives out smoke and gases on burning.
So LPG is better fuel than wood.

5. Give reasons.

(a) Water is not used to control fires involving electrical equipment.
(b) LPG is a better domestic fuel than wood.

(c) Paper by itself catches fire easily whereas a piece of paper wrapped around an aluminium pipe does not.

Ans: a) **Reason:** Water is itself a good conductor of electricity, that is why it is not used to control fires on electrical appliances or circuit. However CCl_4 (Carbon tetra chloride) a non electrolyte is used for this purpose.

b) Refer to Q. No. 04 – Textual Questions

c) Paper when wrapped around an aluminium pipe does not burn when brought near a flame because the heat gets transferred to aluminium pipe and as such ignition temperature of paper is not achieved.

6. Make a labelled diagram of a candle flame.

Ans: Refer to Q.No. 09 – Conceptual Questions

7. Name the unit in which the calorific value of a fuel is expressed.

Ans: kJ/kg

8. Explain how CO_2 is able to control fires.

Ans: **Reason:** Co_2 gas is heavier than air. So it forms an envelope around the burning fire. This cuts off the supply of oxygen gas and fire stops burning and gets in control.

9. It is difficult to burn a heap of green leaves but dry leaves catch fire easily. Explain.

Ans: A heap of green leaves contains a lot of moisture in it, hence its ignition temperature is high. Therefore it does not catch fire easily. But dry leaves have no moisture content in it, hence its ignition temperature is low. Therefore it catches fire easily.

10. Which zone of a flame does a goldsmith use for melting gold and silver and why?

Ans: The goldsmith mainly uses non-luminous flame which is termed to be the outermost part of the flame. This part of the flame is used because the outermost flame undergoes complete combustion and is considered as the hottest part of the flame.

11. In an experiment, 4.5 kg of a fuel was completely burnt. The heat produced was measured to be 180,000 kJ. Calculate the calorific value of the fuel.

Ans: Solution: Mass of fuel = 4.5 kg

Heat produced = 180,000 kJ

Now, calorific value of a substance = $\frac{heat\ produced}{mass\ of\ fuel}$

$= \frac{180{,}000}{4.5}\ kJ/kg$

$= 4x10^4 kJ/kg$

12. Can the process of rusting be called combustion? Discuss.

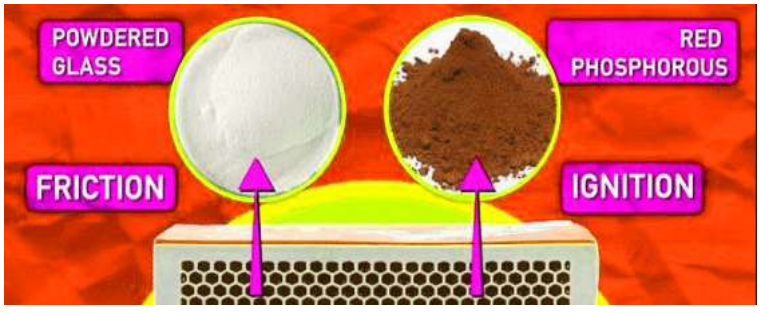
Ans: Refer to Q. No. 11 – Conceptual Question

13. Abida and Ramesh were doing an experiment in which water was to be heated in a beaker. Abida kept the beaker near the wick in the yellow part of the candle flame. Ramesh kept the beaker in the outermost part of the flame. Whose water will get heated in a shorter time?

Ans: The water placed in the outermost part of the flame will be heated in a short time since it is non-luminous flame and is regarded as the hottest part of the flame. So Ramesh's beaker will be heated first. However, Abida who placed the beaker in the luminous flame (yellow flame) is comparatively less hot.

Important points to remember:

1. **Highest calorific value** → Hydrogen
2. **Unburnt particles of carbon are found in** → Inner most zone of candle flame
3. **Lowest ignition temperature** → Gasoline
4. **Heat and light is produced from nuclear reactions** → Sun
5. **Goldsmith uses for melting gold and silver** → Upper most non luminous blue flam.
6. **Global warming**: The rise in temperature of earths temperature caused by the excessive amounts of Co_2 in the air.
7. **Match Stick**: A short thin piece of wood having chemicals coated at one end which is used to light a fire by rubbing against a rough surface, is called matchstick.
8. **Lighting of match stick**: A match stick starts burning on rubbing it on the side of matchbox, because the heat produced by friction heats the chemicals at the head of the match stick to their ignition temperature and make it catch fire.
9. **Inflamable substances:** The substances which have very low ignition temperature and can easily catch fire with a flame are called inflammable substances e.g. petrol, LPG, alcohol etc.



Chapter No. 8

LIGHT

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is light? What are luminous and non luminous object.

Ans: **Light:** Light is a form of energy which enables us to see the objects around us. Light also enables us to see the things from which it comes or from which it is reflected. Light travels in a straight live.

Luminous Bodies: Those objects which emit their own light are called luminous objects. The luminous objects are in fact the sources of light. e.g. Sun, Stars, Burning fire, Radium, glowing tube light, electric bulls etc.

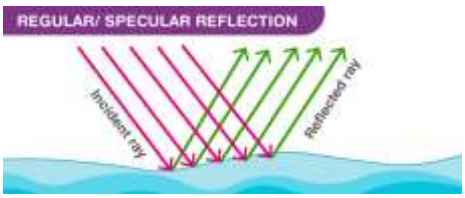
Non luminous Bodies: Those objects which do not emit light of their own but shine due to their luminous bodies are called non luminous bodies e.g. Moon, Earth, Table, Chair, Book, Flowers, Human beings etc. They are visible only when light falls on them.

Q.2. What is Reflection of light? Define (a) Incident ray of light, (b) Reflected ray of light, (c) Normal, (d) Point of incidence (e) Angle of incidence, (f) Angle of reflection.

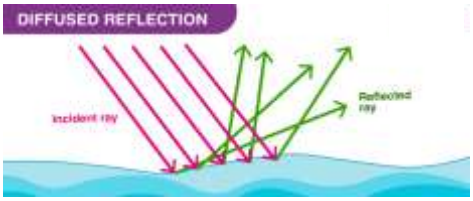
Ans:. **Reflection of Light:** The process of sending back light rays which fall on the surface of an object is called reflection of light.

There are two types of Reflection:.

i. **Regular Reflection:** Reflection taking place on a smooth plane and polished surface is called regular reflection or specular reflection. In this type of reflection the reflected rays are parallel to one another.



ii. **Diffused Reflection:** Reflection taking place on a rough and irregular surface. In this type of reflection the reflected rays are unparallel to each other. i.e, they are scattered.



a. **Incident ray:** The ray of light which falls on the surface of mirror is called incident ray.

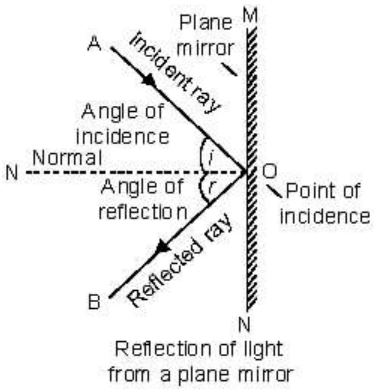
b. **Point of incidence:** The point at which the incident ray strikes the mirror is called the pint of incidence.

c. **Reflected ray:** The ray of light which is sent back by the mirror is called the reflected ray.

d. **Normal:** The normal is a line drawn at right angles to the mirror surface at the point of incidence. In other words the normal is a line which is perpendicular to the mirror surface at the point of incidence.

e. **Angle of incidence:** The angle between incident ray and normal is called the angle of incidence.

f. **Angle of reflection:** The angle between reflected ray and normal is called the angle of reflection.

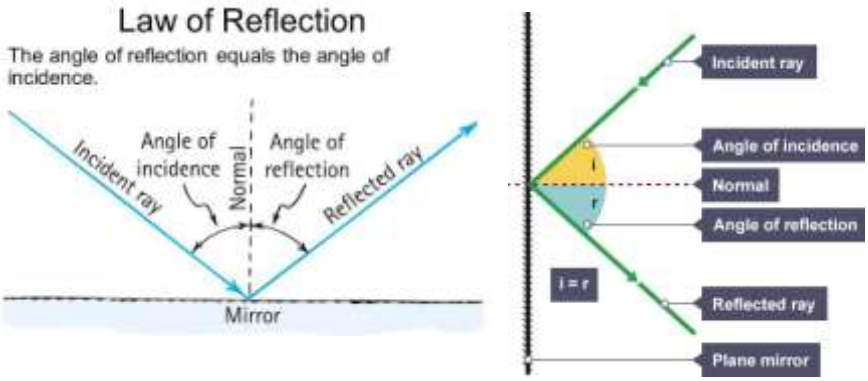


Q.3. State laws of reflection:

Ans: **Laws of reflection:** There are two laws of reflection:

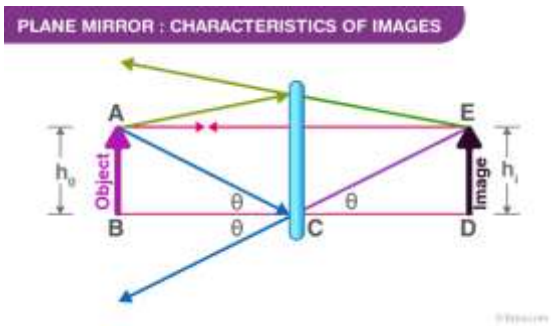
i. **First law of reflection:** According to first law of reflection, the incident ray, the reflected ray and the normal at the point of incidence, all lie in the same plane.

ii. **Second law of reflection:** According to second law of reflection, the angle of reflection is always equal to the angle of incidence. If the angle of incidence is 'i' and the angle of reflection is 'r' then ∠i=∠r



Q.4. State the characteristics of image formed by a plane mirror.

Ans: **Characteristics of image formed by a plane mirror:** When an object is placed infront of a plane mirror, its image is formed in plane mirror. However the image formed in the plane mirror can be located by using the laws of reflection of light. The characteristics of image formed by a plane mirror are as under:



i. The image formed by a plane mirror is as far behind the mirror as the object is infront of it.
ii. The image formed by a plane mirror is virtual/unreal, erect and of the same size as the object.
iii. The image in a plane mirror is laterally inverted (sideways).
iv. The image in a plane mirror is of the same size as that of the object.

v. The image formed in a plane mirror cannot be obtained on the screen.

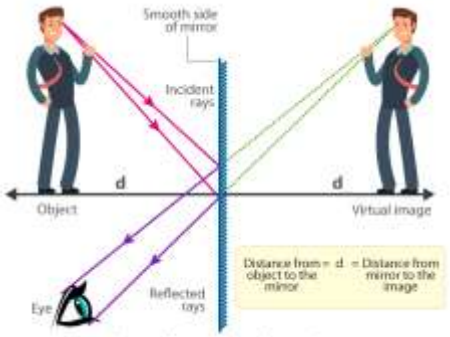


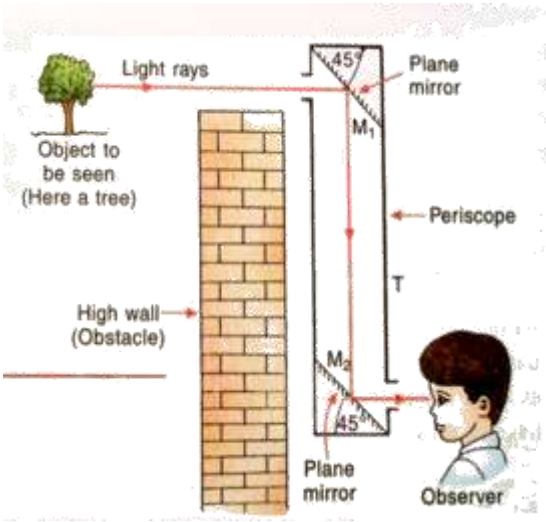
Image formed in plane mirror

Q.5. What is lateral inversion?

Ans: **Lateral inversion:** The image formed in a plane mirror is sideways reversed with respect to the object. Actually, in an image formed by a plane mirror, the left side of an object appears on the right in the image whereas the right side of object appears on the left side of the image.

This change of sides of an object and its mirror image is called lateral inversion.

Q.6. What is periscope and Kaleidoscope?



Ans: **Periscope:** An optical instrument or device in which reflected light is reflected again is called a periscope.

A periscope is a long tubular device through which a person can see objects that are out of the direct line of sight. A periscope works on the reflection of light from two plane mirrors are arranged parallel to one another.

Uses of Periscope:

i. It is used to see over the heads of a crowd e.g. as in football match.
ii. A periscope is used by soldiers sitting in bunker or trench to observe the activities of the enemy.
iii. A periscope is used by a navy officer sitting in a submarine to see ships over the surface of water in the sea.

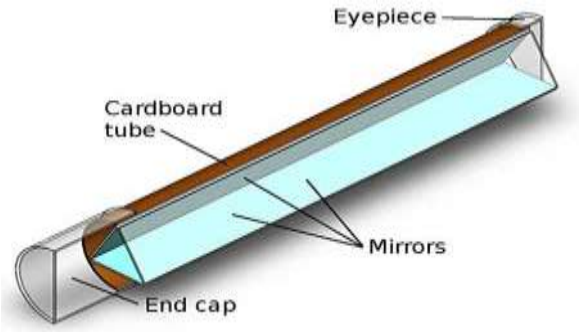
Kaleidoscope: The Kaleidoscope is an instrument or a toy containing inclined plane mirrors which produce multiple reflections of coloured glass pieces/plastic pieces and create beautiful patterns.

The Kaleidoscope consists of three strips of plane mirrors inclined at 60^0 to one another forming a hollow prism fitted in a cardboard. One end of the cardboard tube is closed by an opaque cardboard disc with

a small hole in the centre. The other end of cardboard tube is closed with two circular glass discs, the inner disc being of transparent glass and outer disc of translucent/ground glass.

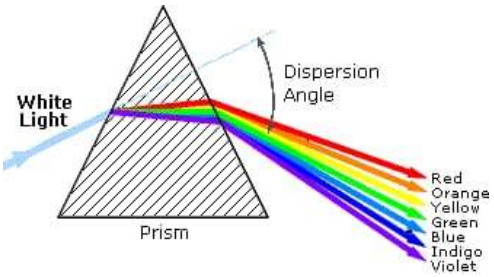
A number of different small coloured pieces of glass or plastic of different shapes are kept between two glass discs which can move around freely. These coloured glasses or plastic pieces act as objects and the inclined plane mirrors form multiple images of these glass pieces by repeated reflections, which look like beautiful patterns or designs. Different designs or patterns can be formed by slight turning of the Kaleidoscope.

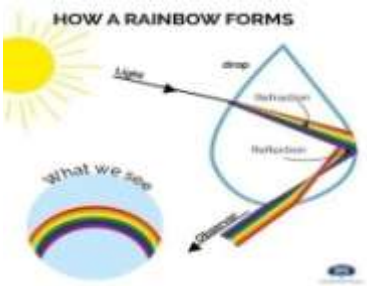
Uses: Kaleidoscopes are used by designers of wall papers and fabrics and artists to get idea of new patterns.



Q.7. What do you mean by dispersion of light and rainbow?

Ans: **Dispersion of light:** The splitting of white sun light into seven colours (VIBGYOR) on passing through a transparent medium like a glass prism is called dispersion of light or spectrum of light.





Rainbow: Rainbow in the sky is a natural phenomenon showing the dispersion of sunlight. It is produced by the dispersion of sunlight by tiny raindrops (acting as water prisms) suspended in the atmosphere.

Q.8. Define persistence of vision. What is the normal range of vision?

Ans: **Persistence of vision:** The image of an object seen by our eyes persists or remains on the retina for $1/16^{th}$ of a second even after the object has disappeared from our view. In other words the ability of an eye to continue to see the image of an object for a very short duration even after the object has disappeared from view is called persistence of vision.

Normal range of vision of human eye: A normal eye can see the distant objects as well as the nearby objects by focusing the images on its retina by changing the thickness or converging power of its lens with the help of its ciliary muscles.

Far point: The farthest point from the eye at which an object can be seen clearly is known as the "Far Point" of the eye. The far point of a normal human eye is infinity.

Near Point: The nearest point up to which the eye can see an object clearly without any strain is called the Near Point of the eye. The near point of a normal human eye is at a distance of 25cm from the eye.

Q.9. Describe briefly Human eye.

Ans: **Human Eye:** The human eye is one of the most important sense organs which enables us to see the various objects around us. It is the organ that reacts to light and allows vision. The organ of sight, the eye is roughly spherical shaped ball like structure which consists of various components like Cornea, Iris, Pupil, Ciliary Muscles, Eye lens, Retina, Optic nerve, Aqueous and Vitreous Humour.

The bulging front part of the eye called cornea is the clear transparent front window of eye that transmits and focuses light in to eye.

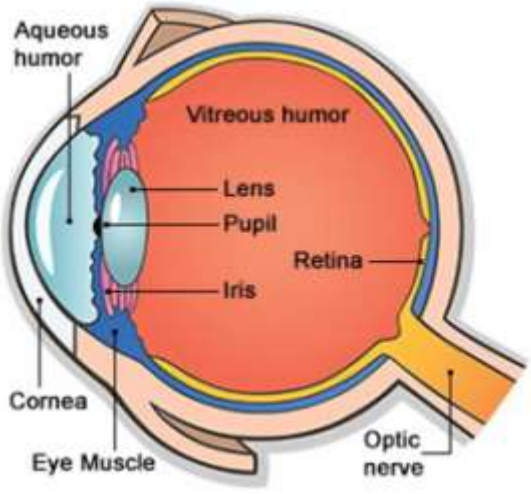
Iris is the coloured part of the eye with black spot like hole in the centre, called pupil. Iris controls the amount of light entering the eye by adjusting the size of the pupil.

Behind pupil is the convex eye lens. The eye lens held in position by ciliary muscles is the transparent structure inside the eye that focuses light rays onto the retina. The ciliary muscles can change the curvature of eye lens and make it thin or thick according to the need of the eye.

The retina behind the eye lens at the back part of eye is a screen on which image is formed. The retina is attached to the optic nerve which carries the image formed on retina to visual cortex of the brain in the form of electrical signals.

The space between cornea and eye lens is filled with a viscous liquid called aqueous humour while as the space between retina and eye lens is filled with another liquid called vitreous humour.

The eyes have externally shutter like covering called eye lids. The eye lids prevent any object from entering the eye.



Q.10. What are the different precautions to protect our eyes?

Ans: **Precautions:** Some important precautions to protect our eyes and maintain healthy eye sight are as under:

i. Wash your eyes atleast twice a day.
ii. Do not read or write in dim light because it puts strain on the eyes and may cause headache.
iii. Do not read by bringing the book too close to your eyes or by keeping it too far from the eyes.
iv. Do not read in a running vehicle.
v. Do not rub your eyes to prevent injury.
vi. Take Vitamin A for keeping eyes healthy and to prevent from many ailments.

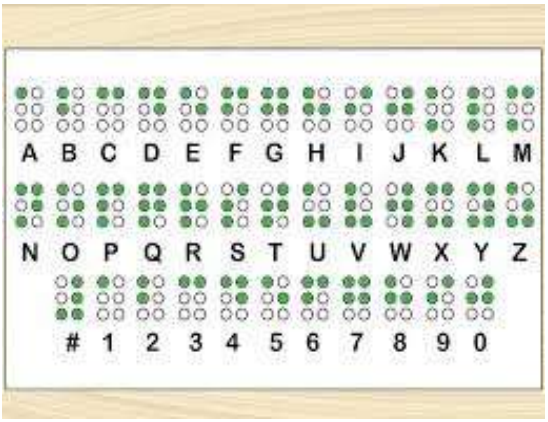
Q.11. What is Night blindness:

Ans: **Night blindness:** the inability of eyes to see properly in dim light especially at night is called night blindness. This eye disease is caused due to deficiency of Vitamin A.

Q.12. What is BRAILLE System?

Ans: **Visually challenged:** Those persons who are unable to see are known as visually challenged persons.

Braille System: The most popular resource for visually challenged persons which can make them read and write is Braille. Braille is a written language for the visually challenged persons in which characters i.e, letters and numbers etc are represented by patterns of raised dots. The visually challenged persons recognize these patterns of raised dots by touching.



Louis Braille who was himself visually challenged person has developed this system in 1821.

TEXTUAL QUESTIONS:

1. Suppose you are in a dark room. Can you see objects in the room? Can you see objects outside the room? Explain.

Ans: If a person is inside the room where there is no light, it is then impossible to visualize the object inside the room but the object out of the room can be seen easily. When light falls on eyes after reflecting from the object, it becomes visible. If the room is dark, then the object which is in the room reflects no light. Hence, the person is not able to see the objects in the room where there is no light.

2. Differentiate between regular and diffused reflection. Does diffused reflection mean the failure of the laws of reflection?

Ans: Refer to Q. No. 02 part (i & ii) – Conceptual Questions.

3. Mention against each of the following whether regular or diffused reflection will take place when a beam of light strikes. Justify your answer in each case.

(a) Polished wooden table
(b) Chalk powder
(c) Cardboard surface
(d) Marble floor with water spread over it
(e) Mirror
(f) Piece of paper

Ans: **a) Polished wooden table:** Regular reflection, as wooden table has smooth polished surface.

b) Chalk powder: Diffused reflection due to rough surface of chalk powder.

c) Cardboard surface- Diffused reflection because cardboard has small irregularities on its surface.

d) Marble floor – Regular reflection as water gives a smooth surface.

e) Mirror- Regular reflection due to smooth surface

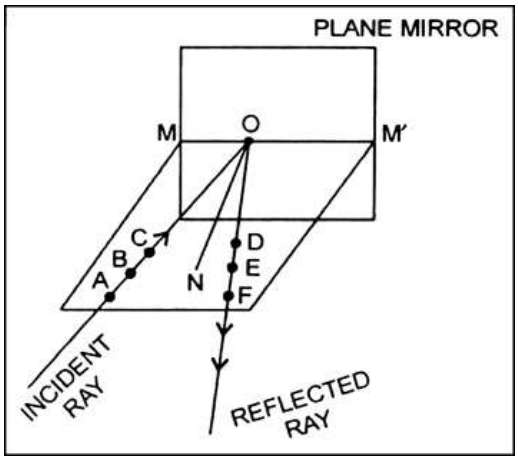
f) Piece of paper- Regular reflection, if paper is fine and diffused reflection, if paper is coarse.

4. State the laws of reflection.

Ans: Refer to Q. No. 03 – Conceptual Questions

5. Describe an activity to show that the incident ray, the reflected ray and the normal at the point of incidence lie in the same plane.

Ans: On a table, place a plane mirror perpendicular to the plane of the table. Make a small hole in a paper and hold it perpendicular to the plane of the table. Try to do this experiment in a dark room. Take one more piece of paper and place it on the table so that it makes contact with the mirror. Draw a line perpendicular to the mirror on the piece of paper which is on the table. Now beam light rays with the help of a torch through the small hole such that the beam of light hits the normal at the bottom of the mirror.



The ray of light will be reflected in the light rays from the hole are incident on the mirror. Looking at the piece of paper on the table, we can easily show that the incident ray, the normal line and the reflected ray at the point of incidence lie in the same plane.

6. Fill in the blanks in the following.

Ans: (a) A person 1 m in front of a plane mirror seems to be **2m** away from his image.

(b) If you touch your **left** ear with right hand in front of a plane mirror it will be seen in the mirror that your right ear is touched with left hand.

(c) The size of the pupil becomes **large** when you see in dim light.

(d) Night birds have **less** cones than rods in their eyes.

Choose the correct option in Questions 7 – 8

7. Angle of incidence is equal to the angle of reflection.

(a) **Always** (b) Sometimes

(c) Under special conditions (d) Never

8. Image formed by a plane mirror is

(a) virtual, behind the mirror and enlarged.

(b) **virtual, behind the mirror and of the same size as the object.**

(c) real at the surface of the mirror and enlarged.

(d) real, behind the mirror and of the same size as the object.

9. Describe the construction of a kaleidoscope.

Ans: Refer to Q. No. 06 – Conceptual Questions (Kalieidoscope)

10. Draw a labelled sketch of the human eye.

Ans: Refer to Q. No. 10 – Conceptual Questions (Human eye diagram)

11. Gurmit wanted to perform Activity 16.8 using a laser torch. Her teacher advised her not to do so. Can you explain the basis of the teacher's advise?

Ans: Laser torch has very sharp beam of light which can destroy the pupil or retina of the eye.

12. Explain how you can take care of your eyes.

Ans: Refer to Q. No. 10 – Conceptual Questions

13. What is the angle of incidence of a ray if the reflected ray is at an angle of 90° to the incident ray?

Ans: If the reflected ray is at the angle of 90^0 to the incident ray, then the angle of incidence is 45^0. According to the law of reflection, the angle of incidence and the angle of reflection are equal. Therefore, the angle of incidence and the angle of reflection both are $\frac{90}{2} = \mathbf{45^0}$.

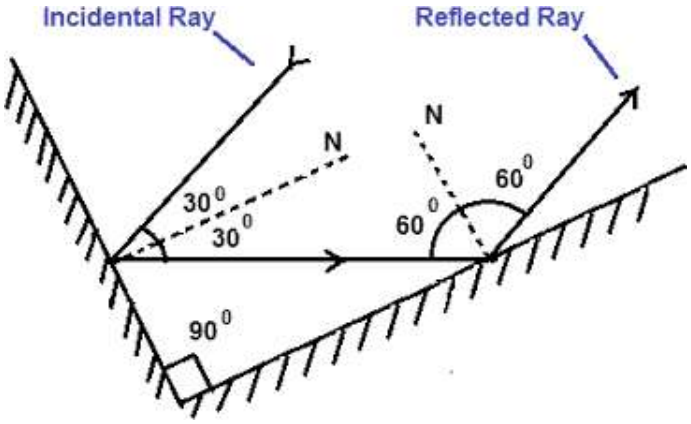
14. How many images of a candle will be formed if it is placed between two parallel plane mirrors separated by 40 cm?

Ans: If a candle is placed between two parallel plane mirror separated by 40 cm, then the multiple and infinite images will be formed due to the multiple reflections between the mirrors. The infinite numbers of images are formed when two mirrors are placed parallel to each other.

15. Two mirrors meet at right angles. A ray of light is incident on one at an angle of 30^0 as shown in Fig. Draw the reflected ray from the second mirror.

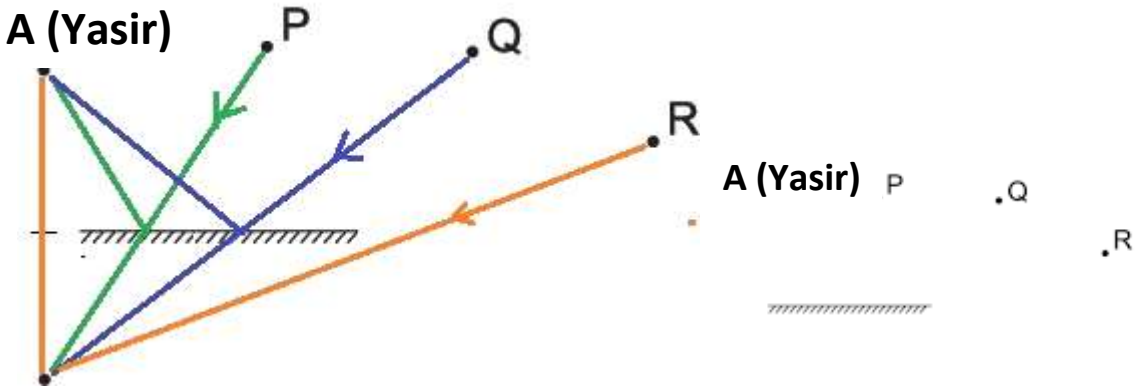
Ans: The ray diagram below shows the direction of reflected ray from the second mirror, when a ray of light is incident on the mirror at an angle of 30^0.

The emergent ray from mirror be reflected at 60^0.



16. Yasir stands at A just on the side of a plane mirror as shown in Fig. Can he see himself in the mirror? Also can he see the image of objects situated at P, Q and R?

Ans: Yasir himself cannot see his image because he is not standing infront of the mirror. However he is able to see object at P & Q because the reflected rays from 'P' & 'Q' reach his eyes. If the ray from object 'R' does reflect and reaches Yasir, he cannot see object 'R' as well.



17. (a) Find out the position of the image of an object situated at A in the plane mirror

(b) Can Saba at B see this image?

(c) Can Yasir at C see this image?

(d) When Saba moves from B to C, where does the image of A move?

Ans: a) Image of an object placed at A is formed behind the mirror. The distance of the image from the mirror is equal to the distance of A from the mirror

b) Yes Saba at B can see this image.

c) Yes Yasir at C can see this image.

d) Image of the object at A will not move. It will remain at the same position when Saba moves from B to C.

Important points to remember:

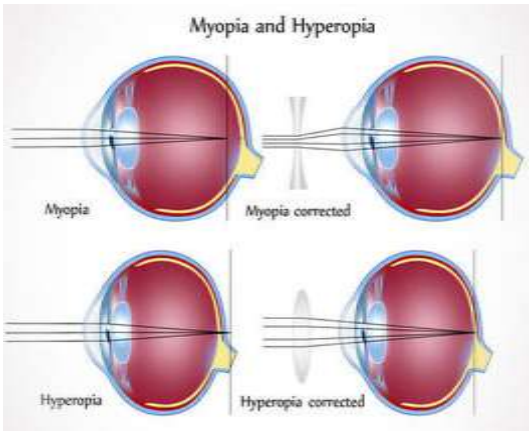
1. **Real Image:** The real image is formed by the actual intersection of light rays. It can be obtained on a screen. Hence projectors form real images. It is always inverted.
2. **Virtual image:** The virtual image is formed when light rays appear to originate from a point but does not actually meet. It cannot be formed on the screen. It is always erect. Rear view mirrors form virtual images.
3. **Name any two photosensitive cells:** Cones and Rods.
4. **Cones:** Cones on retina are sensitive to different colours.
5. **Rods:** Rods on retina are sensitive to intensity of light.
6. **Microscope:** Used to see tiny objects.
7. **Power of Accommodation:** The ability of the eye to focus the distant objects as well as the nearby objects at the retina.
8. **Name three visually challenged persons with great achievements.**

Ans: i. Hellen Keller – American Lecturer and Author

ii. Ravindra Jain – Indian – Famous Lyricist, Singer and Music composer.

iii. Diwakar – India- Very good singer

9. **Blind Spot:** It is a small area of the retina insensitive to light where the optic nerve leaves the eye.
10. **Myopia:** Myopia is the defect of eye due to which a person cannot see the distant objects clearly, though he can see nearby objects clearly. However it can be corrected by using spectacles having Concave lenses.



11. **Hypermetropia:** It is defect of vision in which a person cannot see the nearby objects clearly though he can see the distant objects clearly. However this defect can be corrected by using a spectacle having convex/converging lenses.
12. **Cataract:** It is also a defect of vision in which the eye lenses of a person becomes progressively cloudy resulting in blurred vision. However it can be corrected by surgery.

Chapter No. 9

THE CELL

Basic Concepts/Additional Questions:

Q.1. What are the different instruments used to magnify objects?

Ans: i. **Hand Lens:** A hand lens or a magnifying glass held in a frame with a handle consists a bioconvex lens i.e, convex on both sides is used to magnify objects.

ii. **Microscope:** A microscope is an optical instruments used to see objects that are too small to be seen with the naked eye or magnifying glass. The microscope is used to study microscopic organisms, plant and animal cells, tissue and internal structure of other living things. Robert Hook in 1665 prepared the first simple microscope called primitive microscope.

Parts of Microscope:

a. **Mechanical parts:** Microscope has following mechanical parts.

i. **Base:** It is the basal, metallic, very heavy, horse shoe shaped structure. It is very stable and bears the whole weight of the microscope.

ii. **Pillar:** It is a small vertical, triangular structure which gives support to the handle.

iii. **Handle or Arm:** It is the curved part for holding the microscope. It bears the coarse and fine adjustment screws. It also supports the body tube.

iv. **Stage:** It is a strong, metallic, rectangular, horizontal plate fixed to the handle. In the centre of the stage is a hole.

v. **Stage Clips:** Two clips are attached to the stage. They are used for holding the slide in position.

vi. **Diaphragm:** For regulating the amount of light entering into the microscope, there is present a diaphragm below the stage. It has holes of different sizes.

vii. **Condenser:** Below the stage is present a condenser for concentrating the light rays.

viii. **Body tube:** It is hollow, wide tube attached to the upper part of the arm. It can be moved up and down with the help of two screws.

ix. **Nose Piece:** It is a circular, revolving disc attached to the lower end of the body tube. It bears usually three objective lenses of different magnifications.

x. **Draw Tube:** It can move in and out of the body tube and bears eye piece at the top.

xi. **Course Adjustment Screw:** It is a bigger sized screw used to move the body tube up and down for focusing the object.

xii. **Fine Adjustment:** It is a smaller sized screw used for fine focusing.

b. **Optical Parts:** The microscope has following optical parts.

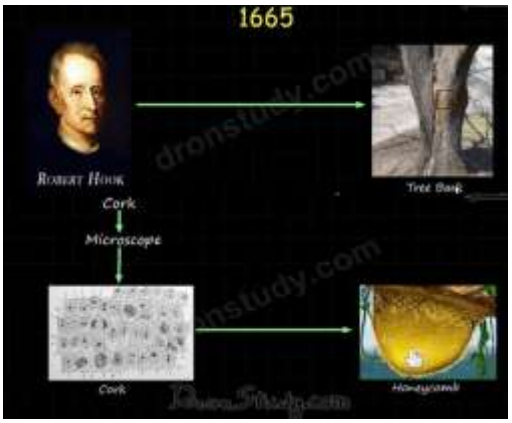
i. **Reflecting Mirror:** It is a movable double sided mirror attached with the pillar. It is meant for reflecting the light rays in such a way so that the light passes through the object which is to be seen.

ii. **Objective Lenses:** They are attached to the nosepiece of the microscope. A standard microscope usually has two or three objective lenses of different magnifications.

iii. **Eye piece lens:** It is a lens fitted at the top of the body tube through which the magnified image of the object is seen.

Q.2. What is a cell? How and who discovered the cell?

Ans: **Cell:** A cell is a living mass of protoplasm. It is the smallest, basic structural and fundamental unit of life.



Discovery of Cell: A cell was discovered by an English Scientist named Robert Hooke in 1665. He investigated the structure of thin slice of cork under his self designed crude microscope. He observed that cork had tiny compartments as small rooms and called them cells. The word cell was derived from a Latin word cellula or cella meaning very small compartment or room.

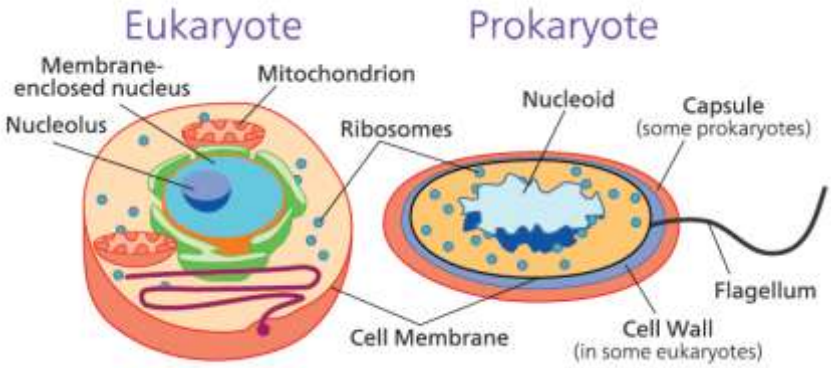
Q.3. Who propounded cell theory? What are its main postulates?

Ans: **Cell theory:** A German botanist M.J. Schleiden in 1838 and a German Zoologist Theodor Schwann in 1839 after studying plants and animals independently put forward a theory called the cell theory. It states that:

i. All the living organisms, whether plants or animals are made up of one or more cells.
ii. A cell is the smallest structural or functional unit of all living organisms.
iii. A cell is a small speck of nucleated protoplasm, bounded by cell membrane and is capable of independent existence and perpetuation.
iv. All cells arise from a division of preexisting cells.

Q.4. What are the types of cells:

Ans: **Types of Cells:** Depending upon the structure, the cells are of two types viz (i) Prokaryotic cells (ii) Eukaryotic cells.

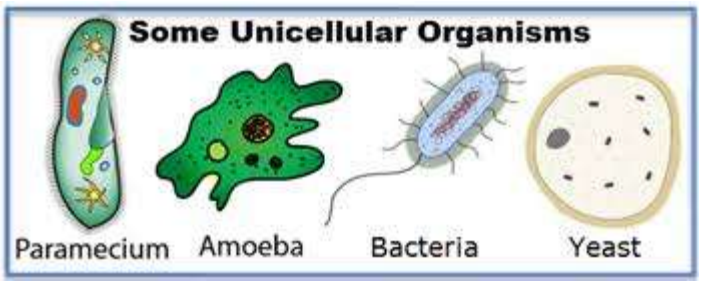


i. **Prokaryotic Cells:** These are the cells with primitive nucleus called nucleoid. The nucleoid is without any nuclear membrane. Moreover, all the membrane bound cell organelles are absent. They are found in all bacteria, blue green algae and mycoplasmas.

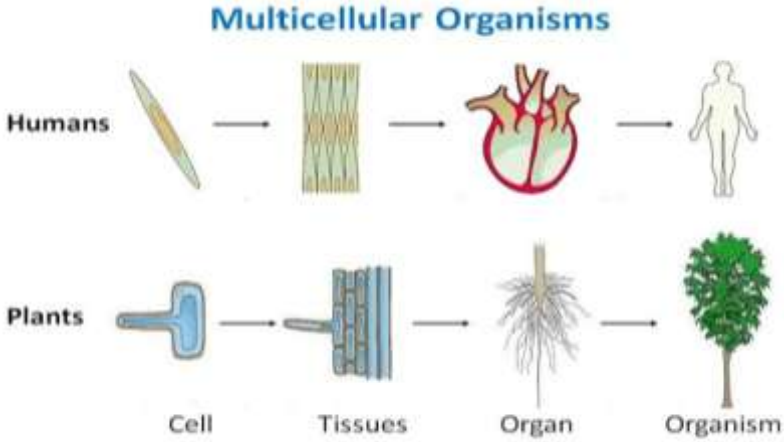
ii. **Eukaryotic Cell:** These cells contain an advanced nucleus encircled by own nuclear envelop. A large number of membrane bound cell organelles are present. These cells are found in all other organisms other than PPLO (Pleuron Pneumonia Like Organisms), bacteria and blue green algae.

Q.5. What are the types of organisms on the basis of number of cells present in them?

Ans: i. **Unicellular organisms:** The organisms which are made of only one cell are called unicellular or singled celled or Acellular organisms e.g, Amoeba, Paramecium, Euglena, chlamydomonas and Bacteria. The single cell of these organisms behaves as a complete organism.



ii. **Multicellular organisms:** The organisms which are made of many cells are called multicellular organisms e.g. A rose plant, a neem tree, a rat, a human being and elephant.



Q.6. Discuss size of cell and shape of cell.

Ans: **Size of a cell:** Size of the cell is greatly variable. Generally some of the cells can be seen with naked eye e.g, eggs of reptiles, birds and jute fibers, but a great majority of cells are too small to be seen with naked or unaided eye. They can be seen only under a microscope. The size of the cells varies from very small cells of bacteria called mycoplasma or pleuropneumonia (i.e, 0.1 – 5μm) to the very large eggs of Ostrich (i.e, 18cm).

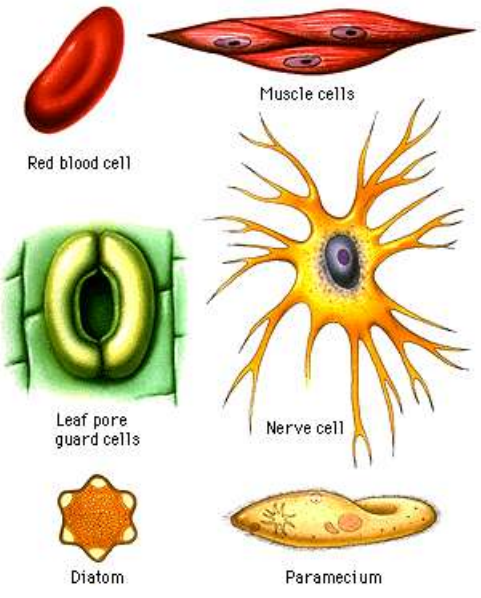
Human RBC is 7 μm in diameters, Human liver and Kidney cell are 20-30 μm in size. The size of nerve cell is about 90-100 cm, the size of single celled marine algae Acetabularia measure 10cm in length. Thus

Smallest Cell → PPLO/Mycoplasma

Largest Cell → Egg of Ostrich

Longest animal cell → Nerve cell

Shape of a cell: The shape and size of the cells vary considerably but all of these are ultimately determined by the specific functions of these cells. Some cells can change their shape like amoeba and white blood cells while most of the plant and animal cells have almost fixed shapes. Cells with fixed shapes can be polygonal like liver cells, spherical like ovum, elliptical like fat cells, spindle shaped like smooth muscle cells, cuboidal like germ cells, elongated like nerve cells, branched like skin cells, discoidal like RBCs and so on.



Q.7. What is Structural Organisation of Eukaryotic Cell?

Ans: **Structure of Cell:** Each cell or A small speck of protoplasm that constitutes one cell is called proplast. This protoplast of a cell can be differentiated into three main essential parts.

i. Plasma membrane or Cell membrane
ii. Cytoplasm
iii. Nucleus

Q.8. Define plasma membrane and cell wall. What are their functions?

Ans: a. **Plasma Membrane:** Each eukaryotic cell is covered by a delicate, thin, elastic but firm selectively permeable membrane called plasma mebrane or cell membrane. Chemically it is made of bilayer of lipids interspersed with proteins.

Functions:

i. It maintains and provides shape and mechanical support to the contents of the cell.
ii. The plasma membrane being selectively permeable allows only useful substances to diffuse in and harmful substances to diffuse out.

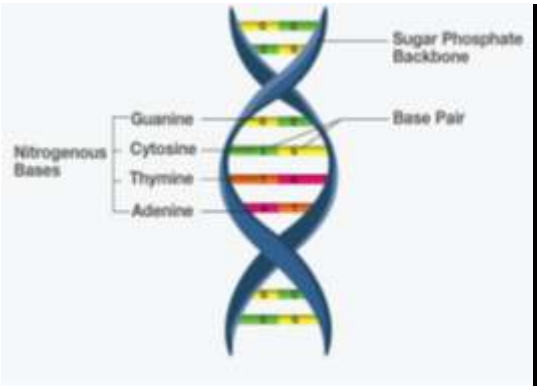
b. **Cell wall/Structure of cell wall:** In case of plant cells , outer to plasma membrane is present a non living and regid cell wall made up of cellulose. The cell wall is free permeable. In between the cell walls of adjoining cells, a gelatinous middle lamella is present that helps to hold the cells together.

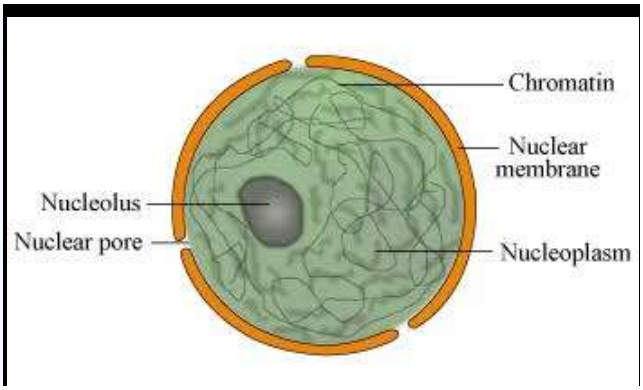
Functions:

i. It provides and maintains the shape of a cell.
ii. It provides rigidity as well as elasticity to the plant cells.
iii. Cell wall helps the plants to bear stresses and strains.

Q.9. Describe structure of nucleus. What are its functions?

Ans: **Structure of Nucleus:** In each eukaryotic cell, is a large spherical organelle and the controlling centre of the cell called as nucleus. In animal cells, nucleus lies in the centre of the cell and in plant cell, the nucleus may be peripheral.





The nucleus is the largest organelle in the cell and is made of four parts as under:

a. **Nuclear Membrane:** The nucleus is bounded by a double, porous selectively membrane called nuclear envelope or nuclear membrane. It separates contents of nucleus from cytoplasm.

b. **Nucleoplasm:** The nucleus is filled with a clear jelly like ground substance named nucleoplasm or nuclear sap. Nucleolus and chromosomes are present in the nucleoplasm.

c. **Nucleolus:** A small spherical dense body made up of nucleoprotein, RNA present in the nucleus is called nucleolus.

d. **Chromatin Material:** A network of thread like structures found in nucleoplasm are called chromatin material. The chromatin reticulum condenses into small thick rod like structures called chromosomes during the cell division. These chromosomes bear the hereditary units called genes which transmit characters from the parents to offspring. The genes are made up of complex substance called DNA (Deoxyribonucleic acid).

Functions of nucleus:

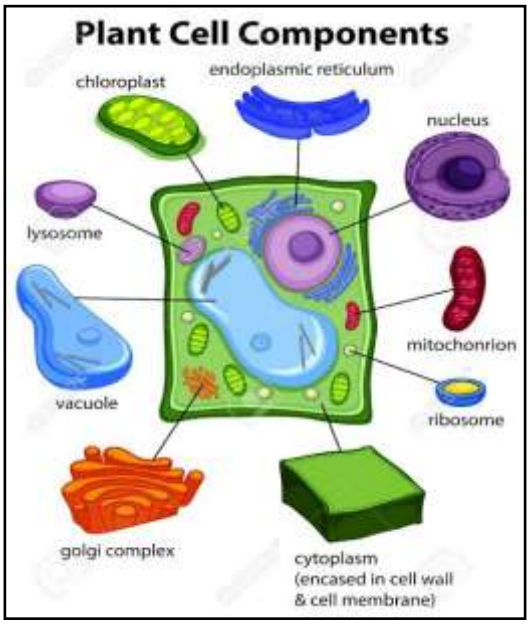
i. Nucleus controls all the activities of the cell.
ii. The nucleus helps in the transmission of characters from parents of one generation to the next generation.
iii. Nucleus is responsible for protein synthesis, cell division, growth and differentiation of the organisms.

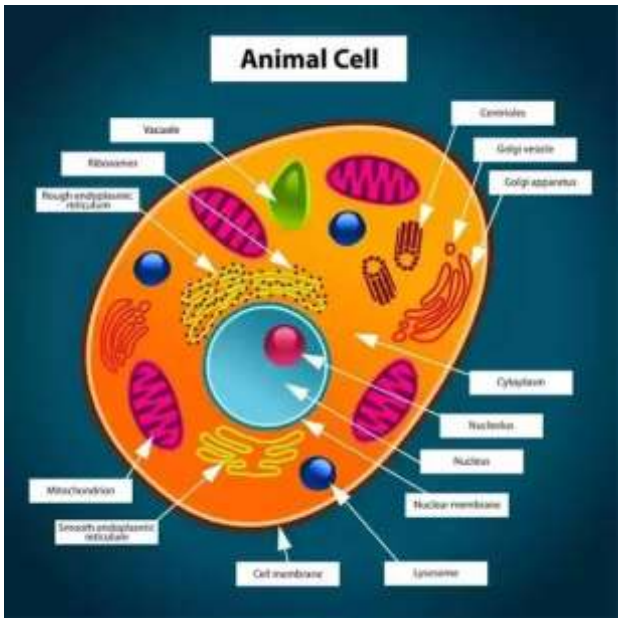
Q.10. Describe briefly structure of cytoplasm. Name different cell organelles present in plant and animals cells.

Ans: **Structure of cytoplasm:** The cytoplasm is a transparent, dense viscous, jelly like colloidal mass present in between the plasma membrane and nuclear membrane. The cytoplasm is a colloidal solution of organic compounds such as carbohydrates, proteins, lipids, vitamins and a true solution of minerals. In the colloidal solution of cytoplasm are present tiny structures called as cell organelles. They perform specific functions and enjoy the same status in a cell as the organs in the organisms.

The various cell organelles found in the cytoplasm of eukaryotic cell are as under:

i. Endoplasmic Reticulum → Both plant and animals
ii. Ribosomes
iii. Mitochondria
iv. Golgi complex
v. Lysosomes: only animal cells
vi. Centrosomes: only animal cells
vii. Plastids: only plant cells
viii. Vacuoles





Q.11. Define mitochondria. What are their functions?

Ans: **Mitochondria:** They are popularly known as 'power house' of the cell. Mitochondria are oval shaped or rod shaped double walled bag like structures present in the cytoplasm.

Functions:

i. Mitochondria help in release of energy from food.
ii. They also store energy in the form of ATP (Adenosine Triphosphate).

Q.12. Define Endoplasmic Reticulum. What are its functions?

Ans: **Endoplasmic Reticulum:** A complex interconnected network of membrane lined channels present in the cytoplasm are called Endoplasmic Reticulum. Its network extends from nuclear membrane to cell membrane.

Endoplasmic Reticulum is of two types namely
i. smooth endoplasmic reticulum (SER) – Smooth in appearance with no ribosomes on its surface.
ii. Rough endoplasmic Reticulum (RER) – Rough in appearance due to presence of granule like structures called ribosomes.

Functions:

i. It helps in protein synthesis.
ii. It provides in intracellular transport system.
iii. It helps in the manufacture of fat molecule called lipids important for cell function.

Q.13. What are Ribosomes? What are its functions?

Ans: **Ribosomes:** They are smallest granular membrane less granular structures present free or attached with endoplasmic reticulum.

Functions: They help in the protein synthesis and are known as the protein factories of a cell.

Q.14. Define Golgi complex or Golgi bodies? What are their functions?

Ans: **Golgi Complex:** Golgi complex also called as Golgi apparatus or Golgi bodies are membrane bound pile of many flattened sacs.

In plants they are called as Dictyosomes,. It was first described by Camilo golgi.

Functions:

i. They are mainly secretary in functions.
ii. They help in the formation of lysosomes and complex sugar from simple sugars.

Q.15. What are lysosomes? What are their functions?

Ans: **Lysosomes:** These are small spherical, most abundant micro sacs present only in animal cells. They have single membrane and contain different types of enzymes called hydrolyses. The lysosomes sacrifice themselves to destroy and digest various materials especially foreign bodies. As such they are also called Suicidal bags.

Functions:

i. The main function of lysosomes is intracellular digestion and digestion of foreign bodies.
ii. They also help in the digestion of worn out cell organelles.

Q.16. What are centrosomes? Give their functions.

Ans: **Centrosomes:** Centrosomes are rod like structures appearing close to the nucleus in animal cells. They are made from two centrioles. Centrioles are Microtubule rings.

Functions:

i. The main function of centrosome is to organize microtubules and provide structure of the cell.
ii. They help to pull chromatids apart during cell division.

Q.17. What are plastids? Give their functions.

Ans: **Plastids:** These are double walled differently shaped. Cell organelles found within the cells of photosynthetic organisms like plants and algae. Plastids are responsible for manufacturing and storing of food. The plastids contain the pigments. Depending upon the colour plastids are of three types namely, (i) green coloured plastids called Chloroplasts (ii) Colourless plastids called leucoplastids and coloured plastids called chromoplastids.

Functions:

i. Leucoplastids help in the storage of food.
ii. Chloroplasts help in photosynthesis.
iii. Chromoplasts provide attractive colours in the plants.

Q.17. Define vacuoles. What are their functions?

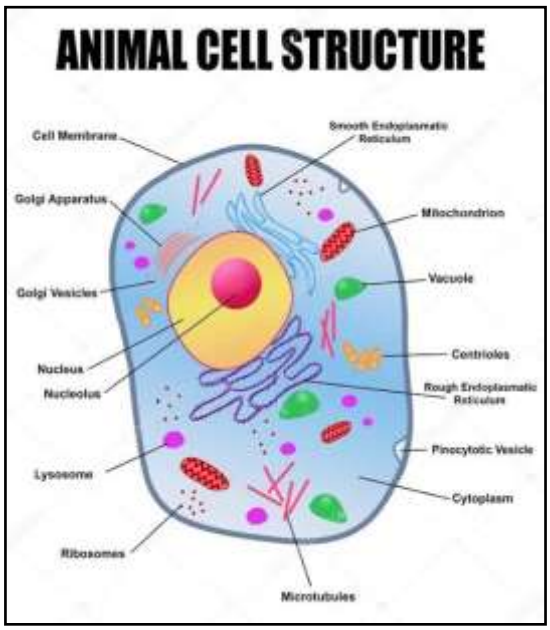
Ans: **Vacuoles:** Vacuoles are flued filled or solid filled spaces in the cytoplasm. The vacuoles are covered by a membrane called tonoplast. In plants vacuoles are larger in size, few in number while as in animals they are smaller in size but more in number.

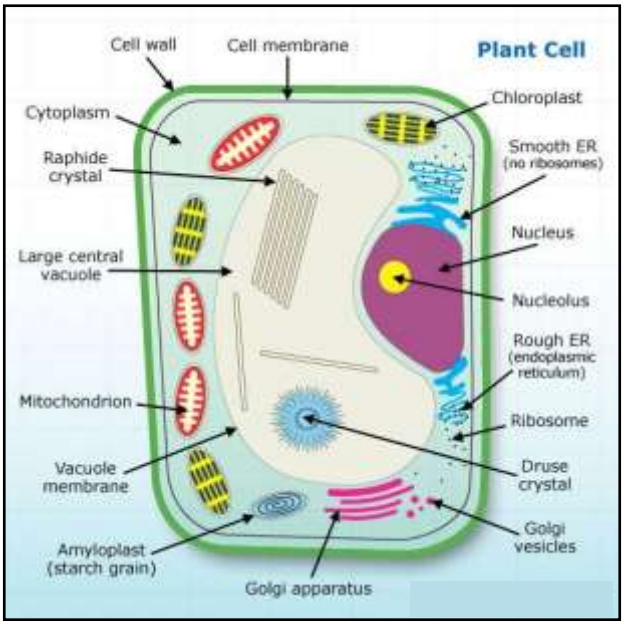
Functions:

i. Vacuoles maintain the turgidity of plant cells.
ii. The tonoplast being semipermeable, segregates the waste materials as well as nutrients to be stored in the vacuoles in their concentrated form.

Q.18. Differences between plant cell and animal cell.

Plant Cell	Animal Cell
A plant cell has a cell wall around it made of cellulose.	An animal cell does not have any cell wall around it.
Plant cells have chloroplasts.	Animal cells do not have chloroplasts.
Plant cells have thin cytoplasm and large vacuoles.	Animals cells have thick cytoplasm with smaller vacuoles.
Centrosome and lysosomes absent	Centrosome and lysosomes present
Reserve food is in the form of starch.	Reserve food is in the form of glycogen and oil.





TEXTUAL QUESTIONA:

Q1. Define a cell?
Ans. Refer to Q. No. 02 – Conceptual Questions.

Q2. Who discovered the cell?
Ans. Refer to Q. No. 02 – Conceptual Questions.

Q3. Give three examples of unicellular organisms.
Ans. Three examples of unicellular organisms are: Amoeba (Protozoa), Paramecium (Protozoa) and Chlamydomonas (Green algae).

Q4. Answer the following questions:

i. Why cells could not be observed before 17th century?
Ans. Most cells are smaller in size, due to this smaller size these cells could not be seen before 17th century because no instrument was invented that could be used see these small structures.

ii. Why cork could not be observed as such by Hook?
Ans. Cork is a solid structure, so Hook was unable to observe it under his crude microscope. He then made slices of cork and observed them under his microscope.

iii. Where did Hooke demonstrate his observations on cork slice?
Ans. Hook demonstrated his observations on cork slices to scientist at Royal Society of London.

iv. Name the outermost layer of animal cell.
Ans. Cell membrane is the outermost layer of animal cell. It protects and provides shape to the cell. It also allows materials to enter and leave the cell through tiny holes.

v. Name the layer which is present outside the plasma membrane in plant cell?
Ans. Cell wall is the layer which is present outside the plasma membrane in plant cell. It is made of a stiff, non-living material called cellulose. It protects the cell. Cell wall is lacking in animal cells.

vi. Where are chromosomes present in a cell?
Ans. Chromosomes are present in the nucleus of the cell.

vii. Name the cell part which has tiny holes?
Ans. Cell membrane or plasma membrane and nuclear membrane have tiny holes. These tiny holes allow the cell parts in the exchange of substances or materials.

viii. Name the cell organelles which are found in a plant cell?
Ans. Mitochondria, Chloroplast, Nucleus, Endoplasmic Reticulum, Golgi Complex, Ribosomes, Lysosomes etc.

ix. Name the cell having branched structures?

Ans. Nerve cell is the cell that have branched structures. A nerve cell is long and has thread like projections, as it has to convey messages to different parts of the body.

x. Which cell can be observed under unaided eye?

Ans. The cells that are bigger in size can be observed with unaided eyes. For example, an Ostrich egg is the largest animal cell that can be seen with naked eyes. In plants, an Algae, Acetabularia has a one big cell that can be seen with naked eyes.

Q5. Mention the functions of the following;
i. Cell membrane ii. Chromosome

Ans. **a. Functions of Cell membrane:** It is a very thin skin covering of cell.

i. It protects the cell.
ii. It provides shape to the cell.
iii. It allows materials to enter and the cell through tiny pores.

b. Functions of chromosomes: Chromosomes are thread like structures.

i. They inherit the characters from one generation to another.
ii. They protect the genetic material (DNA) from being damaged during cell division.

Q6. Why are the following important to a plant cell?
i. Cell wall ii. Chloroplast iii. Mitochondria iv. Nucleus

Ans. **i. Cell Wall:** Cell wall is important to the plant cell because it provides rigidity to it and makes it to stand erect. It also provides protection to the cell.

ii. Chloroplast: It is important to the plant cell because it helps a plant to make food. It has a green pigment called chlorophyll, which in presence of sunlight with Co_2 and water helps in the manufacture of food in plants.

iii. Mitochondria: It is important to the cell because it provides energy to the cell and performs the functions of respiration.

iv. Nucleus: Nucleus is important to the cell because it is responsible for the transmission of characters from one generation to another. It controls all the life functions taking place in the cell. It is the boss of the cell.

Q7. Draw an outline diagram of an animal cell. Label its different parts.

Ans: Refer to Q.No. 18 – Conceptual Questions (Animal Cell Structure)

Q8. Mention three differences between plant cell and animal cell.

Ans. Refer to Q.No. 18 – Conceptual Questions

Q9. What features are possessed by both plant cells and animal cells?

Ans. Features possessed by both plant cells and animal cells are as under:

i. Plasma membrane is present in both.
ii. Nucleus is present in both.
iii. Both cells contain mitochondria.
iv. Both cells contain the organelles like, endoplasmic reticulum, Golgi complex, lysosomes and ribosomes.

Q10. Why are nerve cells long? Why do these cells have projections?

Ans. Nerve cells are long, branched and have thread-like projections because their function is to convey messages to all parts of the body.

Q11. Why are mitochondria known as the 'power house of the cell'?

Ans. Mitochondria are called the 'power house of the cell' because they provide energy to the cell and also helps in respiration.

Q12. Which four basic elements constitute more than 90% of protoplasm?

Ans. Carbon, Nitrogen, Hydrogen and Oxygen are the four basic elements that constitute more than 90% of protoplasm.

Q13. Write in brief about the variation in shape and size of cells.

Ans. Refer to Q.No. 06 – Conceptual Questions

Q14. Name the different cell organelles and the functions of these organelles?

Ans. Refer to Q.No. 09, 11, 12, 13, 14, 15 , 16, 17& 18 – Conceptual Questions (Name and function part only)

Q15. What is meant by protoplasm? How does it differ from cytoplasm?

Ans. Protoplasm is a liquid consisting of cytoplasm, cell membrane and nucleus. Protoplasm is called 'the physical basis of life'. It is a colloidal, complex, elastic, viscous, granular and colourless substance present in the cell. It contains many chemical elements like hydrogen, carbon, oxygen, nitrogen etc.

It is different from the cytoplasm because most of the functions take place in cytoplasm as it contains many tiny structures called organelles which perform the various life functions.

Q16. Fill in the blanks, using the words given below:
(mycoplasma, microscope, nucleus, ostrich egg, cytoplasm, lysosome, mitochondria, Robert Hook, plant, cell membrane)

i. The **lysosomes** are also called as suicide bags.
ii. The term 'cell' was given by **Robert Hook**.
iii. The instrument used to see tiny objects is called a **microscope.**

iv. Smallest cell is that of a **mycoplasma.**
v. An **Ostrich egg** is a cell that can be seen without a microscope.
vi. The **cell membrane**, **cytoplasm** and **nucleus** are parts of a cell.
vii. Energy is produced in **mitochondria**.
viii. Cell wall is present in **plant** cells.

Q17. Write 'True' or 'False' in front of the statement given below:

i. Most of a cell is nucleus. *(True)*
ii. Only the nucleus of a cell represents the protoplasm. *(False)*
iii. Most cells are microscopic. *(True)*
iv. All living organisms are made of cells. *(True)*
v. Every cell has cytoplasm. *(True)*
vi. All cells in a multicellular organism can live independently. *(False)*
vii. The outermost covering in an animal cell is called cell wall. *(False)*

Q18. Match the statements in Column A with those in Column B:

Ans.

	Column A		**Column B**
1.	Cell	**c.**	**Unit of living body.**
2.	Nucleus	**d.**	**Boss of the cell.**
3.	Cell wall	**a.**	**Outermost covering in plant cells.**
4.	Chloroplast	**e.**	**Photosynthetic unit.**
5.	Cytoplasm	**f.**	**Jelly-like substance between cell membrane and nucleus.**
6.	Organelles	**b.**	**Tiny structures inside cells.**

Q19. Label the different parts of the plant cell.

Ans: Refer for Q. No. 18 – Conceptual Questions (Plant cell diagram)

Important points to remember:

1. **Neuleoid:** A nuclear material without a membrane around it is called nucleoid. e.g. in prokaryotic cells.

2. **Protoplasm:** All the living material in a cell is called protoplasm. It includes cytoplasm, nucleus and other organelles.

3. **Gene:** Gene is a unit of inheritance in living organisms.

4. **Cell:** A cell is the smallest unit of life which has a definite structure and performs a specific function.

5. **Tissue:** A group of cells with same structure and same function is called a tissue.

6. **Pseudopodia:** These are finger like false feet of amoeba.

7. **W.B.C:** White blood cells present in the blood are single celled and engulf the foreign materials.

8. **Constituents of protoplasm more than 90%:** Carbon, Hydrogen, Nitrogen, Oxygen or Carbohydrates, Protein, Fats and Nucleic acid.

9. **Who discovered Nucleus:** Robert Brown

10. **Name smallest & largest human cell:**
Smallest cell – Nephron Largest Cell – Neuron

11. **Smallest cell organelle** – Ribosomes

12. **Largest cell organelle** – Plastids

13. **Yellow Yolk in the egg** – Single Cell

14. **Name a unicellular organism with cilia** – Paramecium

15. **Preparation of Microscopic Slide:**
    i. Take a clean glass slide and put a drop of water with the help of a dropper.
    ii. Mount the material/object to be observed in the drop of water with the help of forcep.
    iii. Put a drop of chemical on the object as stainer.
    iv. Then put the cover slip over the object. In this way slide is prepared.

16. **Why we stain the cells while preparing slide?**

Ans: Staining is done to see the nucleus prominently.

Diffusion: Movement of substance (Solid, Liquid or gas) from the region of its higher concentration to the region of lower concentration through a semi permeable membrane.

Osmosis: The movement of water or solvent through selectively permeable plasma membrane is called Osmosis.

Chapter No. 10

FRICTION

Topics:- Basic Concepts/Conceptual questions as per text book:

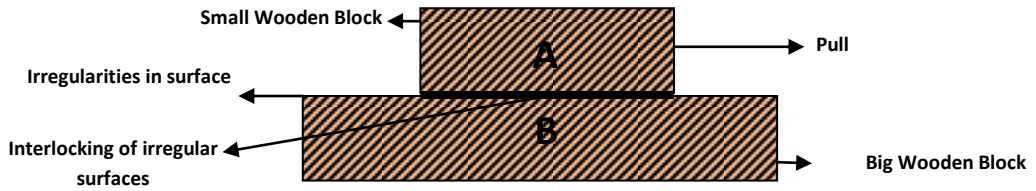
Q.1. What is friction? How is it caused?

Ans: **Friction:** The force which always opposes the motion of one object over the other object is called Friction or Force of Friction. However the force of friction acts in a direction opposite to the direction in which an object moves or tends to move.

Example: Friction occurs between two surfaces which are in contact with each other, such as when we push a heavy box kept on a floor; here the force of friction occurs between the surface of ground and bottom of the box.

Causes of friction: The friction is caused by the interlocking of irregularities in the surfaces of two objects which are in contact with each other. More the roughness of a surface, larger is the number of irregularities on its surface and hence greater will be the friction. Thus the force of friction is greater if very rough surfaces are involved.

Example: When we attempt to one object (e.g, a wooden block A) over the surface of other object (e.g. wooden block B), we have to apply a force to overcome interlocking of the irregularities in their surfaces.



Q.2. What are the factors affecting friction?

Ans: **Factors affecting friction:** It has been found by experiments that the friction between two surfaces depends on the two factors as under.

i. **Nature of the surfaces:** Friction is not same for all the surfaces. Friction depends on the smoothness or roughness of the two surfaces which are in contact with each other.

ii. **The force with which two surfaces are pressed together** if the two surfaces of the objects in contact with each other are pressed together harder by a greater force, then friction will increase.

Q.3. What are the types of friction?

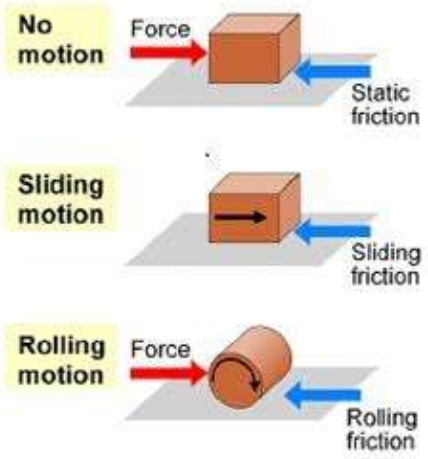
Ans: **Types of friction:** Friction is of three types (i) Static friction, (ii) Sliding friction (iii) Rolling friction or dynamic friction.

i. **Static friction:** The force of friction called into play which does not allow two bodies to slide upon one another, is called static friction.

It is a self adjusting force that is only as much is necessary to prevent the motion.

ii. **Sliding friction:** The frictional force present when one object moves slowly or slides over the surface of other object is known as sliding friction. Thus sliding friction comes into play when an object is sliding i.e, moving slowly and continuously over other object. It is also called dynamic friction.

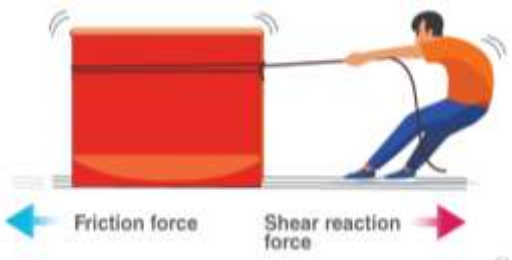
iii. **Rolling friction:** When an object like a wheel rolls over the surface of other object, the resistance to its motion is called rolling friction. It is always easier to roll than to slide an object over other object. So rolling friction is much less than sliding friction. Thus rolling reduces friction.



Rolling friction is caused by the rubbing of surfaces together

Q.4. What is Limiting Friction? State the laws of limiting friction.

Ans: **Limiting Friction:** The maximum static force of friction which comes into play when one body just slides upon another body is called limiting friction.



Laws of limiting friction:

i. Limiting friction always opposes to the motion of a body and acts in a direction opposite to the direction of applied force.
ii. Limiting friction depends upon the nature of two surface in contact with each other.
iii. Limiting force increases with the increase in the weight of body and decreases when the weight of the body decreases.
iv. Limiting friction is independent of the area of contact between two surfaces, provided the weight and nature of the body does not change.

Q.5. Why is dynamic friction slightly less than the sliding friction.

Ans: **Reason:** Dynamic friction is slightly less than the limiting friction because when an object already in motion/already started moving or sliding, the irregularities on the surface do not get enough time to lock into irregularities friction is smaller than the static friction.

Q.6. State advantages of friction:

Ans: **Advantages of friction:** Friction is useful to us as under:

i. It enables us to walk without slipping over the ground because friction between the sole of our shoes and ground prevents us from slipping over the ground.

ii. Friction enables a car to move on road without skidding.
iii. Friction enables us to write and draw on paper.
iv. Friction enables us to pick up and hold things in our hands.
v. Friction enables us to light matchstick.
vi. Nails can be fixed in wall or wood due to friction.

Q.7. State the disadvantages of friction.

Ans: **Disadvantages of friction:**

i. Friction reduces the speed of moving object to a great extent.
ii. Friction causes wear and tear and makes the machine unworkable.
iii. Friction wears out the brake pads and tyres of vehicles.
iv. Friction wears out steps of staircases in buildings and foot over bridges.
v. Friction wears out the soles of our shoes.

Q.8. What are methods of increasing friction?

Ans: **Friction can be increased by the following methods:**

i. Grooves and spikes are made in the soles of shoes to increase friction and prevent slipping.
ii. Treads are made in the tyres of vehicles to increase friction and prevent skidding of vehicles on wet roads.
iii. Machine belts are made of special materials to increase friction and drive machine wheels properly.
iv. Gymnasts apply some coarse substance on their hands to increase friction to better grip.

Q.9. What are methods of reducing friction?

Ans: **Methods of reducing friction:** Following are the methods by which friction can be reduced between two surfaces in contact.

i. By the use of lubricants like oil or grease to the rubbing surface.
ii. It can be reduced by making the surfaces smooth by polishing.
iii. Friction can be reduced by using wheels to move objects.
iv. Friction can be reduced by using ball bearings between moving parts of machines.
v. By using soap solutions.
vi. The fluid friction can be reduced or minimized by giving special shape called streamlined shape like aeroplane, house boat, car.

Q.10. What is fluid? What is fluid friction or drag or drag force? What are the factors responsible for magnitude of drag?

Ans: **Fluid:** Those substances which are able to flow easily are called fluids e.g, liquid & gases are called fluids.

Fluid friction: There is friction whenever an object moves through a fluid. It is called fluid friction. Thus frictional force exerted by a fluid air or water is called drag or drag force e.g.

i. Air exerts frictional force on cars, buses, aeroplanes, rockets and birds etc.
ii. Water exerts frictional force on objects like boats, speed boats, ships, submarines and fish which move through it.

Factors responsible for magnitude of drag:

i. Speed of the object
ii. Shape of the object
iii. Size of the object
iv. Nature of the fluid i.e, viscosity of the fluid i.e. water is more viscous i.e, thick than air.

TEXTUAL QUESTIONS:

1. Answer the following questions:

(i) Why are the worn out tyres, discarded?

Ans. When the tyres are, worn out, their groves disappear due to the constant use; this reduces the friction between tyres and road. The reduced friction increased the speed of vehicles, resulting the chances of accidents, that is why, worn out tyres are discarded.

(ii) Why do carom coins move faster on carom board when dusted with talcum powder?

Ans. When carom board is, dusted with talcum powder, the friction between carom coins and the surface of carom board reduces, thus the carom coins move faster on carom board.

(iii) Why is the surface of conveyor belt, made rough?

Ans. Conveyor belts are used, in the mechanical machines at railway stations or air ports to carry passenger's luggage. The belts are made rough to increase the friction between belt and pulley so that to slow down the speed of the machine. Due to slow speed, no luggage slides over another and this makes passengers easy to collect his luggage.

(iv) Why is the sewing machine often, oiled?

Ans. Constant use of sewing machine makes the surfaces of its moving parts irregular that increases the friction resulting its slow speed and more energy wastage. A less viscous oil acts as a lubricant in the machine that makes the surfaces smooth reducing the friction, less energy usage but more and faster work. That is why sewing machine is often oiled.

(v) Why do new automobile tyres have deep grooves?

Ans. The tyres with deep groves are the kind of irregular surfaces, since the friction is, caused due to the interlocking irregularities of two

surfaces, the friction between the tyres and the road increases; this slows down the speed of the vehicle, resulting in the less chances of accidents. It also helps apply the brakes safely.

(vi) Why does a ball rolling on the ground slowdown?

Ans. When the ball rolls on the ground a part of the ball and the ground surface gets continuously deformed thereby increasing the rolling friction between the two. The increase in the friction reduces the speed of ball, since a limiting force is, applied to the ball it slows down after moving a small distance.

(vii) Why are the boats and aeroplane, given special shape?

Ans. The boats and aeroplane are given a special shape so that friction between water (in case of boat) or air (in case of aeroplane) is reduced to a large extent. This also offer the least resistance to the air and water and help them to move or fly with a lot of speed.

(viii) Why do meteors burn on entering into the atmosphere?

Ans. The meteors enter the earth at a very high speed. At such speeds, the friction due to air is extremely high. Due this high friction, the temperature of the meteor rises to such a high degree that they catch fire and burn down while entering into the atmosphere.

(ix) Why do painters use sand papers in polishing doors?

Ans. Sand papers are, used to make the surfaces smooth. In other words, it helps a painter held the paint while polishing, with the help of sliding friction.

(x) Why is it easier to tie a knot with cotton string as compared to silk string?

Ans. Cotton string has rough surface while as silk string has smooth surface. While we knot a tie, the friction between two end surfaces of cotton string increases, this makes it easy to knot a tie with cotton string as compared to silk string, which has the reduced friction between two smooth end surfaces.

2. Fill in the blank spaces by choosing words from the list given below:

List: movement, sliding, streamlined, static, opposite

(i) Friction always acts in the direction ***opposite*** to the direction of applied force.

(ii) ***Static*** friction is a self-adjusting force.

(iii) Friction is very useful as it helps in the ***movement*** of the bodies.

(iv) The ***sliding*** friction is 10 times the rolling friction.

(v) The boats and aeroplanes are ***streamlined*** so as, to reduce fluid friction.

3. Statements given below are incorrect. Write the correct statements.

(i) Sliding friction is slightly more than the limiting friction. ***True***

(ii) The conveyor belts are, made rough, in order to decrease friction. ***False***

(iii) The friction between two surfaces decreases with the increase in the weight of as body. ***False***

(iv) The friction offered by the wheels is called sliding friction. ***True***

(v) The friction increases with the increases in the area of contact at the two surfaces. ***True***

INTEXT QUESTIONS: (Test yourself) Page 178

Q.1. What do you understand by the term friction? Explain how it is caused.

Ans: Refer to Q. No. 01 – Conceptual Questions.

Q.2. Distinguish between the Static friction and the Dynamic friction.

Ans: Refer to Q. No. 03 part (i) & (ii) – Conceptual Questions.

Q.3. What is limiting friction? State the laws of limiting friction.

Ans: Refer to Q. No. 04 – Conceptual Questions.

Q.4. How is rolling friction caused? Or
What is rolling friction? How is it caused?

Ans: Refer to Q. No. 03 part (iii) – Conceptual Questions.

Q.5. Under what conditions the rolling friction increases?

Ans: The rolling friction increases with the increase in depth of depression farmed as a result of deformation of the wheel or roller.

INTEXT QUESTIONS: (Test yourself) Page 182

Q.1. State one way of increasing the friction between two surfaces.

Ans: Refer to Q. No. 08 – Conceptual Questions.

Q.2. Name four ways by which friction can be reduced between two surfaces in contact.

Ans: Refer to Q. No. 09 – Conceptual Questions.

Q.3. State two advantages of friction.

Ans: Refer to Q. No. 06 – Conceptual Questions.

Q.4. State two disadvantages of friction.

Ans: Refer to Q. No. 07 – Conceptual Questions.

Q.5. Why is friction called a necessary evil?

Ans: **Friction-a necessary evil.** Friction is absolutely necessary for carrying out various day-to-day activities although it has both advantages and disadvantages. Thus it is a necessary evil.

Q.6. a. What is a lubricant?
b. How does a lubricant reduce friction?
c. What kind of lubricant is used in
i. a sewing machine
ii. the axle of a tractor?

Ans: a. **Lubricant.** A lubricant is a substance which, when applied between the two surfaces in contact, reduces the force of friction between them.

b. The lubricant separates the two surfaces in such a way that the interlocking of irregularities are much reduced as the cavities between them are filled with the lubricant (oil, grease, powder or any other liquid).

c. i. Lubricant used in sewing machine: less viscous oil.
ii. Lubricant used in the axle of a tractor: grease or more viscous oil.

Q.7. Name two solid lubricants and state where they are used.

Ans: i. Graphite for heavy parts of machine where oil cannot be applied.
ii. Fine powder on the carom board so as to reduce friction between the carom board and the coin.

Q.8. What do you understand by the term streamlining? Name a few machines which use streamlining to reduce friction.

Ans: **Streamlining.** Giving a special shape or design to the bodies such that they offer the least resistance (friction) to air or water is called streamlining.
Examples: Boat, Aircrafts, Ships, Cars.

Q.9. Why is friction called a perverse force? Or
Friction is a necessary evil. Explain.

Ans: Refer Q.No. 06 & 07 – Conceptual Questions (Advantages & 3Disadvantages of friction)

Important points to remember:

1. **Why are tyres made circular?**
Reason: Because rolling friction is less than sliding friction.

2. **Spring balance:** It is a device used to measure the force of gravity acting on an object or weight of the object.

3. **Ball bearing:** A device used to reduce the rolling friction by making an axle to move over metal balls placed around it radialy is called Ball bearing. It converts sliding friction into rolling friction.

4. **Why it is much easy to move an object kept on rolling than slide it?**
Reason: Because rolling friction is much less than sliding friction.

5. **How can a very heavy machine be moved conveniently from one place to another in a factory if no crane is available?**

Ans: By placing round logs of wood or pipe under the machine and then pushing with the force of hands.

Chapter No. 11

REACHING THE AGE OF ADOLESCENCE

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. Define Adolescence.

Ans: **Adolescence:** The period of life of a person when the body undergoes a lot of changes leading to reproductive maturity is called adolescence. In other words a person who is in the process of growing from a child to an adult is called an adolescent or a teenager.

Adolescence begins around the age of 10 or 11 years and lasts upto 18 or 19 years of age. However adolescence in girls may begin one or two years earlier than in boys.

Q.2. What is puberty? What are the various changes which occur in adolescents during puberty?

Ans: **Puberty:** The period during which adolescents boys and girls reach sexual maturity and become capable of reproduction is called puberty. Generally girls attain puberty at an age of 10 or 13 years while boys reach puberty at the age of 12 or to 14 years.

a. **Changes at puberty in boys:**

i. Sudden increase in the height of boys. The bones of legs and arms become long and make a boy tall.
ii. Chest and shoulders of boys broaden i.e, become wider.
iii. Voice deepens in boys. It becomes low pitched voice. Adam's apple – a protruding part of throat is seen.
iv. Boys get acne and pimples on the face at this time due to the increased activities of sweat and sebaceous glands.
v. Male sex organs like testes and penis develop completely.
vi. Boys develop hair on their chest, under the arms and on the pubic region.
vii. Feelings and sexual drives associated with adulthood begin to develop.

b. **Changes at puberty in girls:**

i. Rapid increase in height but comparatively less than boys.
ii. The ovaries enlarge and start to release eggs or ova.
iii. The oviducts, uterus and vagina enlarge. Menstruation i.e, monthly periods begin.
iv. Hips of girls broaden. Extra fat is deposited on hips and thighs.
v. Hair grow under the arms and on the pubic region develops.
vi. Like boys girls also get pimples on the face.
vii. Breasts in girls begin to develop.
viii. Feelings and sexual drives associated with adulthood begin to develop.

Q.3. Define primary sexual characteristics and secondary sexual characteristics?

Ans: **Primary sexual characteristics:** The sexual characteristics which are present at birth are called primary sexual characteristics e.g, Testes, penis and seminal vesicles etc are primary sexual characteristics in males/boys, while as ovaries, oviducts, uterus and vagina are primary sexual characteristics in females/girls.

The primary sexual characteristics are directly involved in reproduction.

Secondary sexual characteristics: The sexual characteristics controlled by hormones which distinguish between sexually mature males and females but are not directly involved in reproduction are called secondary sexual characteristics e.g. growth of facial hair i.e, beard and mustaches in boys and development of breasts in girls are the secondary sexual characteristics which distinguish a girl from boy.

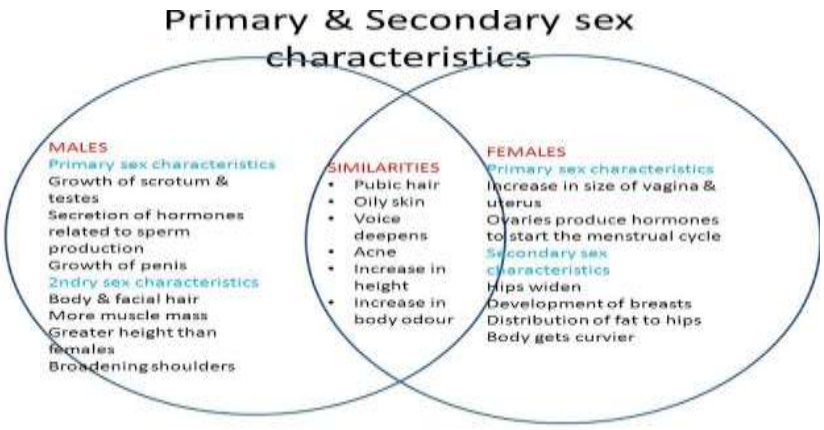
Q.4. What are secondary sexual characteristics in males and females?

Ans: a. **Secondary sexual characteristics in males/boys:** The secondary sexual characteristics in boys are produced by the male sex hormone called "testosterone" made in testes.

i. Hair grow on face in the form of beard and mustaches in boys.
ii. Shoulders and chest broaden in boys.
iii. A deeper voice i.e, low pitch in boys.
iv. Adam's Apple develops in front of throat in boys.

b. **Secondary sexual characteristics in females/girls:** The secondary sexual characteristics in girls are produced by the female sex hormone called "Estrogen" made in ovaries.

i. Development of breasts in girls.
ii. Hips and thigh broaden and become more curved.
iii. A shrill voice i.e. high pitched voice in girls.



Q.5. a. What are hormones? How are they produced?

Ans: **Hormones:** Hormones are the chemical substances which coordinate the activities of living organisms and their growth. Hormones are made and secreted by specialized tissues in the body called Endocrine glands.

A hormone is produced by an endocrine gland in one part of the human body and are poured directly into the blood and carried to specific organs/tissues called Target sites. Hormones are of different types and perform different functions of the body.

b. What are sex hormones. State their functions.

Ans: **Sex hormones:** The hormones involved in the development and control of reproductive organs and secondary sexual characteristics are called sex hormones.

There are two main common sex hormones namely

i. **Male sex hormone/Testosterone:** It is secreted by testes and causes changes in boys like growth of facial hair. It also stimulates spermatogenesis along with other male secondary sexual characteristics.

ii. **Female sex hormone/Estrogen/Oestrogen:** It is secreted by ovaries and controls the development of secondary sexual characters in female like shrill voice, development of breast and broader hips. It also maintains pregnancy.

Q.6. Describe briefly the reproductive phase of life in humans.

Ans: **Reproductive phase of life in humans:** Adolescents become capable of reproduction when their testes and ovaries begin to produce gametes. In men the capacity to produce male gametes or sperms at puberty and lasts through out the life.

In females the reproductive phase of life begins at puberty and generally lasts till the age of 45-50 years.

Within the onset of puberty, the eggs or ova begin to mature in the ovaries of a woman. One ovum matures and is released by one of the ovaries once in 28-30 days. During the period, the wall of the uterus becomes thick so as to receive the egg. In case it is fertilized and begins to develop. This results in pregnancy. In case fertilization does not occur, the released egg and the thickened lining of the uterus along with its blood vessels are shed off. This causes bleeding in women called menstruation. The menstruation occurs once in a month (i.e, 28-30 days).

At the age of 45-50 years the menstrual cycle stops in a female and is termed as menopause.

Q.7. Define Menarche, Menstruation, Menopause, Endocrine glands, Exocrine glands.

Ans: **Menarche:** The first occurrence of menstruation or monthly periods/period at puberty in a woman is called Menarche.

Menstruation: The bleeding from the uterus which occurs in a woman or mature girl every month if the egg cell has not been

fertilized is called menstrual flow/menstruation/monthly period/ menses. OR

The cyclic changes that occur every 28-30 days in the reproductive tract of human females from the period of puberty to the age of menopause is called menstrual cycle.

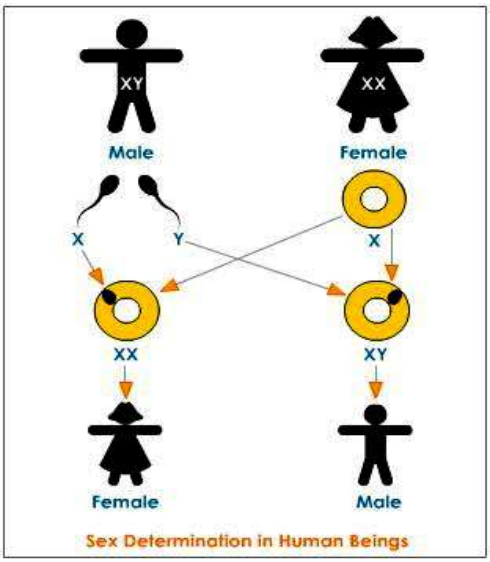
Menopause: The permanent stoppage of menstruation or monthly periods in a women at the age of 45-50 years is called menopause.

Endocrine glands: A gland which does not have duct and secrets its product directly into good stream is called an Endocrine gland. Pituitary gland, Thyroid gland and Adrenal gland.

Exocrine gland: A gland which secrets its product into a duct or tube is called Exocrine gland e.g, Salivary gland, Sweat glands, Sebaceous gland (oil glands)

Q.8. How is the sex of a baby determined? OR What are sex chromosomes?

Ans: **Determination of sex of baby:** Every human being has 23 pairs of chromosomes in the nuclei of its body cells. However out of these 23 pairs of chromosomes, one pair of chromosomes is sex hormones. The two sex chromosomes named 'X' chromosomes and 'Y' chromosomes are present in the reproductive cells or gametes of the human being. In females all the gametes or eggs have 46 'X' chromosomes and in males, all the gametes or sperms have 23 'X' chromosomes and 23 'Y' chromosomes.



The sex of a baby is determined by the type of sex chromosomes present in the fertilized egg or zygote from which the bay develops.

The baby developed from XX combination of sex chromosomes in zygote is a girl.

While as the baby developed from XY combination of sex chromosomes in zygote will be a boy.

Q.9. Name some important endocrine glands, their hormones and their main functions other than sex hormones.

Ans: i. **Pituitary Gland:** Pituitary gland is attached to the base of the brain. It secretes a number of hormones and is the most important endocrine gland. It is also called Master gland in the body because most of the hormones secreted by it also control the functioning of other endocrine glands in the body.

One of the hormones secreted by pituitary glands is the growth hormone. It controls growth of the body. Besides pituitary gland secretes hormones that make other endocrine glands like testes, ovaries, thyroid gland and adrenal glands to function i.e, secrete their hormones.

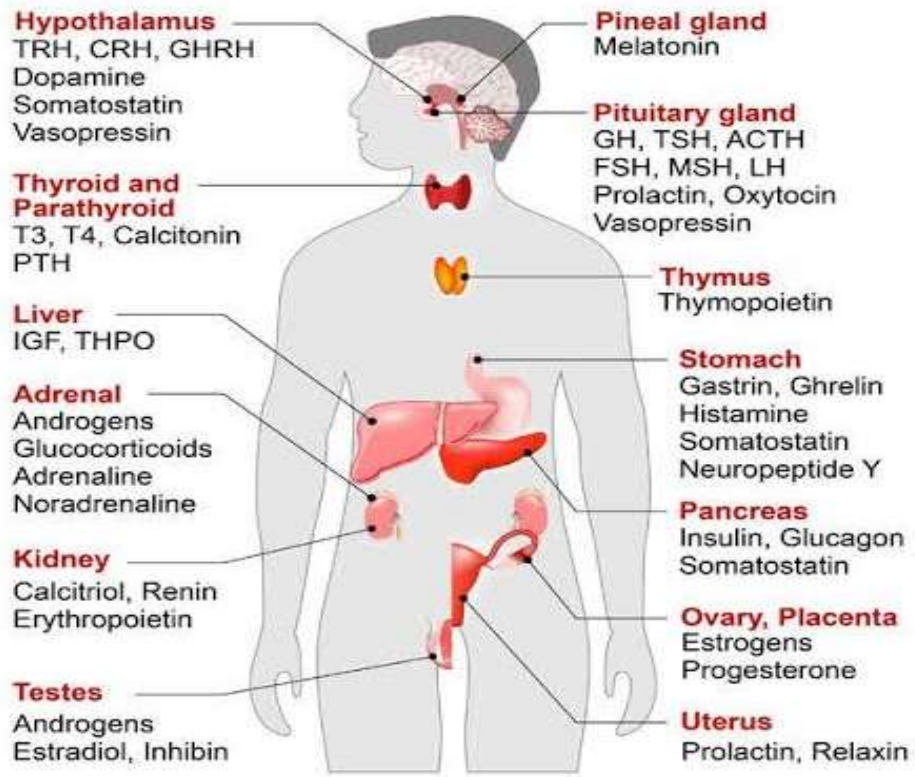
ii. **Thyroid Gland:** Thyroid is a large endocrine gland in the neck and is attached to the wind pipe in our body. Thyroid gland makes a hormone called thyroxine (whch contains iron). Thyroid hormones controls the rate of body's metabolism. The deficiency of thyroxine hormone causes a disease known as goiter. However using iodised salt prevents the goiter.

iii. **Pancreas:** Pancreas acts as an endocrine as well as an exocrine gland. Pancreas is just below the stomach in our body and secretes the hormone called Insulin.

The function of insulin hormone is to lower the blood sugar level or blood glucose level.

iv. **Adrenal Gland:** There are two adrenal glands in our body located on the top of two kidneys. These adrenal glands produce adrenaline hormone. This hormone prepares our body to function at maximum efficiency during emergency situations like danger, fear, shock, surprise, anger or excitement.

These adrenal glands secrete one more hormone called Aldosterone hormone which maintains the correct salt balance in the blood.



Q.10. What is the role of hormones in completing the life history of frogs and insects?

Ans: **Frog:** In a frog, the tadpole or larva hatched from the eggs passes through certain stages to become a frog. The change from tadpole or larva to the adult frog is called Metamorphosis. In frog, metamorphosis is brought about by thyroxine hormone produced by thyroid gland.

In fact, all the amphibians need thyroxine hormone to undergo metamorphosis and change from larva into adults.

Insects: The process of metamorphosis in insects like silk moth is controlled by insect hormones called 20-Hydroxyecdysone and Lipid Juvenile Hormone. In other words the change from larva to adult insect during metamorphosis is brought about by insect hormones.

Q.11. Define reproductive health. What are the precautions for it?

Ans: **Reproductive Health:** According to WHO, reproductive health is defined as a state of physical, mental and social well being of a person in all matters relating to the reproductive system at all stages.

Some important precautions/conditions to maintain good reproductive health during adolescence are as:

i. To eat balanced diet during adolescence.
ii. To maintain personal hygiene during adolescence.
iii. To take adequate physical exercise during adolescence.
iv. To avoid any drugs during adolescence.

Q.12. What are the nutritional needs of Adolescents?

Ans: **Nutritional needs of adolescents:**

A human being at any age, needs to have a balanced diet to keep the body healthy. It is all more important to eat balanced diet during adolescence, because a rapid growth and development of the body takes place during this period.

The diet which contains the adequate amount of each constituent viz Carbohydrates, fats, proteins, vitamins and minerals sufficient for the normal growth and development of the body and keep a person healthy is called a balanced diet.

List of food items:

i. Wheat and Rice – Chapati, Bread, Poori, Dosa, Idli, Biryani to provide carbohydrates.
ii. Ghee, Oil, Ground nuts and fatty meat to provide fats.
iii. Pulses, Eggs, Lean meat, Fish, Milk, Ground nuts to provide proteins.
iv. Fruits and Vegetables to provide vitamins and minerals.

Q.13. Define Myths and Taboos? What are common myths and taboos based on ignorance of facts?

Ans: **Myth:** A widely held but false belief is known as myth. In other words a myth is an unproved or false collective belief that is used to justify a social institution.

Taboo: Something prohibited by social customs is called taboo. In other words a social or religious custom prohibiting or restricting a particular practice or forbidding association with a particular person, place or thing is called Taboo.

There are some important myths and taboos regarding body changes in women/girls which are based on ignorance of facts.

i. A girl becomes pregnant if she looks at boys during menstruation.
ii. The mother is responsible for the sex of the child.
iii. A girl should not be allowed to work in the kitchen during menstruation.

TEXTUAL QUESTIONS:

1. What is the term used for chemical secretions of endocrine glands responsible for changes taking place in the body?

Ans: Hormone.

2. Define adolescence.

Ans: Refer to Q. No. 01 – Conceptual Questions

3. What is menstruation? Explain

Ans: The process of shedding of the uterine lining on a regular monthly basis is called menstruation. It starts at puberty and in the reproductive cycle of the female body. The uterus prepares itself to receive a fertilized egg on every month. Due to this the inner lining of the uterus become thick and is supplied with blood to nourish the embryo. If the egg is not fertilized, then the lining of the uterus breaks down and get released in the form of blood through the vagina. The time period for this is about 2 to 8 days every month. This monthly cycle is known as the menstrual cycle.

4. List changes in the body that take place at puberty.

Ans: Refer to Q. No. 02 – Conceptual Questions

5. Prepare a Table having two columns depicting names of endocrine glands and hormones secreted by them.

Ans: The table given below indicates the endocrine glands and their hormones:

Endocrine gland	Hormones
Pituitary gland	Growth Hormones
Thyroid	Thyroxine
Adrenal	Adrenalin
Pancreas	Insulin
Testis	Androgen (Testosterone)
Ovaries	Estrogen

6. What are sex hormones? Why are they named so? State their function

Ans: Refer to Q. No. 05 Part (b) – Conceptual Questions

7. Choose the correct option.

(a) Adolescents should be careful about what they eat, because
- (i) proper diet develops their brains.
- (ii) **proper diet is needed for the rapid growth taking place in their body.**
- (iii) adolescents feel hungry all the time.
- (iv) taste buds are well developed in teenagers.

(b) Reproductive age in women starts when their
- (i) **menstruation starts.**
- (ii) breasts start developing.
- (iii) body weight increases.
- (iv) height increases.

(c) The right meal for adolescents consists of
- (i) chips, noodles, coke.
- (ii) **chapati, dal, vegetables.**
- (iii) rice, noodles and burger.
- (iv) vegetable cutlets, chips and lemon drink.

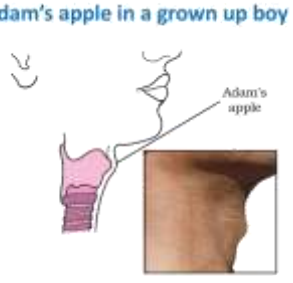
8. Write notes on—

(a) Adam's apple.

(b) Secondary sexual characters.

(c) Sex determination in the unborn baby.

Ans: a. The bulge or projection at the front of throat or neck as a protruding part of the throat in grown up boys is called Adam's Apple. It is a feature of throat or neck of grown up boys.



b. Refer to Q. No. 04 – Conceptual Questions

c. Refer to Q. No. 08 – Conceptual Questions

9. Word game:

Use the clues to work out the words.

Across

3. Protruding voice box in boys
4. Glands without ducts
7. Endocrine gland attached to brain
8. Secretion of endocrine glands
9. Pancreatic hormone
10. Female hormone

Down

1. Male hormone
2. Secretes thyroxine
3. Another term for teenage
5. Hormone reaches here through blood stream
6. Voice box
7. Term for changes at adolescence

Ans:

Across

3. Adam's apple
4. Endocrine
7. Pituitary
8. Hormone
9. Insulin
10. Estrogen

Down

1. Testostrerone
2. Thyroid
3. Adolescence
5. Target site
6. Larynx
7. Puberty

Important points to remember:

1. **Voice box:** It is a box consisting of cartilages present in the throat of human beings producing voice. It is also called larynx.
2. **Pimples:** Red spots on the face of a person.
3. **Acne:** A condition of skin marked by the eruption of numerous red pimples on the face.
4. **Legal age of marriage:** 18 years for girls and 21 years for boys.
5. **Fertilisation:** Fertilisation is the process of fusion of a sperm (male gamete) and egg or ova (female gamete).

6. **Goitre:** The diseases caused due to deficiency of goiter is called goiter. The main symptom of goiter is bulging of neck.

7. **Deficiency of Growth Hormone:** Dwarf or very short person.

8. **AIDS:** AIDS stands for Acquired Immuno Deficiency Syndrome AIDS is a dangerous disease caused by HIV (Human Immunodeficiency Virus virus.

9. **Importance of one's adolescence:** Adolescence is the time in one's life when the brain has the greatest capacity for learning.

10. **Formula to calculate full height of a person =**

$$\frac{Present\ \ height}{\%age\ of\ full\ height\ at\ present\ \ age} \times 100$$

Example: A boy is 8 years old and 108 cms tall. At the end of growth period calculate his full height

Solution: $\frac{108}{72} \times 100cm = 150cm\ tall$

Chapter No. 12

REPRODUCTION OF ANIMALS

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is reproduction? What are the advantages of reproduction?

Ans: **Reproduction:** Reproduction is the important life process of producing off springs by sexual or asexual means that are biologically and genetically similar to the parent organisms.

OR

The production of new organisms from the existing organisms of the same species is known as reproduction. It is the most important characteristic of living things.

Advantages/importance of reproduction:

i. All living organisms are surviving on the earth due to reproduction.
ii. Reproduction ensures continuity of life on the earth.
iii. Reproduction increases the population of species.
iv. Reproduction passes favourable characters or variations from one generation to another.

Q.2. What are the types of reproduction?

Ans: **Types of reproduction:** There are two main methods of reproduction

i. **Asexual reproduction:** The production of a new organisms from a single parent without the involvement of sex cells or gametes is called Asexual reproduction e.g, Binary fission in Amoeba, Budding (in Hydra), Fragmentation, Spore formation, Regeneration, Vegetative propagation and tissue culture.

ii. **Sextual reproduction:** The production of a new organisms from two parents by making use of their sex cells or gametes is called sexual reproduction e.g, Reproduction in humans, Fish, Frog, Cats, Dogs etc.

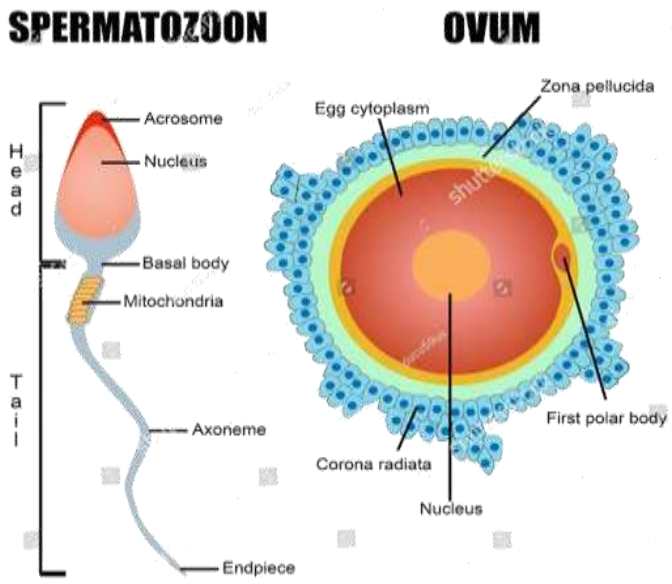
Q.3. What are reproductive cells/sex cells/gametes? What is the difference between unisexual and bisexual organisms.

Ans: **Reproductive cells/Gametes:** The cells involved in sexual reproduction of organisms are called sex cells or gametes or reproductive cells. These sex cells are produced by the sex organs of the body called as Gonads e.g, Testis in males and Ovaries in females.

Gametes are of two types of Male gamete and Female gamete.

a. **Sperms:** These are male gametes produced by the testes in males. They are also called Spermetazoa or Male cells.

b. **Eggs:** These are the females gametes produced by the ovaries in females. They are also called as Ova or Female reproductive cells.



The difference between Unisexal and bisexual organisms

a. **Unisexual organisms:** The organisms which have only one kind of sex organs are called unisexual organisms either male or female. e.g, Human being, Sheep, Frog, Dogs, Duck, Hen etc.

b. **Bisexual organisms:** Those organisms which have both sex organs i.e, male and female are called bisexual or Hermaphrodite e.g, Earth worm, Starfish, Tap worm, Leech, Snail etc.

Q.4. What is fertilization? What are the types of fertilization?

Ans: **Fertilisation:** The process of fusion or combination of a male gamete with a female gamete to form a zygote during sexual reproduction is called fertilization. There are two kinds of fertilization.

i. **Internal Fertilisation:** When the fertilisation takes place inside the body of a female organism i.e, in the genital tract of a female is called internal fertilisation e.g. Human, Cattle, Birds etc.

ii. **External Fertilisation:** When the fertilisation takes place outside the body of a female organism is called external fertilisation. In this type of fertilisation, male and female organisms discharge their gametes outside the body where they fuse to form zygote e.g. Frog, Fish etc.

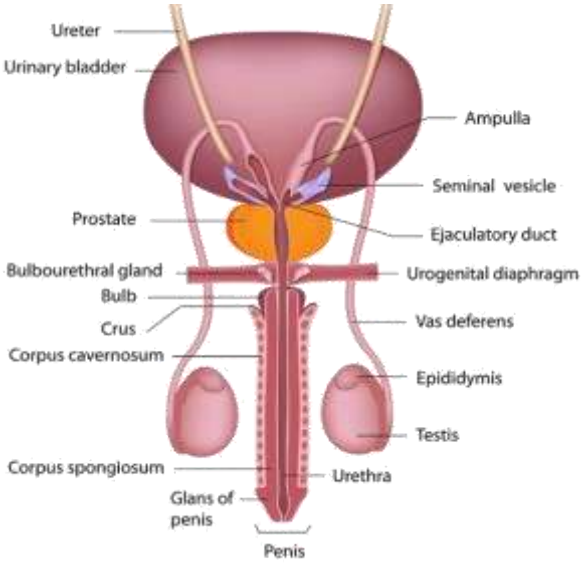
Q.5. Describe briefly male reproductive system with neat and labeled diagram.

Ans: **Male Reproductive System:** The male reproductive system consists of various organs namely a pair of testes, scrotal sacs, epididymis, sperm ducts, seminal vesicles, urethra and a penis.

The Testes lie in a small sac like muscular structure outside the abdomen in a membranous pouch called Scrotum which provides optimum temperature for the formation of sperms by testes.

The sperms formed in testes come out and go into coiled tube called Epididymes. From epididymes, the sperms are carried by a long tube called Sperm duct for storage into organs called Seminal vesicles. The sperms are carried in a liquid called Semen.

The Seminal vesicles join to another tube called Urethra coming from the bladder. The urethra carries the sperms to an organ called Penis which opens outside the body. The Penis is an organ for introducing sperms into the woman through vagina for the purpose of reproduction. The penis opens outside through a male genital pore. This opening is used both for urine and sperms.

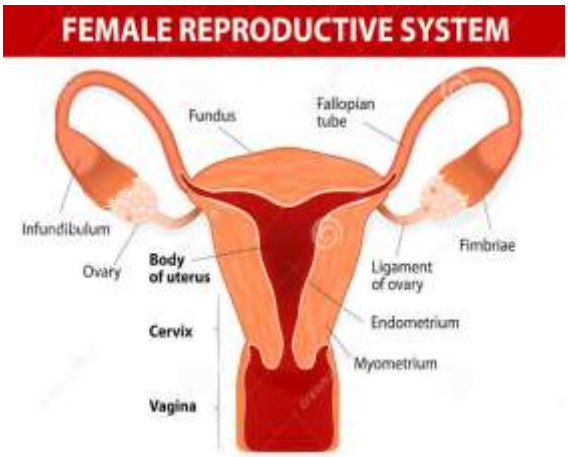


Q.6. Describe briefly female reproductive system with neat and labeled diagram.

Ans: **Female Reproductive System:** The human female reproductive system consists of various organs namely Ovaries, Oviducts, Uterus and Vagina.

Two Ovaries are located in the abdominal cavity of a woman. The ovaries make the female gametes called egg or Ova besides female hormones called Oestrogen and progesterone.

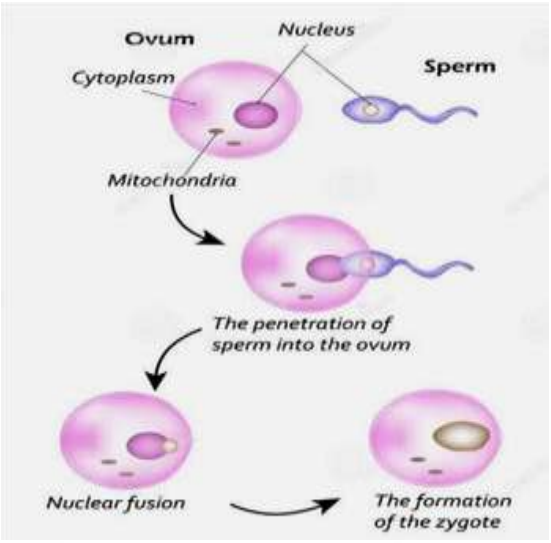
Near the posterior end of each ovary, a funnel like structure leads into a long convoluted tubes called Oviducts/Fallopian tubes. The eggs or ova released by an ovary through fallopian tubes goes into a muscular bag like structure called Uterus. The growth and development of a fertilized egg or zygote into a baby takes place in the uterus.



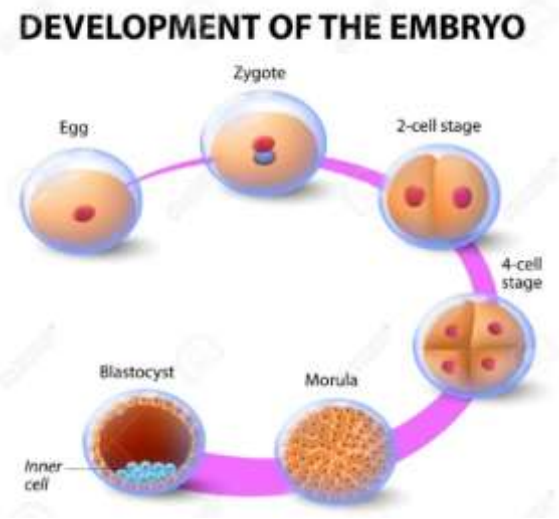
The uterus opens into a tubular structure called vagina which is also known as birth canal. Vagina receives the penis for putting sperms into the woman's body. In females the urinary and vaginal openings are separate.

Q.7. Describe briefly fertilisation and development of embryo in humans.

Ans: **Fertilisation:** Fertilisation occurs when released egg from ovary moves down the oviduct meets with the sperm of man. One sperm fuses with the ovum in the fallopian tube/oviduct to form a zygote. During fertilisation the nucleus of a sperm fuses with the nucleus of egg cell to form a single nucleus which results in the formation of a diploid cell called zygote.



Development of Embryo: The zygote or fertilized egg divides repeatedly to make a ball of hundreds of cells called as Embryo. This stage is called Blastocyst. The embryo moves down and gets embedded in the soft and thick lining of the uterus. This stage is called implantation. This process takes place between 6 to 9 days after fertilisation. At this stage, a woman is called pregnant.



The embryo in uterus gets food and oxygen from the blood vessels in the lining of the uterus called placenta. The cells of the embryo begin to form specialized groups that develop into different tissues, organs and body parts of the baby called as Foetus. This state of embryo is called as foetus and it takes about eight weeks after pregnancy to develop into Foetus. It takes 280 days (39 weeks aprx.) from the fertilisation of egg to the formation of fully developed baby.

The fully developed baby comes out of the mother's body through vagina by the rhythmic powerful contractions of the muscles of the uterus, this is called parturition.

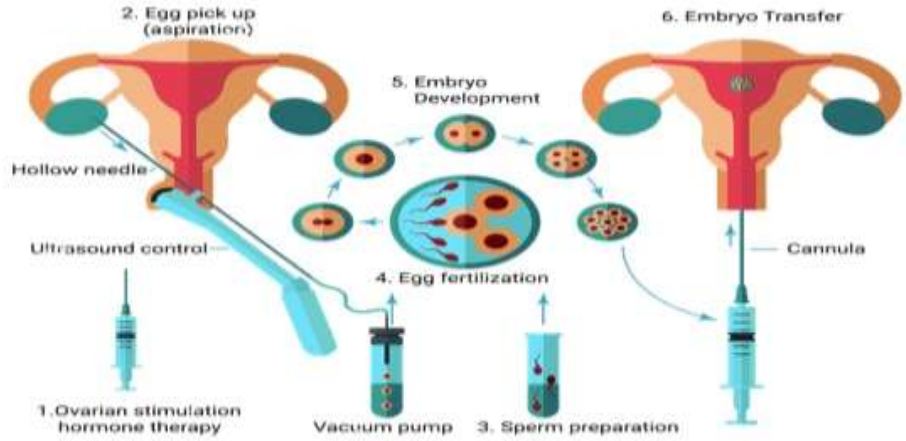
Q.8. What is meant by In-vitro fertilisation? Or Test tube babies.

Ans: **Invitro fertilisation:** A woman who cannot produce babies is called a sterile or baren lady. Such women can also have babies by using the In-vitro fertilisation technique.

Method: In In-vitro fertilisation the eggs are removed from the woman with blocked oviducts by laproscopy and are fused with the sperms of her husband in a glass dish or glass tube. In this in-vitro fertilisation technique the fertilized egg or zygote develops into embryo. After a

week this embryo is placed in the uterus of sterile woman for implantation which results in normal pregnancy. This technique is commonly called Test tube baby technique or In-vitro fertilisation (IVF).

The babies born through in-vitro fertilisation technique are also called Test tube babies.



Q.9. What are Oviparous and Viviparous animals?

Ans: **Oviparous animals:** The animals which lay eggs from which young ones or baby animals are hatched later on are called Oviparous animals e.g. frog, hen, butterfly, crow, sparrow, lizard, snake etc. In fact all insects, birds and reptiles are oviparous animals.

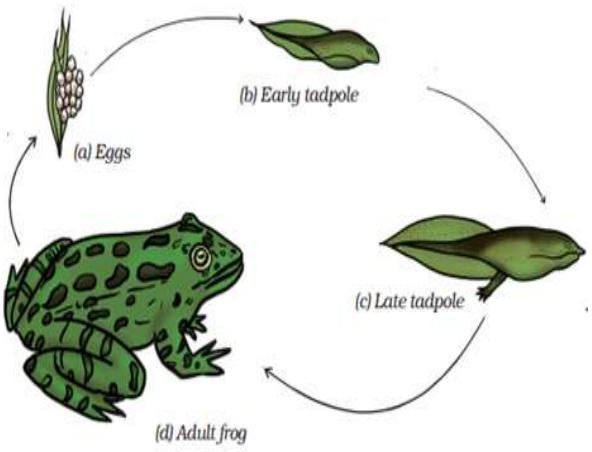
Viviparous animals: The animals which give birth to young ones or baby animals are called viviparous animals e.g, man, dog, cow, cat, elephant, camel etc. In fact all mammals are Viviparous animals.

Q.10. What is Metamorphosis? How it takes place in frogs?

Ans: **Metamorphosis:** The process of transformation from an immature form of animal like "larva or tadpole" to its adult form in two or more distinct stages is called Metamorphosis. Metamorphosis occurs in amphibians like frogs and insects like silk moth, butterfly, housefly and mosquito.

Example:

Metamorphosis in frog: The hatching of a fertilized egg of frog produces a very immature young one called Tadpole (Larva). The tadpole or larva of frog develops gradually and undergoes many drastic changes in appearance before it forms an adult frog. In this way Metamorphosis changes the aquatic/water living tadpole into an amphibian frog which can live in water as well as land.



Life cycle of frog

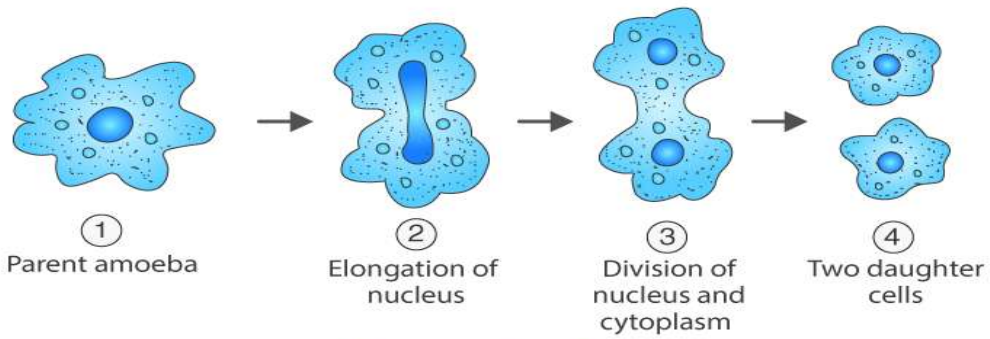
Q.11. Describe briefly two methods of asexual reproduction in animals.

Ans: The most common methods of asexual reproduction in animals are Binary Fission and Budding.

i. **Binary fission:** Binary fission is an asexual method of reproduction in organisms. In binary fission, the parent organism splits or divides to form two new daughter organisms.

In binary fission, the nucleus of parent organisms elongates and divides into two parts and then cytoplasm divides e.g. in Amoeba when cell attains the maximum growth, its nucleus lengthens to divide into two parts. After that cytoplasm of amoeba accordingly divides into two parts one part around each nucleus.

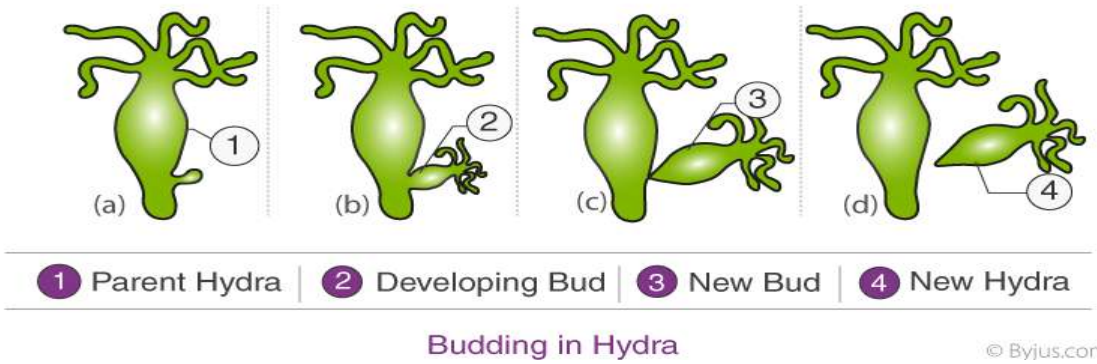
In this way one parent amoeba divides to form two daughter amoebae.



Fission in Amoeba

ii. **Budding:** Budding is an asexual method of reproduction. In this method of reproduction, a small part of the parent organism grows out as a bud which then detaches and becomes a new organism e.g. this asexual method of reproduction is observed in animals like Hydra, Sponges, Sea anemones, Yeast etc.

In hydra (a simple multi-cellular animal), first a small outgrowth called bud is formed on the side of its body by the repeated division of its cells. This bud then gradually grows to form a small hydra by developing mouth tentacles. And finally the tiny new hydra detaches itself from the body of parent hydra and lives as an independent organism. In this way the parent hydra produces a new baby hydra.



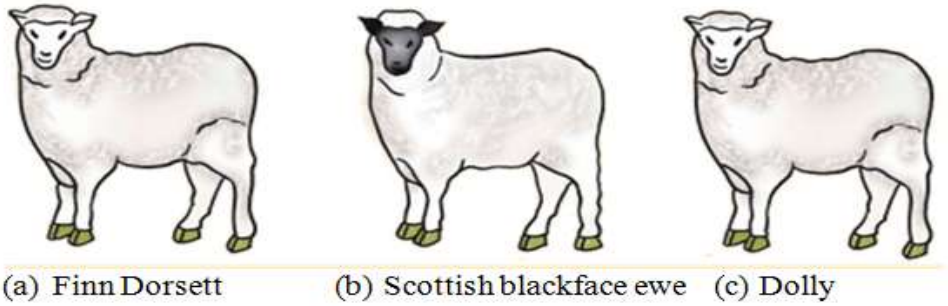
Budding in Hydra

Q.12. What is Cloning and how cloning of Dolly sheep was performed?

Ans: **Cloning:** Cloning is the production of an exact copy of an animal by means of asexual reproduction. An animal which is genetically identical to its parent is called a clone.

Cloning of an animal was successfully performed for the first time by Prof. Sir Lan Wilmut and his colleagues at the Roslin institute in Edinburg, Scotland.

Cloning of Dolly sheep: The nucleus of mammary gland of a female sheep named Finn Dorset ewe which was to be coloned was inserted into the unfertilized empty egg cell (Nucleus containing chromosomes was also removed) of Female Scottish Blackface ewe. In this way a new egg cell was obtained and implanted in the uterus of another female Scottish Blackface sheep making it pregnant. After 148 days, this pregnant Scottish Blackface sheep gave birth to Dolly Sheep.



(a) Finn Dorsett (b) Scottish blackface ewe (c) Dolly

TEXTUAL QUESTIONS:

Q.1. Explain the importance of reproduction in organisms.

Ans. Refer to Q.No. 01 – Conceptual Questions

Q.2. Describe the process of fertilization in human beings.

Ans. Refer to Q.No. 07 – Conceptual Questions

Q.3. Choose the most appropriate answer:

(a) Internal fertilization occurs

(i) **in female body** (ii) outside female body
(iii) in male body (iv) outside male body

(b) A tadpole develops into an adult frog by the process of

(i) fertilization (ii) **metamorphosis**
(iii) embedding (iv) budding

(c) The number of nuclei present in a zygote is

(i) none (ii) **one**
(iii) two (iv) four

Q.4. Indicate whether the following statements are True (T) or False (F):

(a) Oviparous animals give birth to young ones. ( )

Ans. False

(b) Each sperm is a single cell. ( )

Ans. True

(c) External fertilization takes place in frog. ( )

Ans. True

(d) A new human individual develops from a cell called gamete.

Ans. False

(e) Egg laid after fertilization is made up of a single cell. ( )

Ans. True

(f) Amoeba reproduces by budding. ( )

Ans. False

(g) Fertilization is necessary even in asexual reproduction. ( )

Ans. False

(h) Binary fission is a method of asexual reproduction. ( )

Ans. True

(i) A zygote is formed as a result of fertilization. ( )

Ans. True

(j) An embryo is made up of a single cell. ( )

Ans. False

Q.5. Give two difference between a zygote and a foetus.

Ans. **Zygote**: It consists of single cell. It is formed after the fertilization of gametes.

Foetus: It is the stage which identifies all the parts of embryo. It consists of multiple cells.

Q.6. Define asexual reproduction. Describe two methods of asexual reproduction in animals.

Ans. Refer to Q.No. 02 & 11 – Conceptual Questions

Q.7. In which female reproductive organ does the embryo get embedded?

Ans. Foetus

Q.8. What is metamorphosis? Give examples.

Ans. Refer to Q.No. 10 – Conceptual Questions

Q.9. Differentiate between internal fertilization and external fertilization.

Ans. Refer to Q.No. 04 – Conceptual Questions

Q.10. Complete the crossword puzzle using the hints given below

Across

1. The process of the fusion of the gametes. *FERTILIZATION*
6. The type of fertilization in hen. *INTERNAL*
7. The term used for bulges observed on the sides of the body of Hydra. *BUDS*
8. Eggs are, produced here. *OVERY*

Down

2. Sperms are, produced in these male reproductive organs. *TESTES*
3. Another term for the fertilized egg. *ZYGOTE*
4. These animals lay eggs. *OVIPAROUS*
5. A type of fission in amoeba. *BINARY*

Important points to remember:

1. **Ovulation:** Process of discharge of an egg or ovum from the ovary of a female is called ovulation.
2. **Placenta:** Disc like structure which provides food and oxygen to the foetus from the uterus is called placenta.
3. **Parturition:** Birth of a child by the contraction of uterus is called Parturition.
4. **Semen:** Semen is a milky fluid produced by the male reproductive system. It contains spermatozoa and the secretions of seminal vesicles, prostate gland.
5. **Embryo:** An unborn baby at early stage of development in the uterus is called an embryo.
6. **Foets:** An unborn baby in the uterus at the stage when all the body parts can be identified is called a foetus.
7. **Clones:_** In asexual reproduction two off springs having the same genetic material and the same body features are called clones.

Chapter No. 13

CHEMICAL EFFECTS OF ELECTRIC CURRENT

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. Define good conductors and poor conductors?

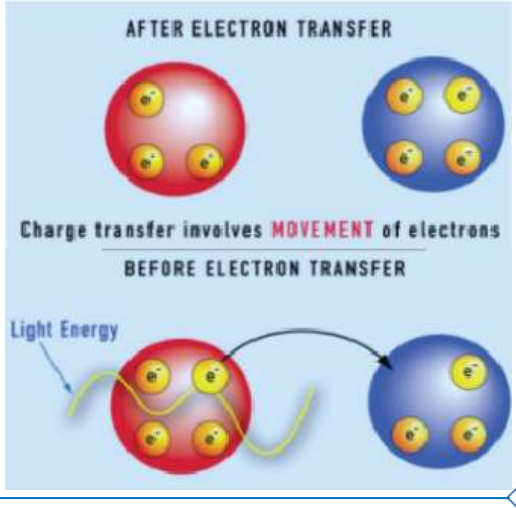
Ans: **Good conductors**:- The materials which allow electric current to pass through them easily are called good conductors of electricity e.g, metals like copper, aluminium, solutions of acids, bases, salts in water.

Poor conductors: Those materials which do not allow electric current to pass through them easily are called poor conductors of electricity or non conductors of electricity or insulators e.g. Rubber, Plastic, Wood etc.

Q.2. What are the differences in the conduction of electricity by solids like metals and liquids like solutions of acids, bases and salts.

Ans: Differences in conduction of electricity in metals and liquids:-

i. In solids like metals, electricity is carried by electrons but in liquids, electricity is carried by ions i.e, positively charged and negatively charged ions e.g. in a solid like copper metal, electricity is carried by electrons but in a liquid like copper sulphate solution ($CuSo_4$ solution) electricity is carried by copper ions Cu^{2+} and sulphate ions So_4^{2-}.



ii. When electricity is passed through a solid, then no chemical change takes place but when electricity or electric current is passed through a liquid, then a chemical change takes place e.g. when electricity is passed through copper wire, no chemical change takes place in it while as electricity or electric current is passed through acidified water, then a chemical change takes place in which water is decomposed into hydrogen and oxygen ions.

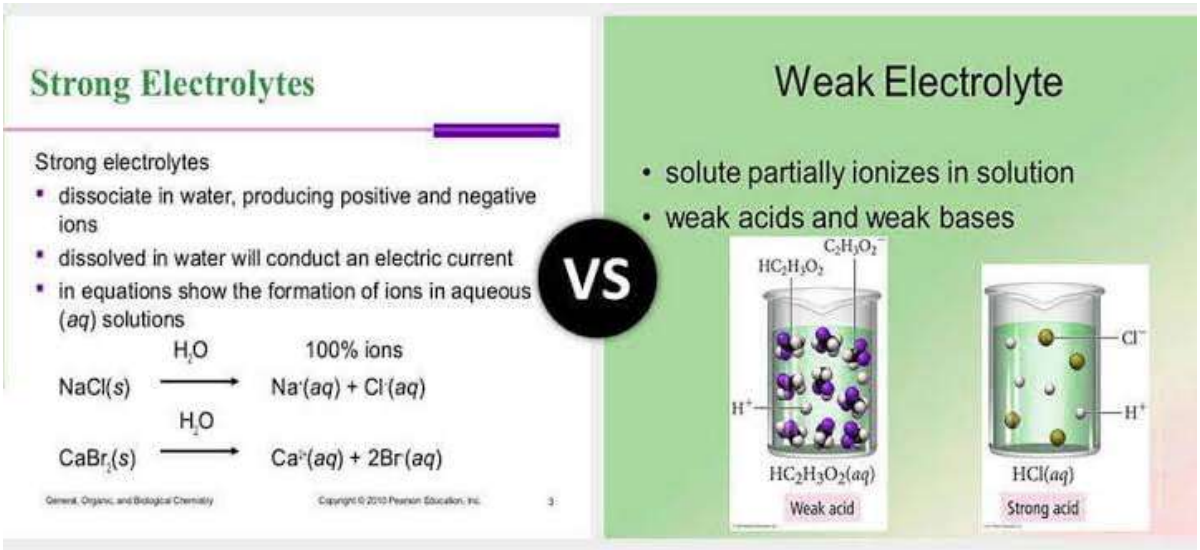
Q.3. What is electrolyte? What are strong and weak electrolytes?

Ans: **Electrolyte:** A liquid or solution of a substance which can conduct electricity or electric current is called an electrolyte e.gh. copper sulphate solution, the solutions of acids, bases and salts in water etc.

A conducting liquid or electrolyte contains ions i.e, +vely charged and –vely charged ions. The flow of these ions conducts electricity through the conducting liquid or electrolyte.

i. **Strong electrolytes:** A strong electrolyte is a liquid or solution which conducts electricity very well. A strong electrolyte is a very good conductor of electricity because it contains a lot of ions in it e.g. H_2So_4 solution. HCl solution, HNo_3 solution NaoH solution, KoH solution, NaCl solution, $CuSo_4$ solution $AgNo_3$ solution etc.

ii. **Weak electrolytes:** A weak electrolyte is a liquid or solution which conducts electricity to a lesser extent. A weak electrolyte is a weak conductor of electricity because it contains lesser number of ions. e.g. vinegar i.e, acetic acid solution, lemon juice i.e, citric acid solution, carbonic acid solution, NH_4Cl solution, tap water, rain water etc.



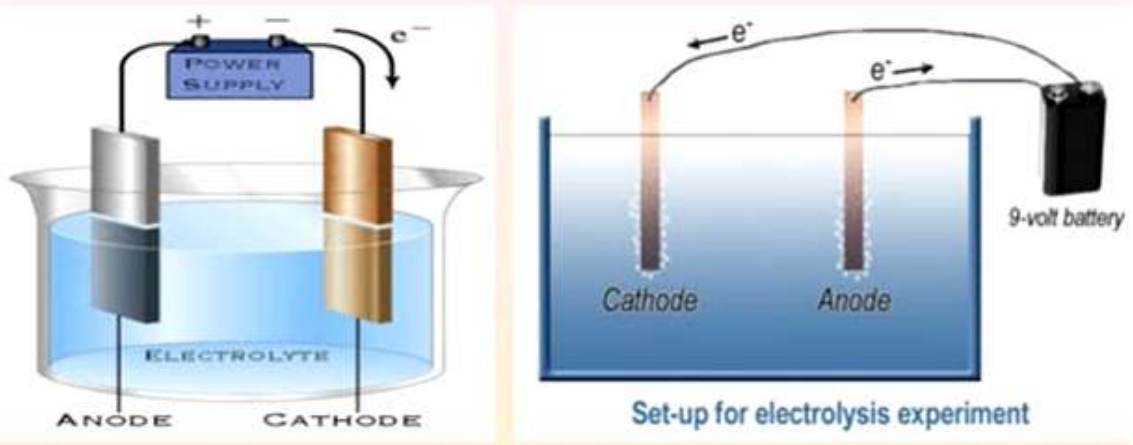
Q.4. What is electrode? What are the types of electrodes?

Ans: **Electrodes:** A solid electrical conductor through which an electric current enters or leaves something like a dry cell or an electrolytic cell is called an electrode e.g. carbon rods or metal rods.

Types or electrodes: Electrodes are of two types Anode and Cathode.

i. **Anode:** The electrode which is connected to the positive terminal of the battery gets +vely charged. The +vely charged electrode is called Anode.

ii. **Cathode:** The electrode which is connected to the negative terminal of the battery gets negatively charged. The –vely charged electrode is called Cathode.



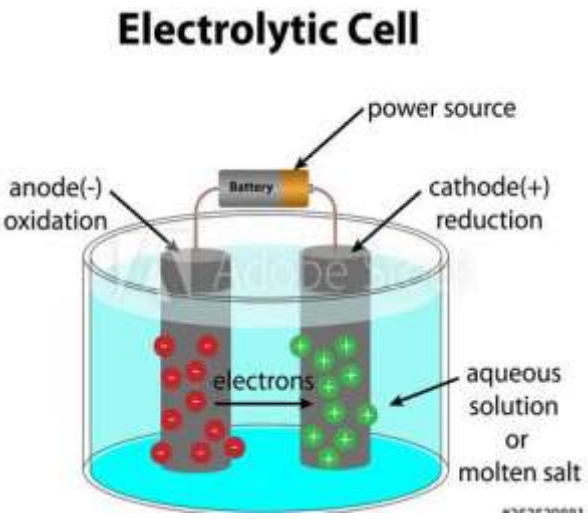
Q.5. Define electrolysis and electrolytic cell.

Ans: **Electrolysis:** It is the process by which a substance called electrolyte is decomposed into its basic components by passing electric current through it.

Example: When electric current is passed through acidified water by using carbon electrodes, then a chemical reaction takes place to form hydrogen gas and oxygen gas. The chemical reaction can be written as

$$Water \xrightarrow[\text{Chemical Reaction}]{\text{Electric current}} Hydrogen + Oxygen$$

In this reaction water – a chemical compound of hydrogen and oxygen has been decomposed into two elements hydrogen and oxygen by the action of electric current. So this reaction is an example of chemical effect of electric current.

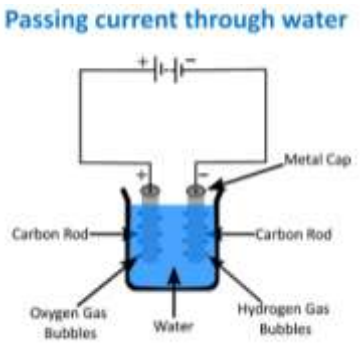


Electrolytic cell: An arrangement having two electrodes kept in a conducting liquid or electrolyte in a vessel is called an electrolytic cell e.g. if we keep two carbon electrodes in a beaker containing acidified water, it will be an electrolytic cell.

Q.6. What do you mean by chemical effects of electric current? What are its applications?

Ans: Electric current can bring about chemical changes, so it is said to have a chemical effect.

The chemical effect produced by an electric current depends on the nature of conducting solution through which it is passed and on the nature of electrodes used for passing the electric current.



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Note: This reaction was first performed by a British Chemist William Nicholson in 1800 (year)

Applications of the chemical effect of electric current:

The chemical effect of electric current is used in industries or factories for the following purposes.

i. Electroplating metals
ii. Purification of metals.
iii. Production of certain metals from its area.
iv. Production of chemical compounds.
v. Decomposing chemical compounds.

Q.7. Define electroplating. What are the conditions of electroplating?

Ans: **Electroplating:** The process of depositing a thin layer of a desired metal over a metal object with the help of electrolysis is called electroplating. Electroplating is done to protect the desired objects from rusting/corrosion and make them decorative or more shining.

The desired objects/metals are usually electroplated with Chromium, Tin, Nickel, Silver, Gold or Copper metals.

Conditions of electroplating: The following points should be remembered while electroplating.

i. The metal object to be electroplated is made the negative electrode i.e, cathode and is connected to the negative terminal of the battery.
ii. The metal whose layer is to be deposited is made the +ve electrode i.e, Anode and is connected to the +ve terminal of the battery.
iii. A water soluble salt of the metal to be deposited is taken as electrolyte.

Example: Electroplating of iron key with copper metal.

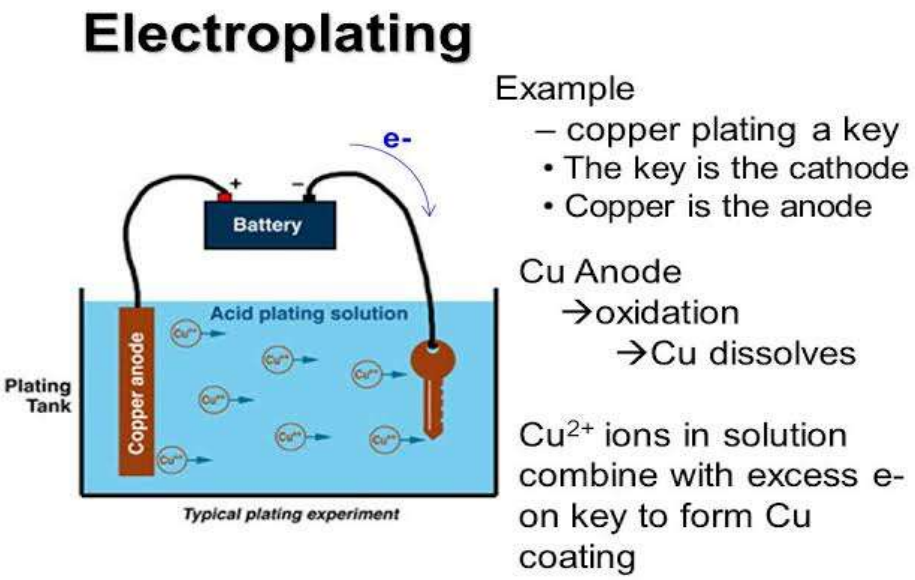
i. A copper sulphate solution is taken as electrolyte because it has copper metal in the dissolved form.

ii. Iron key is connected to the negative terminal of the battery i.e, made as cathode i.e, -ve electrode.

iii. A copper plate is connected to the +ve terminal of the battery i.e, made as anode i.e, +ve electrode.

iv. While passing the electric current, the dissolved +vely charged copper ions (Cu^{2+}) gets attracted to the –vely charged electrode iron key accordingly form copper atoms. These copper atoms deposit on the iron key in the form of a thin layer or coating.

In this way copper plating of iron key is performed.



Q.8. What are the uses of electroplating? Uses of electroplating.

Ans: **Uses of electroplating:**

i. Electroplating is used to cover iron & Steel objects with a thin layer of chromium to prevent them from rusting and shining and attractive look

ii. Electroplating is used to make cheap metal objects salable and attractive like jewellery and other ornaments with a layer of more expensive metals like silver and gold.

iii. Tin cans are made by electroplating a layer of tin on the iron.

iv. Tin sheets are made by electroplating a layer of nickel over them to prevent from rusting.

TEXTUAL QUESTIONS:

1. Fill in the blanks.

(a) Most liquids that conduct electricity are solutions of **acids**, **bases** and **salts**.

(b) The passage of an electric current through a solution causes **chemical** effects.

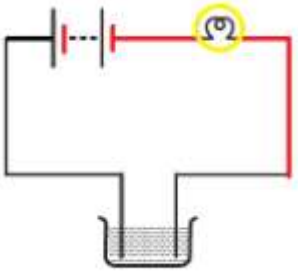
(c) If you pass current through copper sulphate solution, copper gets deposited on the plate connected to the **negative** terminal of the battery.

(d) The process of depositing a layer of any desired metal on another material by means of electricity is called **electroplating**.

2. When the free ends of a tester are dipped into a solution, the magnetic needle shows deflection. Can you explain the reason?

Ans: The compass needle shows a deflection which concludes that current is flowing through the wire. So, the solution is conducting solution hence deflection is obtained in the compass needle.

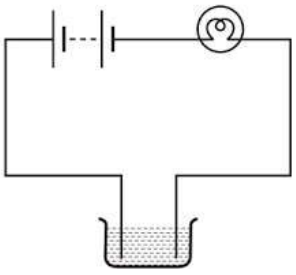
3. Name three liquids, which when tested in the manner shown in Fig., may cause the magnetic needle to deflect.



Ans: I. Saltwater
II. Lemon juice
III. Tap water

These liquids can be taken in a beaker to show the passage of electricity as they will show a deflection in the magnetic needle.

4. The bulb does not glow in the setup shown in Fig. List the possible reasons. Explain your answer.



Ans: The possibility of the bulb not glowing maybe because of the following reasons:

a. The liquid may be non-conducting. In this case, the circuit is incomplete and the current does not pass through the liquid.

b. Electric current may be weak for the circuit is made up of a material which is not a good conductor of electricity or there is insufficient energy in the battery to generate electricity.

5. A tester is used to check the conduction of electricity through two liquids, labelled A and B. It is found that the bulb of the tester glows brightly for liquid A while it glows very dimly for liquid B. You would conclude that

(i) liquid A is a better conductor than liquid B.
(ii) liquid B is a better conductor than liquid A.
(iii) both liquids are equally conducting.
(iv) conducting properties of liquid cannot be compared in this manner.

Ans: Liquid A is a better conductor than liquid B.

6. Does pure water conduct electricity? If not, what can we do to make it conducting?

Ans: Pure water does not conduct electricity as it does not contain any type of salts. Adding, a small amount of Common salt (Sodium Chloride ie, NaCl) will turn the water to a conducting medium.

7. In case of a fire, before the firemen use the water hoses, they shut off the main electrical supply for the area. Explain why they do this.

Ans: In case of a fire, before the firemen use the water hoses, they shut off the main electrical supply for the area because water sprayed from the hose might conduct electricity which may come in contact with the electrical appliances which increases the chance of electricity passing through wire. This may hurt fire man.

8. A child staying in a coastal region tests the drinking water and also the seawater with his tester. He finds that the compass needle deflects more in the case of seawater. Can you explain the reason?

Ans: The amount of dissolved salts present in the seawater is more than that of the drinking water. So, the sea water will be a better conductor than the drinking water. That is the reason behind the increased deflection of the needle in the seawater when compared with the drinking water.

9. Is it safe for the electrician to carry out electrical repairs outdoors during heavy downpour? Explain.

Ans: No. It is not safe to repair electrical appliances outdoors during a heavy downpour. Rainwater is composed of a certain percentage of dissolved salts making it conductive. This may cause electric shocks and harm the electrician while working outdoors during heavy downpours.

10. Paheli had heard that rainwater is as good as distilled water. So she collected some rainwater in a clean glass tumbler and tested it using a tester. To her surprise she found that the compass needle showed deflection. What could be the reasons?

Ans: Rainwater is composed of a certain percentage of dissolved salts making it conductive. This makes the deflection in the compass.

11. Prepare a list of objects around you that are electroplated.

Ans: Electroplated objects.

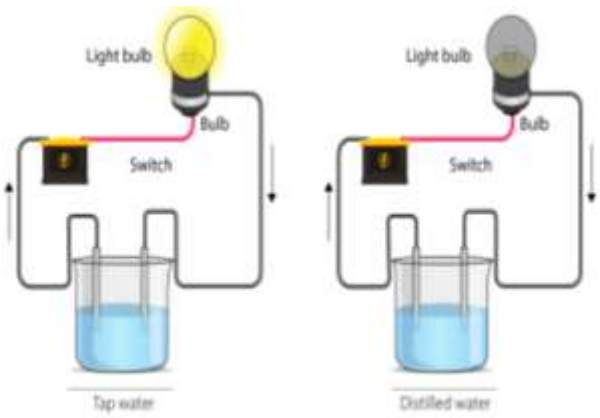
i. Handle bar of cycle.
ii. Wheel rims.
iii. Artificial ornaments
iv. Bath taps.
v. Kitchen gas burners.

12. The process that you saw in Activity 8.7 is used for purification of copper. A thin plate of pure copper and a thick rod of impure copper are used as electrodes. Copper from impure rod is sought to be transferred to the thin copper plate. Which electrode should be attached to the positive terminal of the battery and why?

Ans: The thick rod of impure copper plate is to be attached to the positive terminal of the battery because when electric current is passed through the copper sulphate solution, it gets dissociated into copper and sulphate. The free copper, being positively charged, gets drawn to the negative terminal of the battery and gets deposited on it. On the other hand the loss of copper from the solution is regained from the impure copper rod which is attached to the positive terminal of the battery.

Important points to remember:

1. **LED:** It is light emitting diode which glows when the light is very small. It is used to detect/check weak conductors of electricity like vinegar and lemon juice.



2. **Name different effects of electric current.**
   Ans: Heating, Lighting, Chemical, Magnetic effects

3. **Which effect of current makes a bulb glow?**
   Ans: Heating effect.

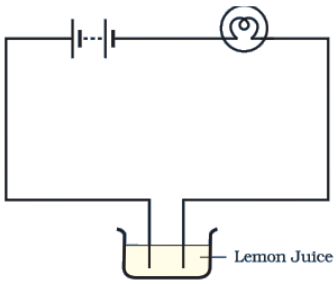
4. **Which effect of current is used in electroplating?**
   Ans: Chemical effect.

5. **Insulators:** Materials like wood, rubber, silk, plastic etc which do not allow electric current to pass through them are called bad conductors of electricity or insulators.

6. **Pure distilled water** → Non electrolyte

7. **The weak electric current flowing the liquids having low electrical conductivity can be detected by**
   i. LED ii. Magnetic compass

8. **Fruits and vegetables** → can also conduct electricity



9. **In artificial satellite, the source of current is –** Solar battery

Chapter No. 14

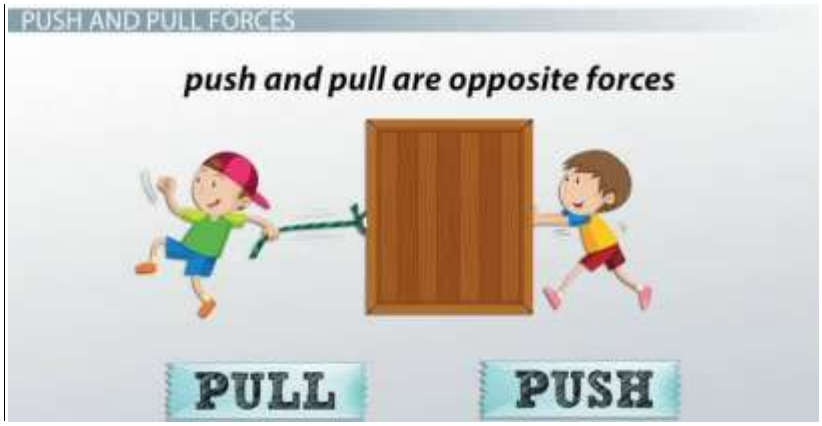
FORCE & PRESSURE

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is force?

Ans: **Force**:- A force is an external influence i.e, pull or push that changes or tends to change the state of rest, speed, direction of motion or shape of an object.

The direction in which the object is pushed or pulled is called the direction of force. e.g. Forces are used in our every day actions like pushing, pulling, lifting, stretching, twisting, pressing etc.



Q.2. What are the effects of force? Or
When a force is applied to a body, state its effects.

Ans: **Effects of force:** A force cannot be seen but it can be judged only by its effects it can produce in various objects around us. The following conclusion can be drawn about the effect of force applied to an object.

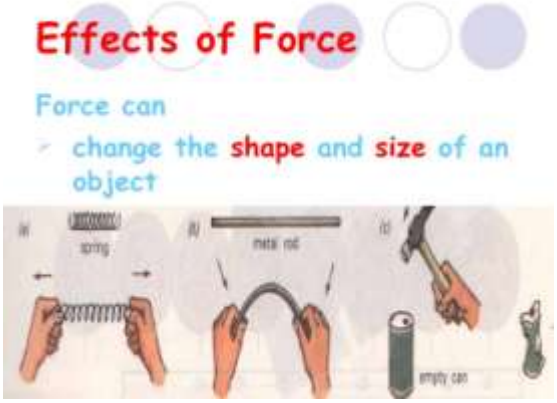
i. **Change in speed:** The applied force can produce a change in the speed of an object e.g, if the force is applied in the direction of motion of an object, its speed increases e.g, pushing moving bicycle from behind. Similarly if the force is applied in the opposite direction of the motion of an object, then its speed decreases e.g, pulling moving bicycle from behind.

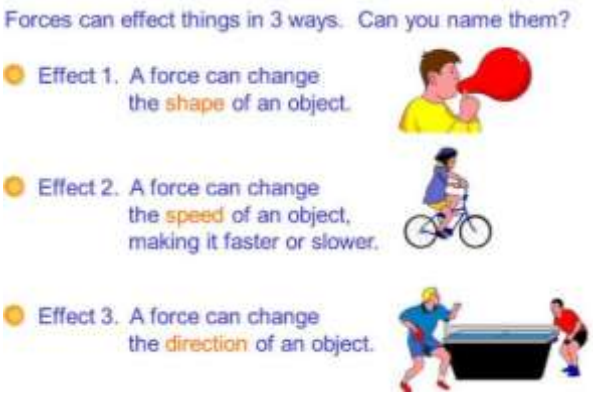
ii. **Change in direction of motion:** The applied force can change the direction of motion of object e.g, when a moving cricket ball is hit by a bat, the direction of cricket ball changes and it goes in another direction.

iii. **Change in the state of stationary object:** The applied force can move a stationary object e.g, kicking of football kept on the ground.

iv. **Change in the state of moving object:** The applied force can stop moving object e.g, a moving ball stops when a force is applied to it.

v. **Change in shape and size of an object:** The applied force can change the shape and size of an object e.g, pulling of light spring on both ends with our hands, changes the shape and size of the spring, change in shape of dough by pressing it by balen while making chapattis.





Q.3. What are types of forces? Or Define contact and non contact forces.

Ans: **Types of forces:** All types of forces can be divided into two main groups namely contact forces and non contact forces.

i. **Contact forces:** Contact forces are those forces which act at the points of contact when one object comes in contact with the other object. In other words a force which can be exerted by an object on another object is known as contact forces.

Contact forces are described by Newton's laws of motion. e.g, Muscular forces and Frictional forces.

a. **Muscular forces:** The forces exerted by the muscles of the body of a human beings and animals are called muscular forces e.g, bullocks apply muscular force to drive a cart or human beings exert muscular force for performing various day to day activities like walking, running, jumping, climbing, lifting, pushing, kicking, stretching, squeezing etc.

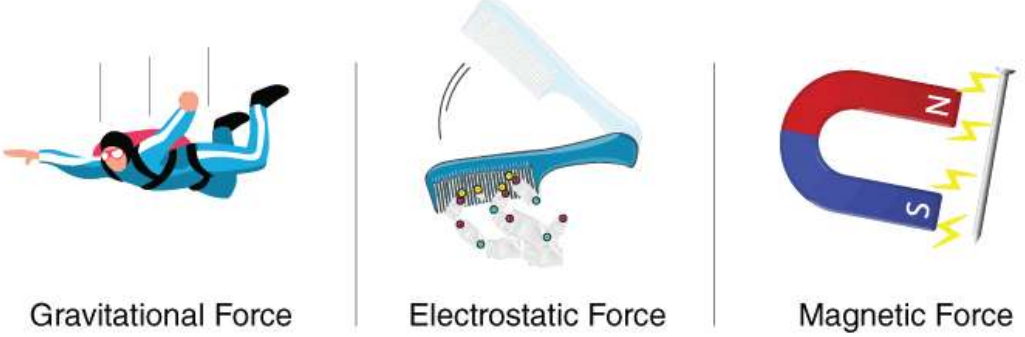
b. **Frictional force/friction:** The force which always opposes the motion of one object/body over another body/object is called Frictional force or friction. The frictional force acts between the two surfaces which are in contact with each other e.g, a ball moving on the ground slows down and then stops due to frictional force.

ii. **Non contact forces:** A non contact force is a force applied to an object by another body from a distance not in direct physical contact with it. Or a force which is exerted by an object on another object without touching each other is called non contact force e.g, non contact forces are magnetic force, electrostatic force and gravitational force.

a. **Magnetic force:** A magnet has the property of moving things made of cobalt, nickel, iron or steel. The force exerted by a magnetic substance is called the magnetic force. It is a noncontact force e.g. attraction of iron pins and a magnet etc.

b. **Electrostatic force:** The force exerted by an electrically changed object is called electrostatic force. It is also a noncontact force and can be exerted by a charged object on another object from a distance e.g, a plastic comb which is electrically charged by rubbing in dry hair exerts an electrostatic force on uncharged tiny pieces of paper and attracts them etc.

c. **Gravitational force:** The earth exerts a force of attraction on all things on its surface and beyond. Hence the force with which the earth pulls the objects towards it is called the force of gravity or gravitational force. It is also a noncontact force and causes all the objects to fall towards the earth e.g. a fruit falls on the earth from a tree, a ball thrown upwards fall back to the earth etc.



Gravitational Force | Electrostatic Force | Magnetic Force

Q.4. Discuss, force has both magnitude and direction as well.

Ans: **Force has magnitude as well as direction:** The strength of a force is expressed by its magnitude. It means a force could be larger or smaller than other.

The direction in which the object is pushed or pulled is called the direction of force. The magnitude of a force is expressed in the S.I. unit of force called Newton. 1 Newton is the force which can produce in an object of 1 kilogam mass on acceleration of $1m/S^2$.

The change in direction or magnitude of the applied force changes the effect of the applied force as under:

i. If the two forces applied to an object act in the same direction, then the resultant force acting on the object is equal to the sum of the two forces. In other words, when two forces acting in the same direction, their effective magnitude increases.

ii. If the two forces applied to an object act in the opposite direction, then the net force or resultant force acting on the body is equal to the difference between the two forces. In other words, when two forces acting in the opposite directions, their effective magnitude decreases.

Q.5. What is pressure? What are its units? What are the factors, pressure depends on?

Ans: **Pressure:** Pressure is defined as the physical force exerted on an object. The force applied is perpendicular to the surface of objects per unit area.

The basic formula for pressure = $\frac{Force}{Area} = \frac{F}{A}$

In other words the amount of force exerted (thrust) on a surface per unit area is defined as pressure.

Unit: S.I. unit of measuring force is Newton (N) and the S.I. unit of measuring area is square meter (m^2)

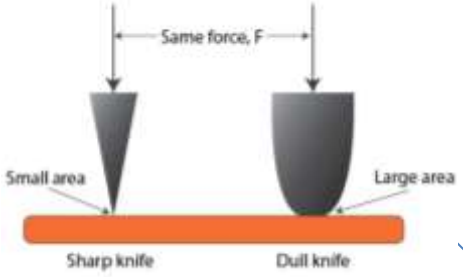
Therefore S.I. unit of pressure is Newton per square meter (N/m^2) which is also called Pascal (Pa)

∴1 Pascal = 1 Newton per square meter or 1 Pa = $1N/m^2$

Factors that pressure depends on: The pressure depends on two factors.

i. Force applied ii. Area over which force acts.

Conclusion: The same force can produce different pressures depending on the area over which it acts e.g, when a force acts over a large area of an object, it produces a small pressure. But if the same force acts over a small area of the object, it produces a large pressure.



Q.6. A force of 100N is applied to an object of area $2m^2$. Calculate the pressure.

Ans: Here Force = 100N

Area = $2m^2$

$\therefore$ Pressure = $\frac{Force}{Newton} = \frac{100}{2}$ = $50N/m^2$

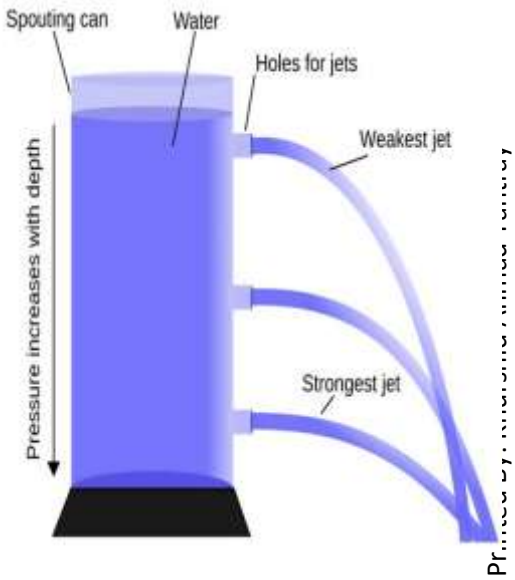
= 50 Pa

Q.7. How does liquids exert pressure on its containers?

Ans: **<u>Pressure exerted by liquids:</u>** All the liquids such as Alcohol, Water, Petrol, Oil etc exert pressure on the base/bottom and walls of their container.

i. The pressure that a liquid exerts on the bottom of the container is dependent upon the height of the liquid in the container. It means the pressure exerted by a liquid increases with increasing depth inside the liquid.

ii. The liquid exerts equal pressure on the different points on the walls of the container having the same depth. It means the sideways pressure of a liquid gradually increases and it becomes maximum at the bottom and minimum at the top of the vessel/container.



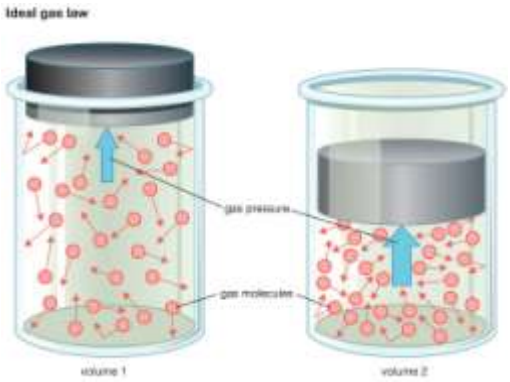
Q.8. How does gas exerts pressure on its container? Why balloons and tyres of a car burst?

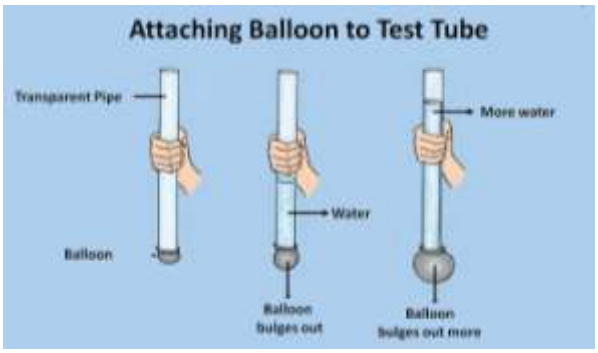
Ans: All the gases such as hydrogen, helium, oxygen, nitrogen, Co_2, air etc exert pressure on the walls of their container.

The gas molecules are continuously colliding in all directions, with each other and the walls of the container with a high speed. Therefore gases exert pressure on the walls of the container.

If gas is heated up, its particles move around more quickly. They hit the walls of their container harder and more often. This increases the pressure. Sometimes the pressure gets so great that the container bursts.

This is why balloons and tyres burst, if we blow them too much.



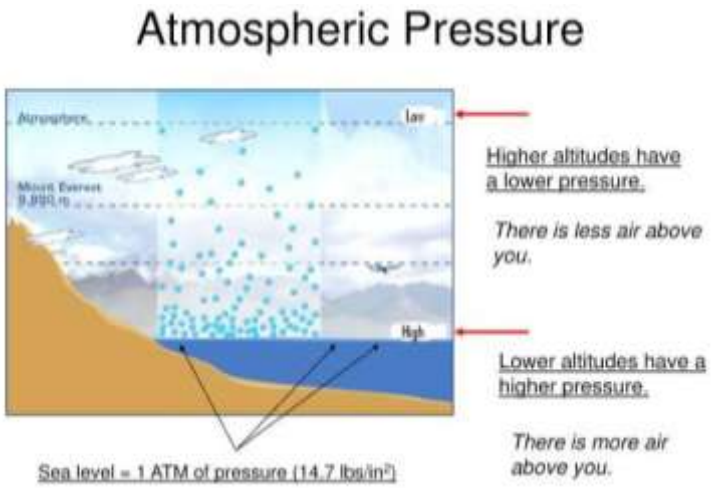


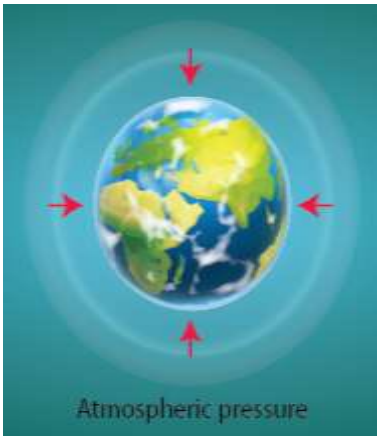
Q.9. What is atmospheric pressure?

Ans: **Atmospheric pressure:** Atmospheric pressure is a force in an area pushed against a surface by weight of the atmosphere i.e, air of earth. Barometers can be used to measure atmospheric pressure.

Magnitude of atmospheric pressure: On the surface of earth, the atmospheric pressure is maximum at the sea level. This is because the column of air above the surface of earth is tallest at the sea level.

As we go up in the atmosphere from the surface of earth, the atmospheric pressure goes on decreasing.





TEXTUAL QUESTIONS:

1. Give two examples each of situations in which you push or pull to change the state of motion of objects

Ans: Examples of situations in which you push or pull to change the state of motion of objects.

1. Pull situations
   a) In order to open a drawer, we have to pull it. This action changes the state of motion of the drawer.
   b) To draw water from the well, the rope is pulled. This action changes the state of motion of the bucket.
2. Push Situations

a) A football is pushed by the foot of a player. This action changes the state of motion of the ball.

b) In order to change the place of the heavy box from one room to another, we have to push it. This action changes the motion of the box.

2. Give two examples of situations in which applied force causes a change in the shape of an object.

Ans: The forces which change the shape of an object are as follows:

i) By pressing the clay between the hands, it deforms.

ii) The shape of the plastic bottle changes by squeezing it.

3. Fill in the blanks in the following statements.

1. To draw water from a well we have to **pull** at the rope.
2. A charged body **attracts** an uncharged body towards it.
3. To move a loaded trolley we have to pull or **push** it.
4. The north pole of a magnet **repels** the north pole of another magnet.

4. An archer stretches her bow while taking aim at the target. She then releases the arrow, which begins to move towards the target. Based on this information fill up the gaps in the following statements using the following terms. muscular, contact, non-contact, gravity, friction, shape, attraction

(a) To stretch the bow, the archer applies a force that causes a change in its **shape**.

(b) The force applied by the archer to stretch the bow is an example of **muscular** force.

(c) The type of force responsible for a change in the state of motion of the arrow is an example of a **contact** force.

(d) While the arrow moves towards its target, the forces acting on it are due to **gravity** and that due to **friction** of air.

5. In the following situations identify the agent exerting the force and the object on which it acts. State the effect of the force in each case.

(a) Squeezing a piece of lemon between the fingers to extract its juice.

(b) Taking out paste from a toothpaste tube.

(c) A load suspended from a spring while its other end is on a hook fixed to a wall.

(d) An athlete making a high jump to clear the bar at a certain height

Ans: a) We make a muscular force to extract the juice of the lemon by squeezing it. As a result, the shape of the lemon gets changed.

b) To take out paste from the toothpaste tube we use our muscular force. This muscular force acting on the toothpaste tube leads to a change of its shape.

c) Here, the suspended load exerts a force on the spring and pushes the spring downwards. As a result, the spring gets stretched. Hence, its shape gets changed.

d) The feet of the athlete exert the muscular force on the ground, which pushes the ground. This allows him to jump over the bar. As a result, his state of motion gets changed.

6. **A blacksmith hammers a hot piece of iron while making a tool. How does the force due to hammering affect the piece of iron?**

Ans: A blacksmith uses his muscular force while hammering a hot piece of iron. The muscular force changes the shape of the iron so that it can be given the desired shape.

7. An inflated balloon was pressed against a wall after it has been rubbed with a piece of synthetic cloth. It was found that the balloon sticks to the wall. What force might be responsible for the attraction between the balloon and the wall?

Ans: Electrostatic force.

8. Name the forces acting on a plastic bucket containing water held above ground level in your hand. Discuss why the force acting on the bucket do not bring a change in its state of motion.

Ans: For holding the bucket of water above the ground, we use muscular force. This muscular force acts against the force of gravity that pulls the bucket towards the ground. The two forces are equal in magnitude but opposite in direction. Therefore, the net force on the bucket is zero. Hence, there is no change in the state of motion.

9. A rocket has been fired upwards to launch a satellite in its orbit. Name the two forces acting on the rocket immediately after leaving the launching pad.

Ans: When a rocket leaves launching pad the following forces acting on it:

i. Gravitation force of the earth (Downward)

ii. Propelling force of gasses emitted by combustion of fuels.

10. When we press the bulb of a dropper with its nozzle kept in water, air in the dropper is seen to escape in the form of bubbles. Once we release the pressure on the bulb, water gets filled in the dropper. The rise of water in the dropper is due to

(a) pressure of water.

(b) gravity of the earth.

(c) shape of rubber bulb.

(d) **atmospheric pressure**

Important points to remember:

1. **Force is due to an interaction:** This means an interaction of one object with another object results in a force between the two objects.

2. **Resultant force:** When two or more forces act on a rigid body simultaneously, then a single force representing all the forces applied to the object is called as resultant force.

3. **Weight:** Weight of a body is the force with which the body is attracted towards the centre of earth.

4. **Name the force applied, when food is pushed forward from mouth to food pipe?**
   Ans: Muscular force

5. **How can pressure be increased or decreased?**
   Ans: By changing the area on which force acts.

6. **Why is foundation of wall made wider?**
   Ans: To decrease the pressure on the walls on the base.

7. **Which type of tool is needed for cutting or piercing?**
   Ans: A sharp edged tool.

8. **Why do tubes inflate when air is pumped in them?**
   Ans: Due to the air pressure on the walls of the tube.

9. **How force is a vector quantity?**
   Ans: Force has magnitude as well as direction.

10. **Why are not we crushed, if atmospheric pressure is so great?**
    Ans: The fluid filled cells of our body exerts pressure from within, which prevents us from being crushed by atmospheric pressure.

11. **Formula for calculation of pressure =** $\frac{Force}{Area}$

12. **Applications of atmospheric pressure.**
    Ans: i. Drinking straw ii. Syringe
    iii. Dropper iv. Rubber sucker

13. **Define Pascal and kilopascal?**

    Pascal: Pascal is a metric pressure unit and is equal to a force of 1 Newton/square meter. Its symbol is 'Pa'.

    Kilopascal: It is a metric pressure unit and is equal to 1000 force of Newton/square meter. Its symbol is 'kPa'.

    Therefore, 1Pa = 0.001 kPa or 1kPa = 1000 Pa.

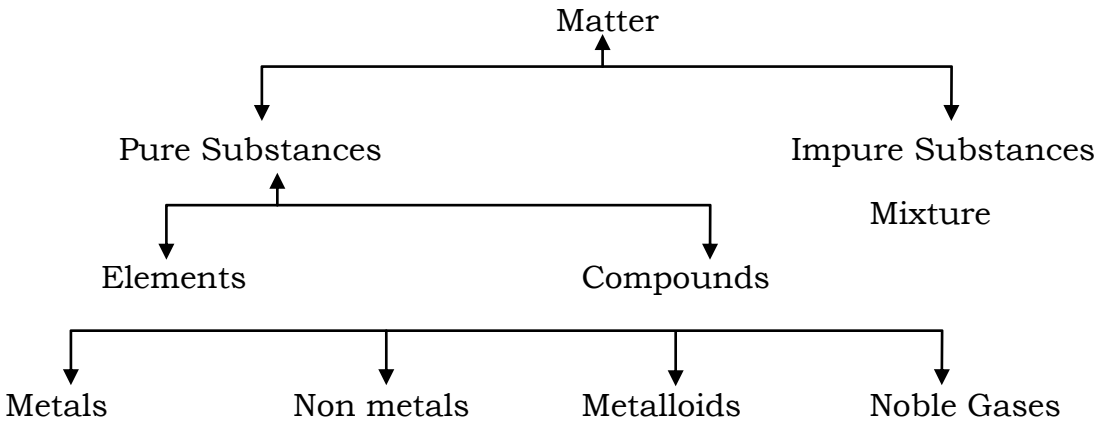
Chapter No. 15

MATERIALS – Metals & Non metals

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. Write the classifications of matter?

Ans: **Classification of matter**:-



Q.2. Define pure substances, mixtures, elements and compounds.

Ans: i. **Pure substances:** Pure means having no adulteration. Scientifically the material or substance which is made up of only one kind of atoms and molecules is called pure substances e.g, distilled water, All elements and compounds like iron, copper (made of same kind of atoms, NaCl, Ice, Calcium oxide (made of same kind of molecules.

ii. **Mixture (Impure substances):** A mixture is a substance which consists of two or more elements or compounds, chemically not combined together e.g, Air, Milk, Gun powder is a mixture of potassium nitrate sulphur and charcoal.

Elements: An element is a pure substance that is made entirely from one type of atoms e.g, the element Hydrogen is made from atoms containing a single proton and a single electron. There are 118 elements known so far. 92 are naturally occurring elements and rest elements are manmade or derived artificially. An element cannot be broken down into two or more simpler substances by chemical reactions i.e, heat, light or electricity.

Q.3. Define metals. What are their physical properties?

Ans: **Metals:** A metal is an element that readily forms positive ions called cations. A metal has generally shiny surface, is good conductor of heat and electricity and can be melted or fused, hammered into thin sheets or drawn into wires. Out of 92 naturally known elements 70 elements are metals and have been placed left side of Modern Periodic Table. The most common physical properties of metals are:

i. **Malleability:** Metals are malleable i.e, they can be beaten into sheets with a hammer.

ii. **Ductility:** Metals are ductile i.e, they can be drawn into wires.

iii. **Lusture:** Metals have lusture i.e, they shine and can be polished.

iv. **Sonority:** Metals are sonorous i.e, they produce sound when hit with an object.

v. **Hardness:** Metals are usually very hard and strong i.e, they cannot be cut easily.

vi. **Density:** Metals are generally crystalline in nature i.e, atoms are closely packed in a metal.

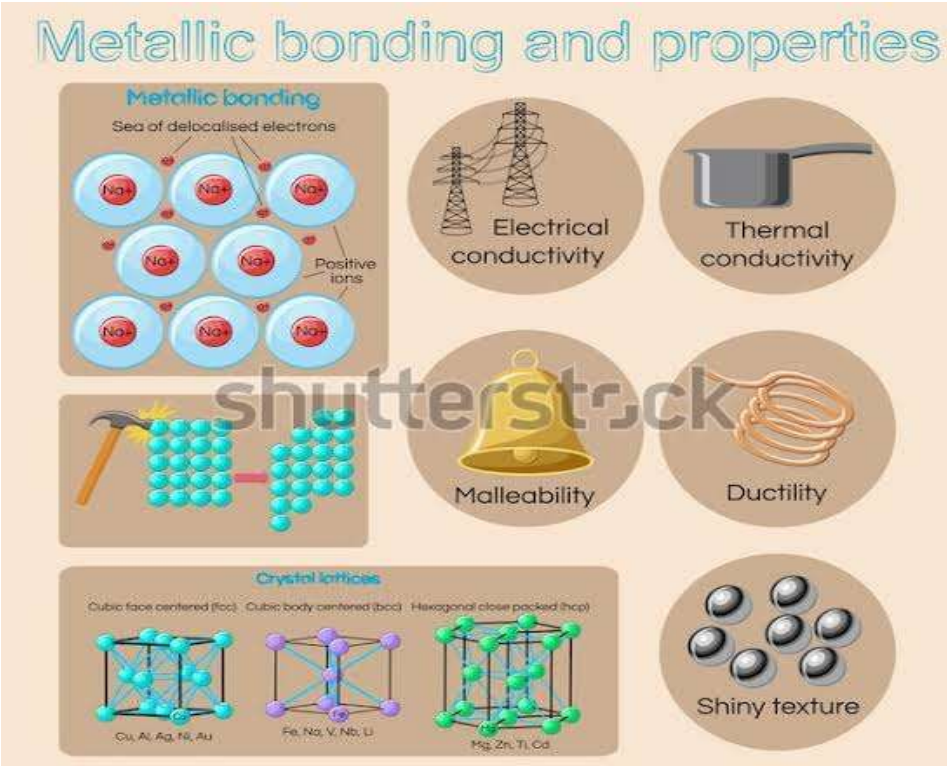
vii. **Melting and boiling points:** Metals have high melting and boiling points.

viii. **Electrical conductivity:** All most all the metals are good conductors of electricity.

ix. **Thermal conductivity:** Metals are also good conductors of heat.

x. **Physical state:** Metals are generally solids at room temperature except Mercury and Gallium which are liquids.

Examples: Iron, Copper, Alumimnium, Zinc, Silver, Gold, Nickel, Cobalt etc.



Q.4. What are nonmetals. Give their physical properties.

Ans: **Nonmetals:** Non metals are those elements which do not exhibit the metallic characteristics. They have been placed in the right side of the Modern Periodic Table. Out of 22 known nonmetals, 11 are solids, 10 gases and 01 solid. The most common physical properties are as under:

i. **Malleability:** Non metals are non malleable i.e, they cannot be beaten into sheets with hammer.

ii. **Ductility:** Non metals are non ductile i.e, they cannot be drawn into wires.

iii. **Lusture:** All non metals are non lustrous except graphite, diamond and iodine.

iv. **Sonority:** All non metals are non sonorous.

v. **Hardness:** Non metals are generally soft except Diamond which is allotropic form of carbon is very hard,.

vi. **Density:** Non metals have low density.

vii. **Melting and boiling points:** Non metals have usually low melting and boiling points.

viii. **Electrical conductivity:** Non metals are generally non conductors or poor conductors of electricity.

ix. **Thermal conductivity:** Non metal are generally bad conductors of heat.

x. **Physical state:** Non metals are found to exist in the three states of matter i.e, solid, liquid and gases.

Q.5. What are metalloids?

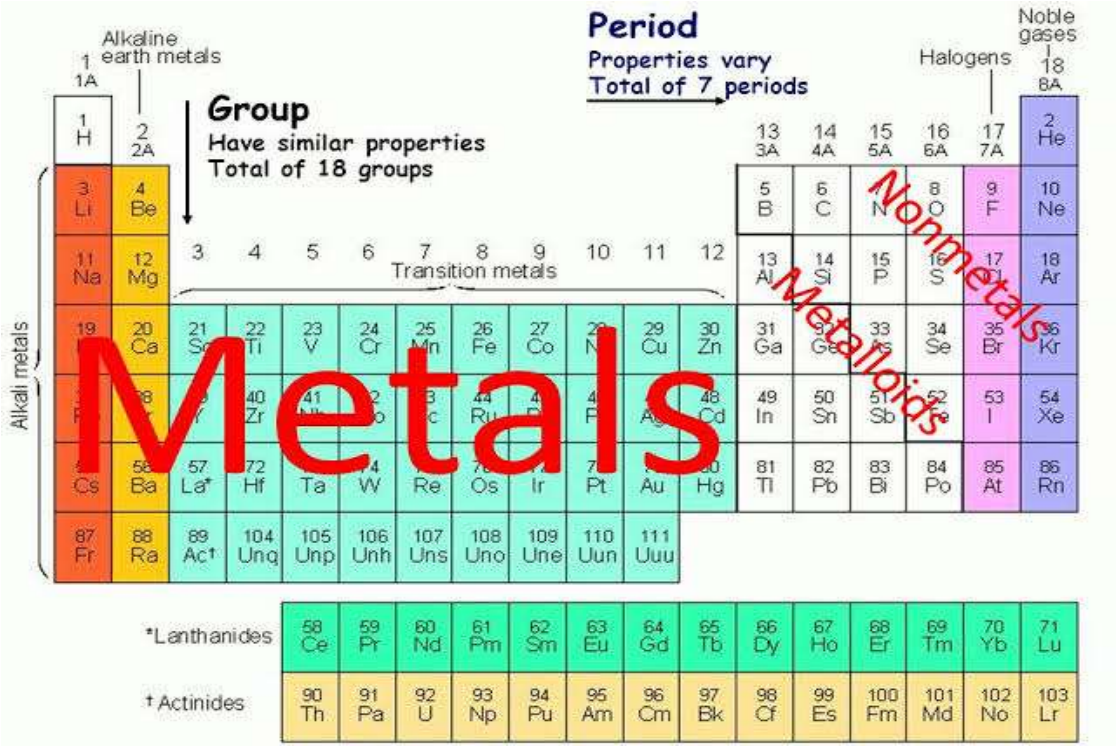
Ans: **Metalloids:** A metalloid is a chemical element that exhibits intermediate properties between those of metals and non metals. In periodic table metalloids form a jogged zone dividing elements that have clear metallic properties from elements that have clear non

metallic properties e.g, Boron, Silicon, Germanium, Arsenic, Antimony, Tellurium, Polonium are metalloids.

Q.6. What are noble gases?

Ans: **Noble gases:** The elements which have 8 electrons in the outer most shell and are chemically inert are called noble gases. e.g. Helium, Argon, Neon, Kripton, Xenon and Radon.

The noble gases make a group of chemical elements with similar property, under standard conditions they are all odorless, colourless, mono atomic gases with very low chemical reactivity.



Q.7. Describe briefly chemical properties of metals and non metals.

Ans: **Chemical properties of metals and non metals:** Metals and non metals react differently with other substances and form different products. Some of the important chemical properties of metals and non metals are as

i. **Reaction with oxygen: Metals** react with oxygen to form metal oxides which are basic in nature i.e, they turn red litmus blue e.g

a. $Magnecium + Oxygen \xrightarrow{Heat} Magnecium\ oxide$

$2Mg + O_2 \longrightarrow 2MgO$

b. $Copper + Oxygen \xrightarrow{Heat} Copper\ oxide$

$2Cu + O_2 \longrightarrow 2CuO$

c. $Aluminium + Oxygen \xrightarrow{Heat} Aluminium\ oxide$

$4Al + O_2 \longrightarrow 2Al_2O_3$

Similarly **non metals** react with oxygen to form non metal oxides which are acidic in nature i.e, they turn blue litmus to red e.g.

a. $Sulphur + Oxygen \xrightarrow{Heat} Sulphur\ oxide$

$S + O_2 \longrightarrow SO_2$

b. $Carbon + Oxygen \xrightarrow{Heat} Carbon\ dioxide$

$C + O_2 \longrightarrow CO_2$

c. $Phosphorus + Oxygen \xrightarrow{Heat} Phosphorus\ perta\ oxide$

$4P + 5O_2 \longrightarrow 2P_2O_5$

ii. **<u>Reaction with water:</u> Metals** react with water/steam to form metal oxide or metal hydroxide and hydrogen e.g,

a. $Sodium + Water \longrightarrow Sodium\ hydroxide + Hydrogen$

(Reacts violently)

$2Na + 2H_2O(Cold) \longrightarrow 2NaOH + H_2$

b. $Calcium + Water \longrightarrow Calcium\ hydroxide + Hydrogen$

$Ca + 2H_2O(Cold) \longrightarrow Ca(OH)_2 + H_2$

c. $Magnecium + Water \longrightarrow Magnecium\ hydroxide + Hydrogen$

$Mg + 2H_2O(Hot) \longrightarrow Mg(OH)_2 + H_2$

d. $Zinc + Water \longrightarrow Zinc\ hydroxide + Hydrogen$

$Zn + 2H_2O(Steam) \longrightarrow ZnO + H_2$

Non metals – do not react with water or steam.

iii. **<u>Reaction with Acids:</u> Metals** which are more reactive than hydrogen only displace hydrogen from its dilute acids to produce respective metal salts and hydrogen gas e.g.

a. $Sodium + Hydrochloric\ acid \xrightarrow{Heat} Sodium\ chloride + Hydrogen$

$Na + 2HCl\ (dilute) \longrightarrow 2NaCl + H_2$

(s) (aq) (g)

b. $Potassium + Sulphuric\ acid \xrightarrow{Heat} Potassium\ sulphate + Hydrogen$

$2K + H_2So_4\ (dilute) \longrightarrow K_2So_4 + H_2$

(s) (aq) (g)

Non metals - do not react with dilute acids.

iv. **<u>Reaction with Bases:</u>** All the metals do not react with Bases to form salt and hydrogen. However some metals react with Bases to form salts and hydrogen gas e.g,

a. $Aluminium + Sodium\ hydroxide \xrightarrow{Heat} Sodium\ Aluminate + Hydrogen$

$Al + 2NaOH \longrightarrow 2NaAlO_2 + 2H_2$

b. $Zinc + Sodium\ hydroxide \xrightarrow{Heat} Sodium\ zincate + Hydrogen$

$\boldsymbol{Zn + 2NaOH \longrightarrow Na_2ZnO_2 + H_2}$

Non metals react with bases like NaOH but no hydrogen gas is produced e.g.

i. $\boldsymbol{2NaOH + Cl_2 \longrightarrow NaClO + NaCl + H_2O}$

Sodium hydrochloride

ii. $\boldsymbol{Ca(OH)_2 + Cl_2 \longrightarrow CaOCl_2 + H_2O}$

Calcium hydrochloride

Bleaching powder

Q.8. Define displacement reactions in metals and non metals.

Ans: **Displacement reactions:** Displacement reaction is a chemical reaction in which a more reactive element displaces a less reactive element from its compound e.g, a more reactive metal displaces a less reactive metal from its salt solution.

i. Reaction of iron metal with copper sulphate solution: In this reaction more reactive metal iron displaces a less reactive metal copper from its salt solution as under.

$Copper\ sulphate + Iron \longrightarrow Iron\ sulphate + Copper$

$\boldsymbol{CuSo_4 + Fe \longrightarrow FeSo_4 + Cu}$

(Blue Solution) (Grey) (Greenish Solution) (Red-brown)

ii. **Reaction of Zinc with copper sulphate solution**: In this reaction more reactive metal zinc displaces less reactive metal copper from its salt solution as under

$Copper\ sulphate + Zinc \longrightarrow Zinc\ sulphate + Copper$

$\boldsymbol{CuSo_4 + Zn \longrightarrow ZnSo_4 + Cu}$

(Blue Solution) (Silvery white) (Colourless Solution) (Red-brown)

Similarly a more reactive **non metal** displaces a less reactive non metal from its salt solution e.g.

a. When chlorine is passed through a solution of Sodium bromide, then bromine is liberated.

$\boldsymbol{2NaBr + Cl_2 \longrightarrow 2NaCl + Br_2}$

(Aq. Soln) (Gas) (Aq. Soln.) (Gas)

b. $Potassium\ Bromide + Clorine \longrightarrow Potassium\ chloride + Bromine$

$\boldsymbol{2KBr + Cl_2 \longrightarrow 2KCl + Br_2}$

(Aq. Soln.) (Gas) (Aq. Soln.) (Gas)

Q.9. What are the uses of metals?

Ans: **Uses of metals:** Some important uses of metals are as:

i. Iron, Copper and Aluminium metals are used to make cooking utensils and water boilers for factories.

ii. Aluminium foils are used for packaging medicines, chocolates, food items and many other materials.
iii. Aluminium metal in the form of alloys is used to make aeroplanes.
iv. Iron metal in the form of steel is used to make nails, screws, nut bolts, pipes, railings, gas cylinders, stoves, water tanks, office furniture's, industrial tools and machine etc.
v. Zinc metal is used for galvanizing iron to protect it from rusting.
vi. Mercury metal is used in thermometers and blood pressure machines.
vii. Silver and gold metals are used to make jewellery.
viii. In our body iron is used in the red pigment called haemoglobin of blood.

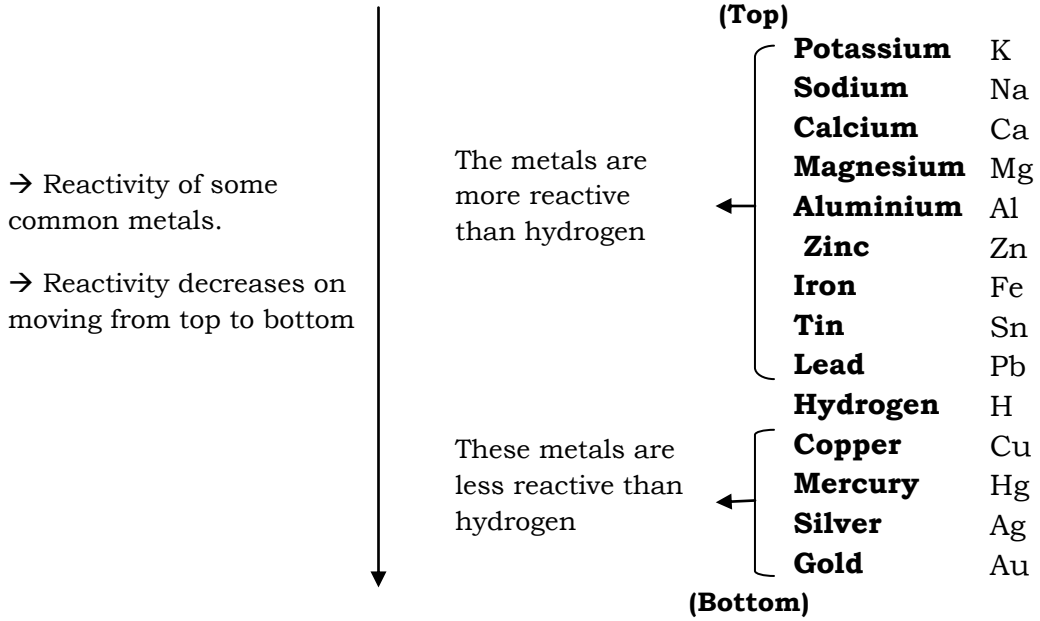
Q.10. What are the uses of non metals?

Ans: **Uses of non metals:**

i. Non metals like Oxygen is essential for our life and Carbon dioxide for plants.
ii. Nitrogen is a non metal which is used in making fertilizers.
iii. Non metals are used in water purification processes e.g, Chlorine.
iv. Non metal iodine is used as tincture iodine.
v. Carbon is a non metal is used as fuel.
vi. Non metals are used in crackers e.g, Sulphur

Q.11. What is meant by Reactivity Series of metals?

Ans: **Reactivity series of metals:** The arrangement of metals in a vertical column in the order of increasing reactivates is called reactivity series of metals.



Q.12. Reactivity series of some common non metals:

Most reactive ↓ Least reactive

Fluorine	F
Chlorine	Cl
Oxygen	O
Bromine	Br
Iodine	I
Sulphur	S
R. Phosphorus	P

TEXTUAL QUESTIONS:

1. Which of the following can be beaten into thin sheets?

(a) **Zinc** (b) Phosphorus
(c) Sulphur (d) Oxygen

2. Which of the following statements is correct?

(a) All metals are ductile.
(b) All non-metals are ductile.
(c) **Generally, metals are ductile.**
(d) Some non-metals are ductile.

3. Fill in the blanks.

Ans: (a) Phosphorus is a very **reactive** non-metal.
(b) Metals are good conductors of heat and **electricity.**
(c) Iron is **more** reactive than copper.
(d) Metals react with acids to produce **hydrogen** gas.

4. Mark 'T' if the statement is true and 'F' if it is false.

(a) Generally, non-metals react with acids. **(False)**
(b) Sodium is a very reactive metal**. (True)**
(c) Copper displaces zinc from zinc sulphate solution**. (False)**
(d) Coal can be drawn into wires**. (False)**

5. Some properties are listed in the following table. Distinguish between metals and non-metals on the basis of these properties.

Ans: Differences between metals and non-metals.

Properties	Metals	Non-metals
Appearance	They have silvery or grey lustre.	They have a dull appearance.
Hardness	They are hard.	They are soft.
Malleability	They are malleable materials.	They are non-malleable materials.
Ductility	They are ductile.	They are non-ductile.
Heat Conduction	They are good conductors of heat.	They are poor conductors of heat.
Conduction of Electricity	They are good conductors of electricity.	They are poor conductors of electricity.

6. Give reasons for the following.

(a) Aluminium foils are used to wrap food items.

(b) Immersion rods for heating liquids are made up of metallic substances.

(c) Copper cannot displace zinc from its salt solution.

(d) Sodium and potassium are stored in kerosene

Ans: a) Aluminium is malleable, less reactive to air and water and can be drawn into thin sheets hence Aluminium foils are used to wrap food items

b) Immersion rods for heating liquids are made up of metallic substances because metals are good conductors of heat and electricity.

c) Copper cannot displace zinc from its salt solution because Zinc is more reactive than copper.

d) Sodium and Potassium are highly reactive metals which readily reacts with atmospheric Oxygen to catch fire hence Sodium and Potassium are stored in kerosene.

7. Can you store the lemon pickle in an aluminium utensil? Explain.

Ans: Pickle consists of acids which react with Aluminium metal to produce salt and Hydrogen. Hence pickle is not stored in aluminium utensil.

8. Match the substances given in Column A with their uses given in Column B.

Ans:

Column A	Column B
(i) Gold	(d) Jewellery
(ii) Iron	(e) Machinery
(iii) Aluminium	(c) Wrapping food
(iv) Carbon	(f) Fuel
(v) Copper	(b) Electric wire
(vi) Mercury	(a) Thermometer

9. What happens when

(a) Dilute sulphuric acid is poured on a copper plate?

(b) Iron nails are placed in a copper sulphate solution?

Write word equations of the reactions involved.

Ans: (i) No reaction occurs when dilute sulphuric acid is poured on a copper plate. However, when concentrated sulphuric acid is poured on a copper plate, hydrogen gas evolves along with the formation of blue coloured copper sulphate crystals. The chemical reaction for the reaction between concentrated sulfuric acid and copper is:

$Cu + H_2So_4$ (conc.) ---------> $CuSo_4 + H$

ii) Iron being more reactive displaces copper from copper sulphate. In this reaction, the blue colour of copper sulphate fades and there is a deposition of copper on the iron nail.

$Fe + CuSo_4$ ---------> $FeSo_4 + Cu$

10. Sahrish took a piece of burning charcoal and collected the gas evolved in a test tube.

(a) How will she find the nature of the gas?

(b) Write down word equations of all the reactions taking place in this process.

Ans:

a) In a test tube containing gas, add a few drops of water. Now cover the test tube and shake well. After shaking, test the solution with blue litmus. It will change from blue to red. Thus, gas is acidic in nature.

b) Charcoal reacts with oxygen to form carbon dioxide gas.

11. One day Reeta went to a jeweller's shop with her mother. Her mother gave old gold jewellery to the goldsmith to polish. Next day when they brought the jewellery back, they found that there was a slight loss in its weight. Can you suggest a reason for the loss in weight?

Ans: In order to polish the gold ornament, it is to be dipped into a liquid called aqua regai (a mixture of hydrochloric acid and nitric acid). On getting dissolved in the environment of aqua regia, the outer layer of gold dissolves and an inner shiny layer appears. The dissolving of the layer causes a reduction in the weight of the jewellery.

***INTEXT QUESTIONS* (Page No. 204)**

Q1. Why sodium metal is stored in kerosene?

Ans. Sodium metal is stored in Kerosene to prevent its oxidation as it is highly reactive and readily combines with oxygen and water to from oxides and hydrogen.

Q.2. Oxides of metals are basic in nature. Explain.

Ans: Oxides of metals are basic in nature because the solution of oxides in water turns red litmus paper blue, which reveals that oxides of metals are basic in nature.

Q.3. Oxides of **non-metals** are acidic in nature**.**

Q.4. An acid is a substance which turns blue litmus **red**.

Q.5. A base is a substance which turns red litmus **blue**

Important points to remember:

1. **Acidic Oxide:** These are the oxides of non metals and give acids when dissolved in water. e.g. Co_2 and So_2.

2. **Basic oxides:** These are the oxides of metals and give alkaline or basic solutions in water e.g, CaO and Na_2O

3. **Can you store lemon pickle in aluminium utensil.**
   Ans: `No, because acid present in lemon juice reacts with aluminium to produce poisonous chemicals.

4. **Why is phosphorus stored in water?**
   Ans: It does not react with water but readily combines with air to form phosphorus pentaoxide, as such it is placed in water.

5. **Why Sodium is stored in kerosene?**
   Ans: Sodium being the highly reactive readily combines with air as such is stored in kerosene?

6. **Most ductile metal –** Silver

7. **Metal existing in liquid form**– Mercury

8. **Metal which is poor conductor –** Lead

9. **Non metal existing in liquid -** Bromine

10. **Name the gas released when metals react with acid.**
    Ans: Hydrogen

11. **Free or native state:** The metals which are not attacked by oxygen/air and moisture generally occur in free or native state e.g, gold, platinum etc

12. **Combined state:** Metals that occur in nature in the combined state i.e, compounds like oxides, sulphides etc e.g, Aluminium, Mercury, Silver etc

13. **Acid:** An acid is a substance which turns blue litmus red.

14. **Base:** A base is a substance which turns red litmus blue.

15. **Non metals do not react with**
    Ans: Water, Dilute acids

16. **Name the metals present in chlorophyll and haemoglobin.**
    Ans: Magnesium in chlorophyll, Iron in Haemoglobin

Chapter No. 16

POLLUTION OF AIR AND WATER

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is pollution? What are pollutants?

Ans: **Pollution:** The presence of unusual high concentrations of harmful or poisonous substances in the environment is called pollution.

Or

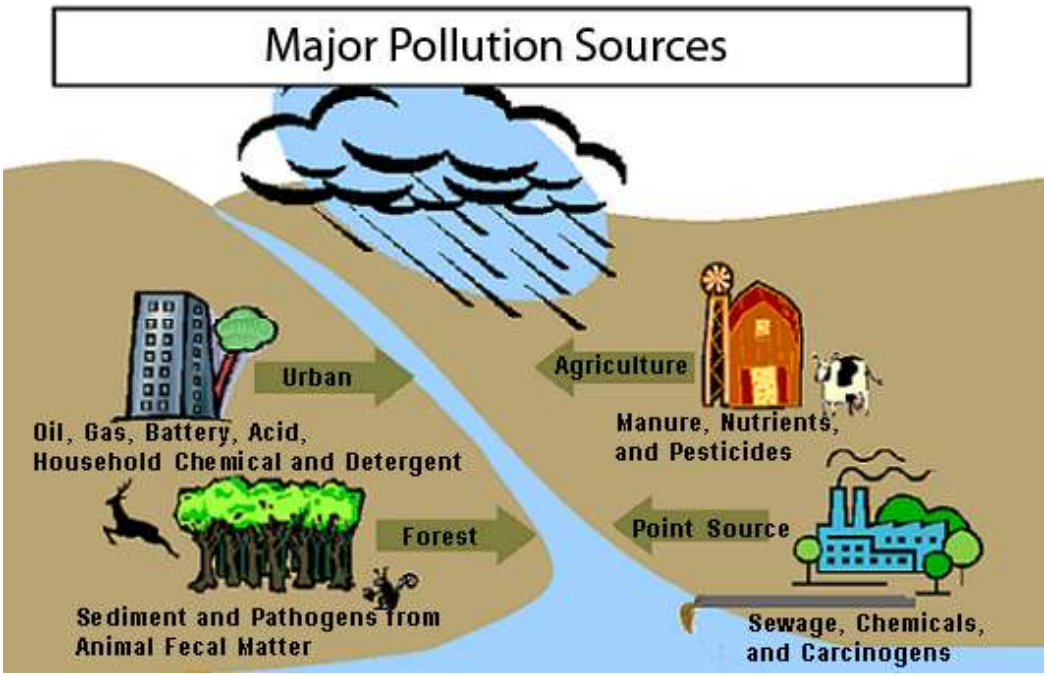
The unhealthy and harmful conditions due to addition of unwanted harmful substances in the environment is called pollution.

Pollution contaminates the air and water with poisonous substances and makes them impure to such an extent that they become harmful to the human beings, other animals, plants and nonliving things.

Pollutants: An unwanted and harmful substance that contaminates the environment such as water and air is called a pollutant e.g,

The major air pollutants include sulphur dioxide, nitrogen oxide, carbon monoxide, excess of Co_2, chlorofluorocarbons, dust, smoke and fly ash.

The major water pollutants include sewage, fertilizers, pesticides and industrial wastes.



Q.2. What is air? What are its constituents?

Ans: **Air:** Air is colourless, odourless and tasteless mixture of gases present everywhere around us. The huge blanket of air that covers the earth is called atmosphere.

The important constituents present in pure air or clean air i.e, good for health is as under:

Nitrogen	= 78%
Oxygen	= 21%
Carbon dioxide	= 0.03%
Argon	= 0.93%
Water vapours	= 0.04%
Other gases	= variable

Q.3. What is air pollution? What are major pollutants of air?

Ans: **Air pollution:** The contamination of air by unwanted and unhealthy substances called pollutants in such a quantity and for such a duration which is injurious or tends to be injurious to human health or welfare, animal or plant life is called air pollution.

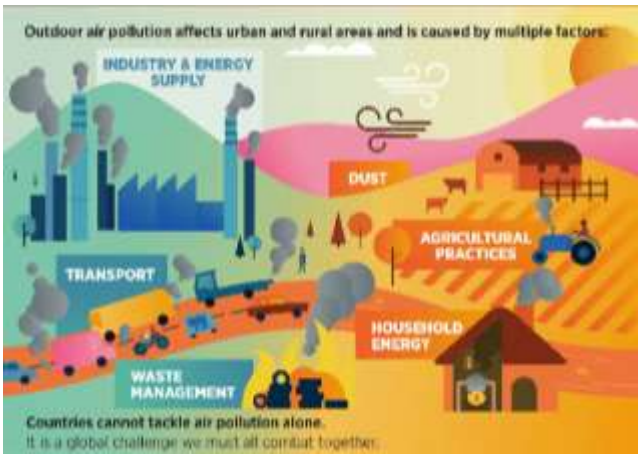
The major pollutants which cause air pollution are:

Sulphur dioxide, Nitrogen oxides, carbon monoxide, excess of Co_2, chlorofluorocarbons and suspended particulate matter like dust, smoke and fly ash.

Q.4. What are the sources of air pollution/causes of air pollution?

Ans: **Sources of/causes of air pollution:** Air pollution is caused due to increasing population. Unplanned urbanization, deforestation and rapid industrialization. Thus pollution of air is mainly caused by human activities as under:

i. Burning of fuels such as wood, coal, petrol, diesel produces harmful smoke which contains So_2, Co and Co_2.
ii. Dust produced due to traffic, mining and various industrial operations.
iii. Production of smoke, soot and lead by automobiles and thermal plants.
iv. Particulate pollutants from agricultural chemicals.
v. chlorofluorocarbons CFCS used in air conditioners and refrigerators.
vi. Forest fires and volcanic eruptions are the two natural sources of air pollution.



Q.5. What are the harmful effects of air pollution?

Ans: **Harmful effects of air pollution:** Air pollution produces a large number of bad effects on living and non living things. Air pollution can cause health problems in human beings. It can kill animals and plants. It can also damage the environment and property i.e, buildings etc. However the bad/ill effects produced by pollutants of air pollution are as under:

i. Sulphur dioxide gas in the polluted air causes severe respiratory problems. So_2 also produces acid rain which damages trees, plants, soil, aquatic animals, statues, buildings and historical monuments.

ii. Nitrogen oxides present in the polluted air damages breathing system besides skin. They also produce acid rain and help in the formation of smog.

iii. Smog formed by the combination of smoke and fog causes cough, asthma and other lung diseases especially in children.

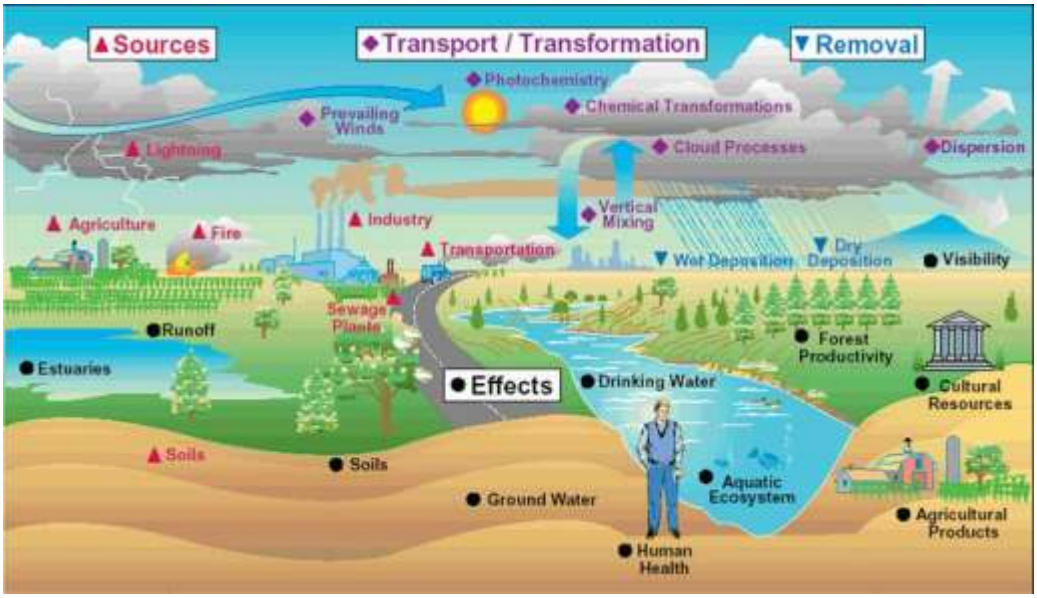
iv. Carbon monoxide present in the polluted air causes suffocation and allied respiratory problems.

v. Excess carbon dioxide in the polluted air produces undesirable changes in the environment.

vi. Chlorofluorocarbons CFCs are depleting the useful ozone layer of the atmosphere; the destruction of ozone layer by CFCs will allow the ultraviolet radiations of sun to reach the earth. These ultraviolet radiations can cause skin cancer, cataract of eyes, destruction of crops and plants.

vii. Suspended particulate matter like dust, smoke and fly ash remain suspended in air for long which are injurious to health like bronchitis, lung and respiratory diseases besides damages photosynthesis in plants, crops and causes diseases.

viii. Fly ash emitted by chimneys of coal based factories and thermal plants cause irritation in eyes, skin, nose, throat and respiratory tract.



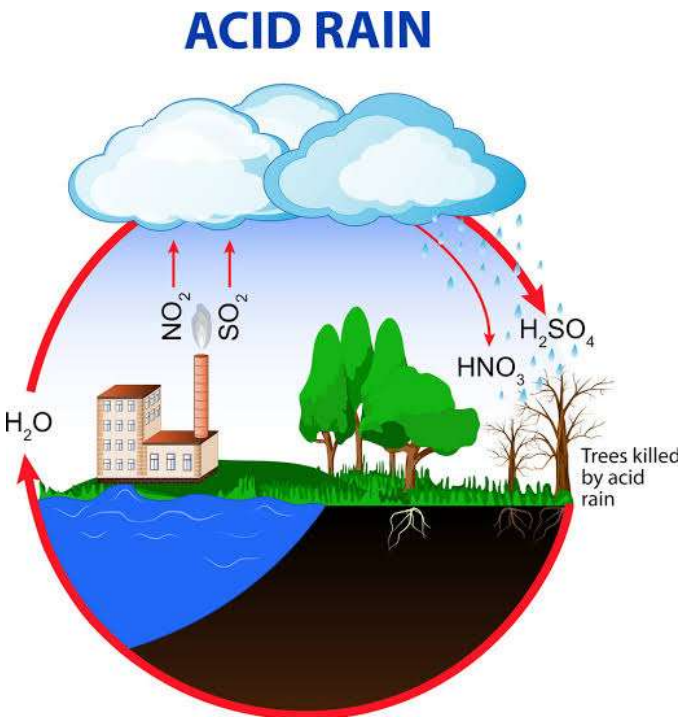
Q.6. How can be air pollution prevented?

Ans: **Prevention of air pollution:**

i. Air pollution can be controlled by using smokeless fuels i.e, LPG, CNG and Biogas, solar cookers, solar water heaters.
ii. Air pollution caused due to different factories can be prevented by washing down their smoke and waste gases with felts of water.
iii. It can be controlled by using non polluting sources of energy like solar energy and hydro energy for generating electricity.
iv. We should avoid to burn dry leaves, papers and garbage in the open areas.
v. We should plant more and more trees.
vi. By educating people about the harmful effects of air pollution.

Q.7. What is acid rain? What are its harmful effects?

Ans: **Acid rain:** The acid rain is that rain which contains small amounts of acids formed from acidic gases like sulphur dioxide and nitrogen oxides present in polluted air.



Formation of acid rain: Oxides of sulphur and nitrogen are being produced in large quantities by combustion of fossil fuels, smelters, power plants, automobile exhausts, domestic fires etc. These oxides are swept into the atmosphere and can travel thousands of kilometers. These oxides are oxidized into acids such as H_2So_4 and HNo_3 and dissolve into water vapours of atmosphere which fall on ground in the form of acid rain

a. $\boldsymbol{2So_2 + O_2 \rightarrow 2So_3 \rightarrow +H_2O \rightarrow H_2So_4}$ $(Sulphuric\ acid)$

b. $\boldsymbol{4NO + 3O_2 \rightarrow 2N_2O_5 \rightarrow +2H_2O \rightarrow 4HNo_3}$ $(Nitric\ acid)$

Effects of acid rain: Acid rains create complex problems and their impacts are far reaching such as:

i. They increase soil acidity effecting land flora and fauna.
ii. It causes acidification of lakes and streams which affects aquatic life.
iii. These rains corrode buildings, monuments, statues etc.

Q.8. What is the threat of acid rain to the beauty of the Taj Mahal?

Ans: Taj Mahal at Agra is a beautiful historical monument made of pure white marbles. It is one of the Seven Wonders of the World.

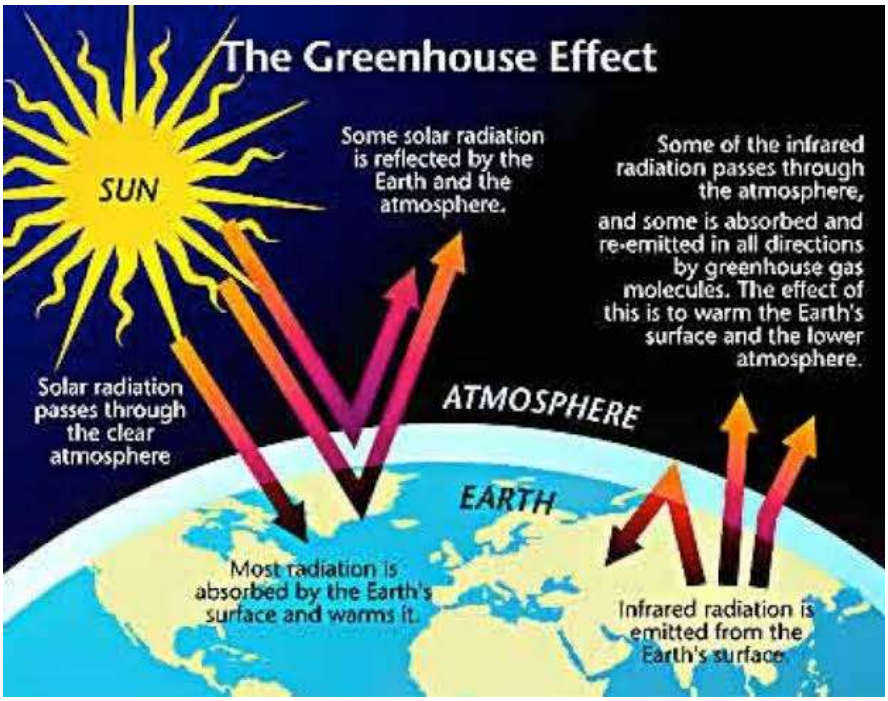
The experts have warned that air pollution around Taj Mahal resulted due to presence of Mathura refinery oil industry and other industries established around Taj Mahal, is discolouring its white marble and corroding it slowly.

This posseses a great threat to the beauty of Taj Mahal. The acids present in acid rain react with marble (Calcium carbonate) of Taj Mahal monument and corrode it slowly and as a result the white marble of Taj Mahal turns into yellow colour. The slow corrosion or eating up of marble of monument by acid rain is also known as Marble cancer.

Q.9. Define Green House Effect.

Ans: **Green House Effect:** the green house effect is a naturally occurring process that acids in heating the earth's surface and atmosphere. It results from the fact that certain atmospheric gas called as green house gases namely Co_2, Water vapours and methane are able to change the energy balance of the planet earth by absorbing long wave radiations of the sun emitted from the earth's surface. This results in the warming up of earth's atmosphere.

This warming up or heating up of earth's atmosphere due to the trapping of sun's heat by Co_2 gas in the atmosphere is called Green house effect. This heating up of earth's atmosphere is important of life on the earth.



Q.10. What is global warming? What are its harmful effects?

Ans: **Global warming:** Global warming as the name suggests in the increase in temperature of the globe i.e, average temperature of the atmosphere has increased.

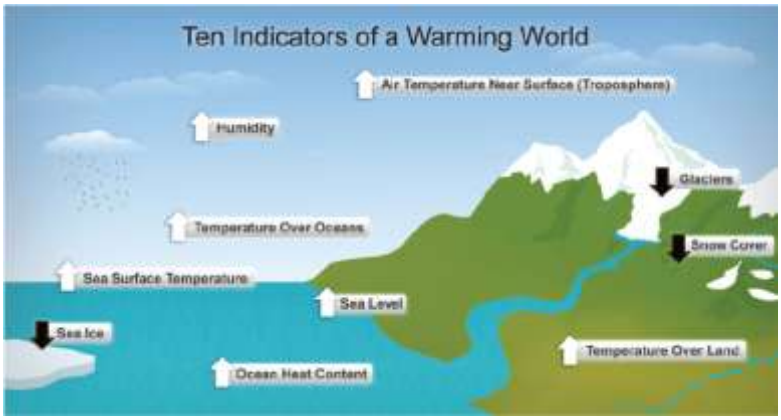
Due to rapid burning of fossil fuels and decrease in forests i.e, plants and trees, the amount of Co_2 in the atmosphere is increasing steadily. These results in increased green house effect i.e, the temperature of earth's temperature is increasing day by day.

This undue rise in temperature of earth's atmosphere due to excessive green house effect produced by increasing amount of ozone, methane especially Co_2 gas in the atmosphere is called global warming.

Gases responsible for global warming: Gases like carbon dioxide, methane, nitrogen oxide and water vapours contribute to the effect of global warming.

Harmful effects of global warming:

i. Global warming can cause sea levels to rise dramatically.
ii. Global warming can reduce rainfall in some areas of earth leading droughts.
iii. Global warming is a serious threat to the existence of life on earth.
iv. Global warming may lead to melting of glaciers and polar ice caps which can cause flooding of low lying coastal areas like Bangladesh, Lakshadweep, Andaman and Nicobar islands.



Q.11. Define smog and what are its ill effects?

Ans: **Smog:** The mixture of smoke and fog is known as smog. It consists of several toxic gases and oxidizing substances like nitrogen oxides, ozone, Peroxy Acyl Nitrates (PAN), ozonated hydrocarbons and ethylene.

Ill effects of smog:

i. It causes glazing, silvering and sometimes necrosis of the lower leaf surface resulting in crop loses.
ii. Smog reduces visibility, especially in cold weather.
iii. It increases incidence of allergies, cancer and heart diseases.

Q.12. What is water pollution? What are different water pollutants?

Ans: **Water pollution:** Water pollution is defined as the decrease in the quality of water by the presence of various solid and liquid wastes which make the water unfit for human use. OR

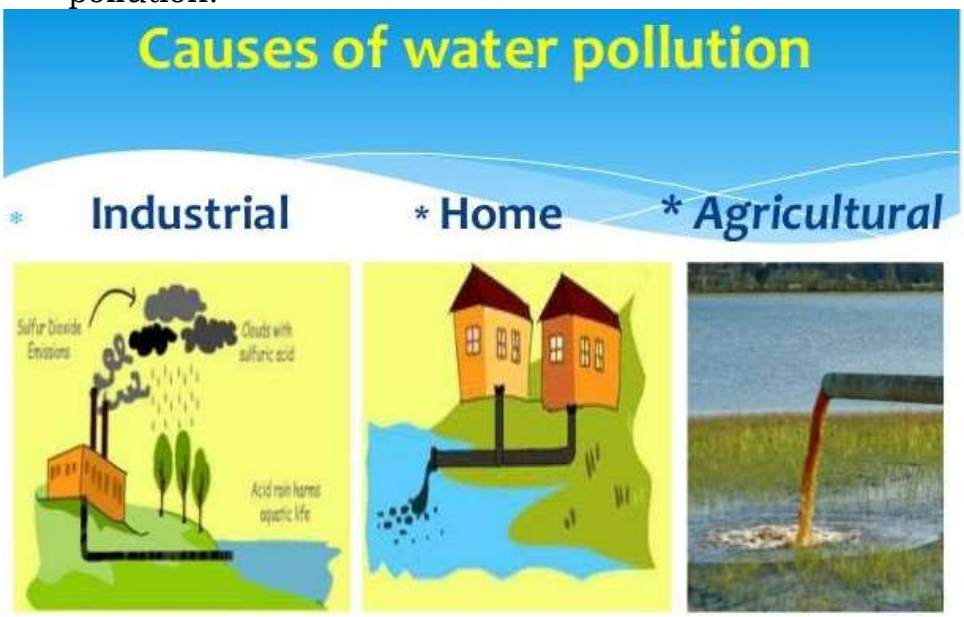
The contamination of water of rivers, lakes and ponds etc with unwanted and harmful substance called pollutants is called water pollution.

The major pollutants which cause water pollution are sewage, fertilizers, pesticides and industrial wastes.

Q.13. What are the sources of water pollution or causes of water pollution?

Ans: **Sources of water pollution:** The major sources of water pollution are as under:

i. Dumping of unwanted sewage into rivers causes water pollution.
ii. Use of fertilizers and pesticides in agriculture causes water pollution.
iii. Discharging of unwanted/untreated industrial wastes into rivers and lakes causes water pollution.
iv. Discharging of untreated domestic and municipal wastes.
v. Hot water of thermal plants and industries returned to water bodies which increases their temperature also causes water pollution.



Q.14. What are the harmful effects of water pollution?

Ans: **Harmful effects of water pollution:**

i. Drinking of water polluted with untreated sewage can cause diseases such as cholera, typhoid, diarrohea, dysentery and jaundice.
ii. Water of rivers and lakes polluted with fertilizers and pesticides cause the death of aquatic animals.
iii. Water of rivers and lakes polluted with toxic substances of industries kills aquatic animals and also damages our health through food chain.
iv. Lead and mercury produced in chemical industries can damage nervous system. It can also cause skin problems and death of human and aquatic life.

Q.15. What are the ways to control water pollution?

Ans: **Control of water pollution:**

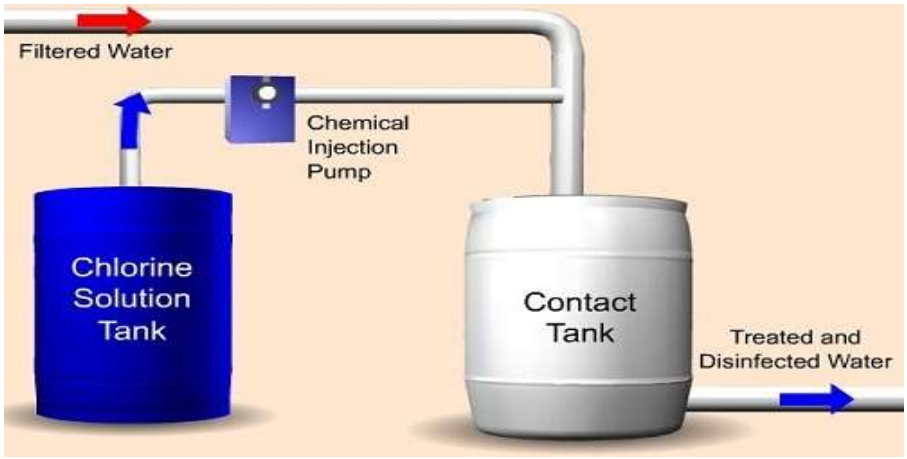
i. Water stored in ponds and lakes for drinking should be protected properly from pollution.
ii. Drinking water should be purified before use.
iii. Garbage and dead bodies of animals should not be thrown into water bodies like ponds, lakes and rivers.
iv. Chemical wastes should not be added to water bodies before proper treatment.
v. Legal action should be taken against the people who do not follow laws related to pollution.
vi. More and more people should be educated about ill effects of water pollution.

Q.16. What is potable water? What are the various method.

Ans: **Potable water:** The term potable means drinkable. The water which is suitable, safe and fit for drinking is called potable water.

Purification of water: In most towns, cities and villages water which is supplied from lakes, rivers or tube wells may contain impurities like harmful microorganisms and salts dissolved in it. Hence its purification is essential before supplying it to homes for consumption. The various methods which can be used to make water potable or safe for drinking are:

i. Sedimentation i.e, settling down impurities present in water in large tanks or reservoirs.
ii. Filteration, using porcelain candle filter or electric water filter.
iii. Water can be purified by chlorination i.e, water collected in tanks is chlorinated to kill germs.
iv. In homes water can be purified by boiling, chemical treatment by adding Potassium permagnate ($KMNo_4$) or bleaching powder to kill germs.
v. By water purifiers.



Q.17. What steps can be taken to restore the River Ganga to its past glory?

Ans: **Pollution of River Ganga:** The water of river Ganga at Kanpur has been highly polluted because people throw large quantities of garbage, untreated sewage, toxic industrial wastes, dead bodies of infants, flowers, worship material and other harmful things directly into the water. people bath, wash clothes, defecate, wash utensils, bath idols of gods and goddesses in the river water. All these uncontrolled human activities pollute the water of river Ganga.

Restoration of river Ganga: Ganga Action Plan in 1985 was launched to reduce the pollution level in the water of River Ganga. It is an ambitious plan to save and cleans the highly polluted water in Ganga. However following steps can be taken to restore the river Ganga to its past glory:

i. Strict laws should be inacted for checking the indulgence of individual and trusts in polluting the waters of river Ganga.

ii. Some seminars, lectures and religious and social groups should be created for causing awareness among the public about the ill-effected of polluting Ganga water.

iii. Some social groups should be involved and helped by the government in cleaning river.

iv. Industries should not be allowed to be installed in the proximity of banks of river Ganga.

v. Industries should be warned not to release wastes directly into the water before it is treated for removing all pollutants.

River Ganga

TEXTUAL QUESTIONS:

1. What are the different ways in which water gets contaminated?

Ans: Refer to Q. No. 13 – Conceptual Questions.

2. At an individual level, how can you help reduce air pollution?

Ans: Refer to Q. No. 06 – Conceptual Questions.

3. Clear, transparent water is always fit for drinking. Comment.

Ans: No, we don't agree to the statement that clean water is always fit for drinking because water might appear clean but it may contain some disease-causing micro-organisms and several other dissolved impurities. Hence, we advise purifying the water by boiling or by any purifying system before drinking it.

4. You are a member of the municipal body of your town. Make a list of measures that would help your town to ensure the supply of clean water to all its residents.

Ans: The following are the measures taken by us to ensure the supply of clean water to our town resident:

a) We clean the area around the water pipes.
b) The main water source has to be built in a clean surrounding and should be maintained properly.
c) Chemical methods such as chlorination must be used for purifying water.

5. Explain the differences between pure air and polluted air.

Ans: The composition of pure air contains 78% nitrogen, 21% oxygen and 0.03% carbon dioxide. Besides these, there are some other gases like methane, argon, ozone and water vapors'. The air is said to be polluted when the composition of air is altered by the addition of harmful substances or gases such as sulphur dioxide, carbon monoxide, nitrogen dioxide and particulate matter.

6. Explain circumstances leading to acid rain. How does acid rain affect us?

Ans: Refer to Q. No. 07 – Conceptual Questions.

7. Which of the following is not a greenhouse gas?

(a) Carbon dioxide
(b) Sulphur dioxide
(c) Methane
(d) **Nitrogen**

8. Describe the 'Green House Effect' in your own words.

Ans: Refer to Q. No. 09 – Conceptual Questions.

9. Prepare a brief speech on global warming. You have to deliver the speech in your class.

Ans: Refer to Q. No. 10 – Conceptual Questions.

10. Describe the threat to the beauty of the Taj Mahal.

Ans: Refer to Q. No. 08 – Conceptual Questions.

.11. Why does the increased level of nutrients in the water affect the survival of aquatic organisms?

Ans: An increase in the level of nutrients in water body leads to an excessive increase in the population of algae in the water body. When these algae die, they serve as food for decomposers. A lot of oxygen is utilized in this process, consequently leading to a decrease in the level of oxygen dissolved in the water body. This in-turn causes fishes and aquatic organisms to die.

***INTEXT QUESTIONS* (Page No. 162)**

Q1. Define Air Pollution.

Ans. Refer to Q. No. 03 – Conceptual Questions.

Q.2. What are air pollutants and name them.

Ans: Refer to Q. No. 01 – Conceptual Questions (Pollutants)

Q.3. Name the various sources of air pollution.

Ans: Refer to Q. No. 04 – Conceptual Questions.

Q.4. Define smog and what are its ill effects?

Ans: Refer to Q. No. 11 – Conceptual Questions

***INTEXT QUESTIONS* (Page No. 164)**

Q1. What do you understand by Green House Effect?

Ans. Refer to Q. No. 09 – Conceptual Questions.

Q.2. Define Global Warming and name the various gases which lead to global warming.

Ans: Refer to Q. No. 10 – Conceptual Questions (Global warming)

Q.3. What are the ill effects of global warming?

Ans: Refer to Q. No. 10 – Conceptual Questions (Ill effects).

***INTEXT QUESTIONS* (Page No. 165)**

Q1. Name the alternate fuels which we can use instead of fossil fuels.

Ans. There being a big gap between demand and production of energy due to steep rise in population and limited reserves of fossil fuels. There is need to switch over to alternate use of fuels as under:

i. Solar energy ii. Hydro power energy
iii. Wind energy.

***INTEXT QUESTIONS* (Page No. 168)**

Q1. What are the factors responsible for the pollution of the river?
Ans. Refer to Q. No. 13 – Conceptual Questions

Q.2. What steps can be taken to restore the River Ganga to its past glory?
Ans; Refer to Q. No. 17 – Conceptual Questions

Q.3. How would the disposal of garbage etc effect the living organisms of the river?
Ans: Refer to Q. No. 11 – Textual Questions

***INTEXT QUESTIONS* (Page No. 169)**

Q1. Why do we need to filter water before drinking?
Ans. Sometimes water contains insoluble impurities. To make this water fit for drinking there is a need to remove these insoluble impurities and, therefore, filter it.

Q.2. Where do you get your drinking water from?
Ans; We get our drinking water from municipal tap which we get after having been filtered and chlorinated thus making it fit for drinking.

Q.3. What will happen if we drink polluted water?
Ans: Polluted water may contain bacteria, viruses, fungi and parasites apart from insoluble and soluble impurities. If we drink this polluted water it may cause diseases like cholera, typhoid and jaundice.

***INTEXT QUESTIONS* (Page No. 170)**

Q1. Name some methods used for purification of water.
Ans. Refer to Q. No. 16 – Conceptual Questions

Q.2. What are the common water borne diseases?
Ans; These are the diseases caused by polluted water (containing bacteria, viruses, fungi and parasites). These are diarrhoea, dysentery, jaundice, vomiting, cholera and typhoid.

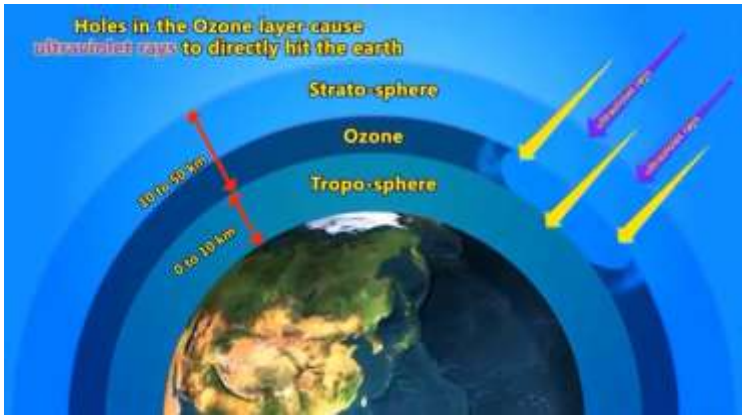
Q.3. How can you save water?
Ans: Ans: The only way we can support future populations is by using our resources more efficiently. The 3 R;s of water conservation are Reduce, Reuse and Recycle the water which are the heart of global water conservation. We can reduce consciously the water in our daily life.

We can reuse water for washing utensils for watering plants. Similarly we can reuse water of washing clothes for washing automobiles. Sewage treatment plants should be used for recycling water.

Important points to remember:

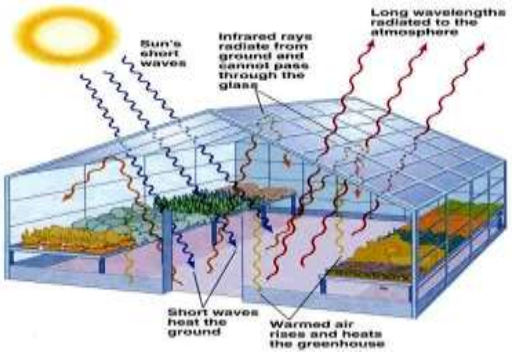
1. **Chemical contamination:** The addition of harmful chemicals in air or water is called chemical contamination.

2. **Ozone layer:** Ozone layer protects the earth from most harmful radiations called UV radiations of the Sun. CFC's are responsible for its depletion.



3. **Name chemical used to purify water.**
   Ans: Bleaching powder or chlorine, Ozone and iodine gases.
4. **What is sewage?**
   Ans: The release of huge quantities of municipal and domestic wastes is called sewage.
5. **Which metals are harmful for health?**
   Ans: Lead, Arsenic and Mercury
6. **In which city Ganga is polluted most?**
   Ans: Kanpur
7. **Which pollutant or gas reduces oxygen capacity of blood?**
   Ans: Carbon monoxide Co.
8. **What is green house?**
   Ans: The green house is a structure or building made of glass walls and glass roof in which the plants need protection from cold weather.

9. **What does WWF stand for**
   Ans: World Wide Fund



Chapter No. 17

SOME NATURAL PHENOMENA

Topics:- Basic Concepts/Conceptual questions as per text book:

Q.1. What is electric charge? What are types of charges?

Ans: **Electric charge:** Electric charge is the property of matter which is responsible for electrical phenomena. Electric charge exists in two forms – positive electric charge and negative electric charge.

OR

Electric charge is the physical property of matter that causes it to experience a force when placed in an electromagnetic field.

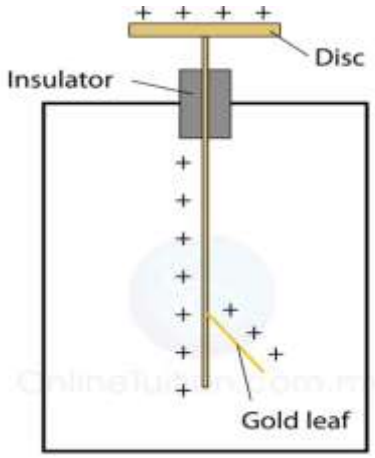
Types of charges: There are two types of electric charge i.e, positive and negative. In an ordinary matter, negative charge is carried by electrons and positive charge is carried by the protons in the nuclei of atoms.

Q.2. Define Static Electricity, Natural Phenomenon and Electroscope.

Ans: **Static electricity:** The chemical charge generated by rubbing is called static electricity because these charges do not transmit. Anybody can be charged by rubbing due to friction or by induction e.g, A glass rod gets charged when rubbed with a slick cloth.

Natural phenomenon: A natural phenomenon is anything that occurs on its own in nature without any kind of intervention e.g. the weather of a place, fog, storms, winds, tides, volcanic eruptions and cyclones. Some natural phenomena can be destructive like cyclones, thunderstorms, lightening and earthquakes.

Electroscope: A device that can detect presence of charge or kind of charge is called an electroscope. Abraham Benet developed a gold leaf electroscope in 1787.



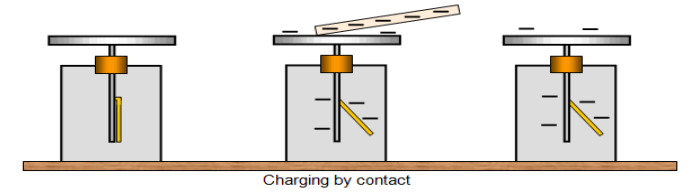
An electroscope consists of a metal rod on which two leaves of aluminium foil are fixed to one end and a metal disc at the other end. The leaves are kept inside a conical flask and it is corked to isolate it from the atmospheric air.

When a charged body comes in contact with the metal disc, the aluminium leaves move away from each other because some charges get transferred to aluminium leaves through the metal rod. This process is called charging by conduction. The charges on the leaves and the charged body are of same in nature and thus the leaves of aluminium repel each other. If the body is not charged then they would attract each other.

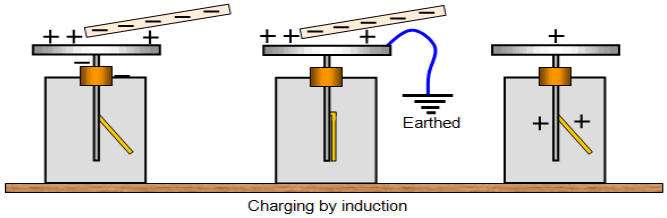
Q.3. Define transfer of charges.

Ans: **Transfer of charges:** Charges can transfer from one object to another with the help of conduction and induction.

Conduction: When a charged object comes in contact with a conductor, it results in the transfer of charges through the conductor.



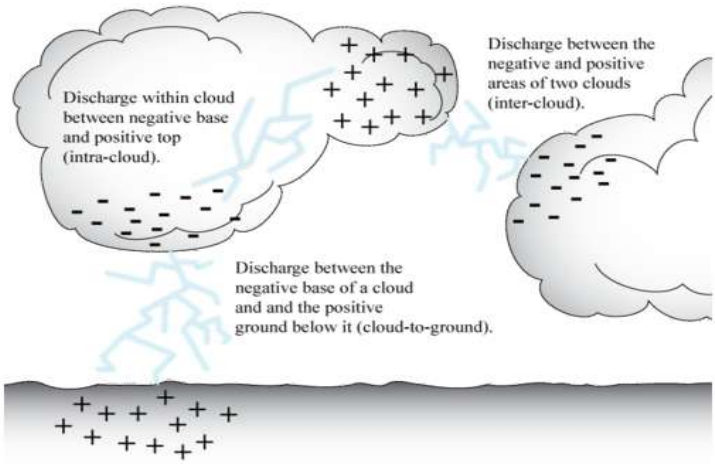
Induction: When a charged object is brought near a neutral object, it results in shifting in the position of electrons in the other subject.



Q.4. What is electric discharge?

Ans: **Electric discharge:** Electric discharge denotes the excitation of atomic states in a gaseous medium on passing an electric current through the medium. e.g.

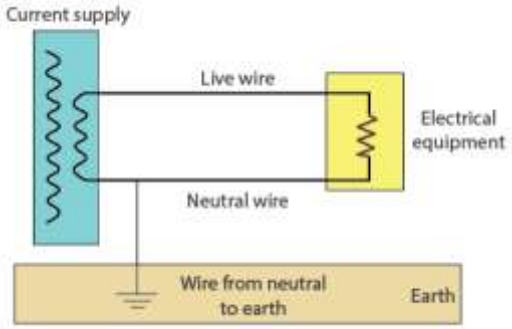
i. An ordinary fluorescent lamp is an example of electric discharge source. The lamp tube coated on the inside with fluorescent phosphorus gas and mercury vapour.
ii. Lightening is a natural electric discharge.



Q.5. Define electrical earthing.

Ans: **Electrical earthing:** The process of transferring the immediate discharge of electrical energy directly to the earth by the help of low resistance wire is known as electrical earthing. The earthing provides

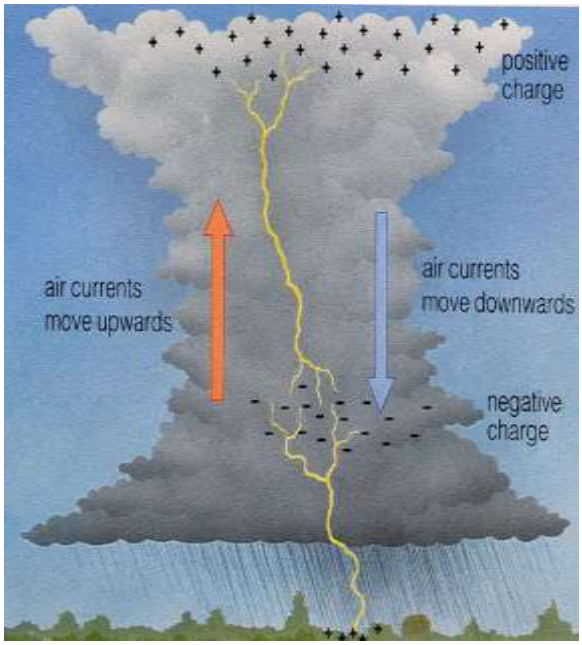
a simple path to the leakage current. The short circuit current of the equipment passes to the earth which has zero potential. Thus, protects the system and the equipment from damage.



Q.6. What is lightening? How it occurs? What are its dangers?

Ans: **Lightening:** Lightening is nothing but an electric discharge. It is a bright light produced across sky due to rubbing of two clouds coming near to each other, clouds come near to earth or clouds and human body come closer.

The process of electric discharge between clouds and the earth or between different clouds causes lightening. The formation of clouds involves friction between water droplets in the atmosphere as a result of which the negative charges accumulate at the bottom of the cloud and +ve charge at the top. As the accumulation of the charges increases, like cloud induces +ve charge on the ground nearby. As the amount of charge increase, the –ve charge on the cloud tends to make a path towards the ground and it results in a narrow streak of electrical discharge which is called as lightening.

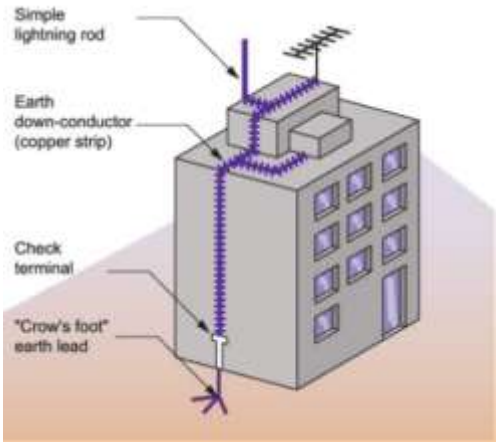


Dangers of lightening: Lightening strike could destroy life of human beings and other animals. However destruction by damaging property i.e, buildings etc, trees and killing people can be protected by lightening by various methods:

i. Taking shelter in interiors, i.e, houses or other closed places.
ii. Vehicles and cars.
iii. Lightening conductors cum protect buildings from effects of lightening.

Q.7. What is lightening conductor? What are its uses?

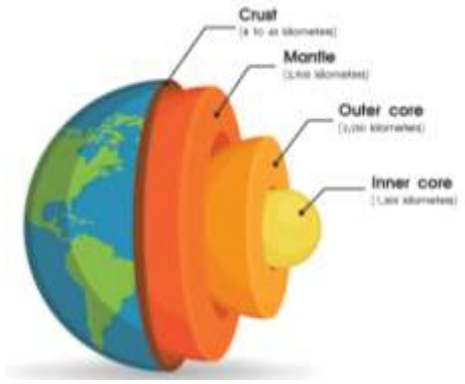
Ans: **Lightening conductor:** A light conductor is a metal rod made up of either iron or copper on a building and other tall structures, connected with ground below the surface of earth to protect buildings and other tall structures from being damaged by lighting.



The purpose of lightening conductor is to offer a low resistance path to lightening and allow it to pass to the ground without impacting the building.

Q.8. What are earthquakes and its dangers?

Ans: **Earthquakes:** An earthquake is a sudden shaking or trembling of the earth which lasts for a very short time earthquake is caused by the violent movements of rocks deep inside the earth's crust. Earthquakes occur all the time all over the earth. Major earthquakes are much less frequent but they are very dangerous.

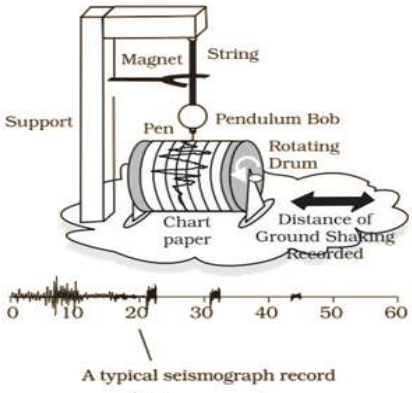


Dangers of earthquake: Earthquakes can cause immense damage to houses, other buildings, bridges, dams and lives of people and other animals etc. Earthquake can also cause floods, landslides and tsunamis. In short, Earthquake is a destructive natural phenomenon which cannot be predicted in advance.

Q.9. Define Seismic zones, Seismograph, Focus of earthquake, Destructive earthquakes and Epicenter, Richter scale.

Ans: i. **Seismic zone:** The weak zone of earth's crust which are more prone to earthquakes are called Seismic zones or faultzones.

ii. **Seismograph:** Earthquake tremors produce shock waves called as seismic waves which travel in all directions and also reach the surface of earth. The instrument which measures and records the magnitude of an earthquake in terms of shockwaves/Seismic waves is called seismograph.



Seismograph:

iii. **Focus of earthquake**: The place inside the earth's crust where the earthquake is generated is called focus of the earthquake.

iv. **Richter Scale:** The intensity or magnitude of an earthquake is expressed on a scale having a series of numbers from 1-12 (just like the Decibel scale) is called a Richter scale.

v. **Destructive earthquakes:** The earthquakes having magnitude higher than "7' on the Richter scale are called destructive earthquakes e.g, Bhuj and Kashmir earthquakes had magnitude of 7.5.

Q.10. What are the protection measures against earthquakes?

Ans: **Protection against earthquakes:** Some important precautions which can be taken by the people living in Seismic zones for protection against earthquakes.

i. It is advisable to design and construct all the houses and other buildings in seismic zones in such a way that they can withstand major earthquake tremors.
ii. The people should consult qualified architects and structural engineers while constructing houses and other buildings so that they can be made quake safe.
iii. If we are at home:
   a. Hide under a table/bed till the shaking stops.
   b. Do not stand or sit near tall and heavy objects.
   c. If we are in bed, do not get up. Protect your head with pillow.
iv. If we are at outdoor:
   a. Drop down away from buildings, trees and overhead electric lines and communication & transmission towers.
   b. If we are in bus, a car or any other covered vehicle do not come out till the tremors stop. Ask the driver to drive slowly to a clear spot.

Q.11. What is thunderstorm?

Ans: **Thunderstorm:** A storm of heavy rain accompanied by lightening, thunder, wind and sometimes hail is called a thunderstorm. They occur when moist air near the ground becomes heated, especially in summer and rises up forming cumulonimbus clouds that produce precipitation. Electrical charges accumulate at the bases of the clouds until lightening is discharged. Air in the path of lightening expands as a result of being heated, causing thunder.

TEXTUAL QUESTIONS:

Select the correct option in Questions 1 and 2.

1. **Which of the following cannot be charged easily by friction?**

(a) A plastic scale (b) **A copper rod**

(c) An inflated balloon (d) A woollen cloth.

2. When a glass rod is rubbed with a piece of silk cloth the rod

(a) and the cloth both acquire positive charge.

(b) **becomes positively charged while the cloth has a negative charge.**

(c) and the cloth both acquire negative charge.

(d) becomes negatively charged while the cloth has a positive charge.

3. Write T against true and F against false in the following statements.

(a) Like charges attract each other. **T**

(b) A charged glass rod attract a charged plastic straw. **F**

(c) Lightning conductor cannot protect a building from lightning. **F**

(d) Earthquakes can be predicted in advance. **F**

4. Sometimes, a crackling sound is heard while taking off a sweater during winters. Explain.

Ans: When we take out sweater, Woollen sweater gets charged and electric discharge occurs due to friction between the sweater and the body. This results in crackling sound.

5. Explain why a charged body loses its charge if we touch it with our hand.

Ans: The charges get conducted to the earth through our body when we touch it and the conductor loses its charge. This phenomenon is known as electric discharge.

6. Name the scale on which the destructive energy of an earthquake is measured. An earthquake measures 3 on this scale. Would it be recorded by a seismograph? Is it likely to cause much damage?

Ans: Richter scale is used to measure the destructive energy of an earthquake. The scale has a reading from 1 to 10. An earthquake measuring 3 would be recorded by a seismograph. The magnitude of scale 3 would not cause much damage. An Earthquake of magnitude 5 is considered destructive in nature.

7. Suggest three measures to protect ourselves from lightning

Ans: Various ways to protect ourselves from lighting are

(i) Always remain in a closed place and if you are in a car stay there until the lighting is over and keep the windows closed.
(ii) Never touch any electrical wires, telephone cables, metal pipes.
(iii) Never bath in running water, this may cause electric shock.

8. Explain why a charged balloon is repelled by another charged balloon whereas an uncharged balloon is attracted by another charged balloon?

Ans: The surface charge on the balloons are of the same nature hence they get repelled. When a charged balloon is brought near an uncharged balloon due to the induction of charges, it acquires charges which are opposite in nature with that of a charged balloon. As unlike charges attract each other, the uncharged balloon gets attracted by the charged balloon.

9. Describe with the help of a diagram an instrument which can be used to detect a charged body.

Ans: Refer to Q.No. 02 – Conceptual Questions (Electroscope)

10. List three states in India where earthquakes are more likely to strike.

Ans: Gujarat, Assam and Jammu & Kashmir are the three states where an earthquake is more likely to strike.

11. Suppose you are outside your home and an earthquake strikes. What precaution would you take to protect yourself?

Ans: The following precautions should be taken when earthquake strikes
(a) Find and go to an open field and stay away from buildings, trees, electric wire and poles.
(b) If you are in a car, then drive to an open field and do not come out of your car.

12. The weather department has predicted that a thunderstorm is likely to occur on a certain day. Suppose you have to go out on that day. Would you carry an umbrella? Explain.

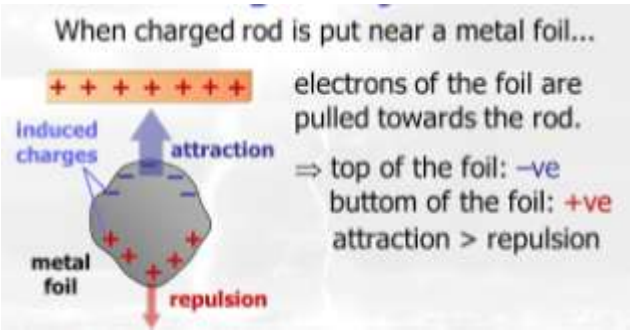
Ans: No, one should not carry an umbrella during a thunderstorm. The thunderstorm is accompanied by lighting and the charges might travel from the cloud to the metal rod on the umbrella and might cause an electric shock to the person carrying it. So, it is not safe to carry an umbrella during lighting.

Important points to remember:

1. **Charged objects:** An object having electric charge on it e.g. rubbed glass rod with silk cloth.

2. **Uncharged object:** An object having no electric charge ei.g, pieces of paper.

3. **Why a charged object attract an uncharged object?**
Ans: A charged object attracts an uncharged object by producing opposite charges in the nearer end of the uncharged object by electric induction.



4. **Where does lightening strikes the most frequently?**
Ans: Lightening strikes are more frequent in the hilly areas because in such areas clouds are comparatively closer to the ground than in planes.

5. **Name the three zones of earth and in which zone earth quake occurs?**
Ans: i. Core ii. Mantle iii. Crust
Earthquake occurs most at the edge of moving plates of the crust.

6. **Why do earthquakes occur?**
Ans: The earthquakes occur when the moving plates of the earth's crust (i) slide past one another (ii) collide with one another.

7. **Name the most threatened areas by earthquakes in India.**
Kashmir, Rajasthan, Highlands of Sind-Ganga, Rann of Kutch

8. **Tsunami:** Tsunami are long and high waves which rise under sea due to earthquakes.

9. **What is amber?**
Ans: It is a type of resin which produces spark or rubbing.

10. **Name the scientist who established nature of lightening.**
Ans: Benjamin Franklin

11. **What are the waves generated by earthquake tremors called:**
Ans: Seismic waves