Chapter-1

Crop Production and Management

1. (a) crop (b) preparation (c) float (d) water, nutrients

2.

Column A	Column B
Kharif crops	Paddy and maize
Rabi crops	Wheat, gram, pea
Chemical fertilizers	Urea and super phosphate
Organic manure	Animal excreta, cow dung, urine and plant waste

3. **(a) Kharif crop :** 1. Soyabean, 2. Ground nut

(b) Rabi crop : 1. Wheat, 2. Pea

4. **(a) Preparation of soil :** Preparation of soil is the first step be fore grow ing a crop. Soil is prepared to sow the seeds. It is tilled to loose the soil particles for better absorption of water and manures.

Generally, the soil is prepared for a better yield by tilling or ploughing and further adding manure and fertilizers. Levelling of the field is again important for sowing and for irrigation. Tilling is done using ploughs.

(b) Sowing : It is a process of putting seeds into the soil for germination. First of all, better and healthy seeds are selected. The tool used traditionally for sowing seeds is shaped like funnel. Now a days, the seed drill is used for sowing with the help of tractors. This sows the seeds uniformly at equal distance and depth. This method saves time and labour.

(c) Weeding : The undesirable plants grown along with the crop are called weeds. The removal of weeds is called weeding. The weeds absorb the nutrients from the soil. So, it is necessary to remove them. The process of removal of weeds is called weeding. The chemicals which are used to remove the weeds are known as weedicides.

(d) Threshing : When the crop is har vested it is cut along with the stalk. It is then separated and the grains are re moved. So this separation of grains from the chaff is called threshing. This is carried out with the help of a machine called 'combine' which is a harvester as well as a thresher. Farmers with small holdings of land do the separation of grain and chaff by winnowing.

5. Difference between Fertilizers and Manure

S.No.	Fertilizers	Manure
1.	These are inorganic substances.	Manure naturally occurs by the decomposition of cattle dung, human waste and plants residues.
2.	Fertilizers are prepared in factories.	Manure can be prepared in fields.
3.	Fertilizers are very useful for soil but excessive use of fertilizers can destroy the soil fertility.	Manure improves soil texture and improve water holding capacity of the soil.
4.	Sometimes fertilizers give adverse effects to crops.	Manures are natural, so these are not harmful to crops.

6. **Irrigation :** To provide appropriate water supply to crops is called irrigation.

Water conserving methods of Irrigation

(i) Sprinkler System : This system is more useful on the uneven land where water is available in smaller quantity. Sprinkler works as fountains. Long perpendicular pipes have holes of regular distances. These holes have rotating nozzles which sprinkle water in all directions when the water is allowed to flow throw the main pipe with the help of a pump

it escapes from the rotating nozzles.

Sprinkler system is very useful for lawns, coffee plantation, etc.

(ii) Drip System : This system is used to save water as it allows the water to flow drop by drop at the roots of the plants. This system consists of a main pipe to which lat eral pipes are joined. Specially prepared nozzles are at tached to these lateral pipes. These nozzles are grounded just near the roots of the plants and provide water drop by drop.

This technique is used for watering fruit plants, gardens and trees. This is best method of irrigation for places which have scarcity of water.

7. Wheat crop does not require much water to grow and kharif crops are sown in rainy season. So, if we sow wheat in the kharif season, the seeds will get destroyed due to excess of water heavy rainfall.

8. Plants need nutrients and water to grow and they get nutrients in the form of minerals and salts from the soil. If we sow continuously in a field then the lacking of nutrients takes place in the soil and field be comes unfertile.

Thus, the soil is unable to yield healthy the and good crop.

9. Weeds are undesirable plants which grow naturally along with crops. Weeds compete with the crops plants for water, nutrients, space and light and hence af fect the growth of the crops. Some weeds are poisonous for animals and human beings.

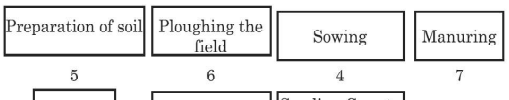
Control of weeds : We can adopt many ways to remove and control their growth.

(i) Tilling before sowing of crops helps in up rooting and killing weeds, which may then dry up and get mixed with the soil.

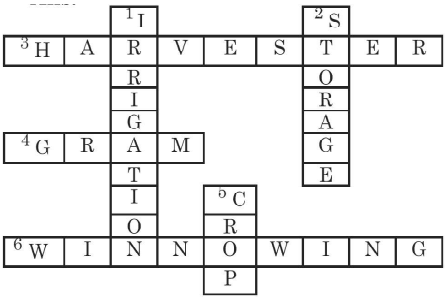
(ii) Weeding is done normally by using khurpi and mechanical machines.

(iii) Weeds are also controlled by using certain chemicals called weedicides like 2-4-D. These chemical are sprayed in the fields to kill the weeds.

10.



11.



Chapter-2

Microorganisms : Friend and Foe

1. (a) magnifying glass or microscope,
(b) nitrogen, (c) yeast, (d) a bacteria.

2. 1. (b) alcohol, 2. (b) streptomycin,
3. (a) female Anopheles mosquito,
4. (b) housefly, 5. (c) growth of yeast cells,
6. (c) fermentation.

3. 1. (e), 2. (a), 3. (b), 4. (c), 5. (d), 6. (f).

4. We can not see micro-organisms with the naked eyes. We use magnifying glass or microscope to see micro-organisms.

5. Micro-organisms are classified into four major groups, these are :

(i) Bacteria (ii) Fungi (iii) Algae (iv) Protozoa.

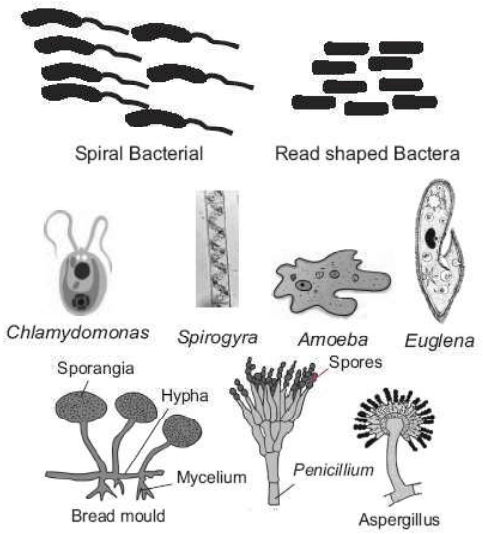
(i) Bacteria : These are unicellular micro-organisms. Bacteria are found al most every where.

(ii) Fungi : Fungi are unicellular or multicellular micro-organism. These are found mostly in humid or warm places.

(iii) Algae : Algae are unicellular or multicellular organism and mostly found in ponds.

(iv) Protozoa : Protozoa are single called micro-organisms and are mostly found in

soil and fresh and marine water, some are found in living organism and are the reason of diseases.



6. Rhizobium, Clostridium and Azotobecter.

7. Micro-organisms are useful for us in many ways, like

(i) Bacterium, Lactobacillus converts milk into curd.

(ii) Bacteria are also involved in the making of cheese.

(iii) Acetobacter aceti is used for production of acetic acid from alcohol.

(iv) Yeast is used for commercial production of alcohol and wine.

(v) Yeast is also used in baking industry for making breads, pastries and cakes.

(vi) Antibiotics are manufactured by growing specific micro-organisms.

(vii) Some bacteria fix atmospheric nitrogen and increase the soil fertility.

(viii) Bacteria are used in the preparation of medicines.

(ix) Microorganisms prepare manures by decomposition of dead bodies of animals and plants.

(x) Microorganisms are helpful in our metabolic activities.

8. Some micro-organisms are useful but some are harmful to us. Micro-organisms are harmful in many ways—

1. Some micro-organisms are the cause of disease in human beings, animals and plants.

2. Common ailments like cold, influenza and most coughs are caused by viruses.

3. Serious diseases like polio and chicken pox are also caused by virus.

4. Diseases like dysentery and malaria are caused by protozoan.

5. Typhoid and tuberculosis are caused by bacteria.

6. Ringworm is caused due to fungi.

7. Foot and mouth diseases of cattle are caused by virus.

8. Anthrax in human and cattle diseases are caused by bacteria.

9. Some micro-organisms release toxic substances which grow on food items and are cause of food poisoning.

10. Some micro-organisms spoil leather items, and wooden work.

9. Antibiotics are the medicines which kill or stop the growth of the disease causing micro-organisms. The antibiotics are manufactured by growing special micro-organism and are used to cure a variety of diseases. The first antibiotic penicillin was discovered by Alexander Fleming in 1929.

Antibiotics are helpful to cure but must be taken with precaution—

1. Antibiotics should be taken only on the advise of a qualified doctor.

2. We must finish the course prescribed by the doctor.

3. If we take antibiotics when needed, we help bacteria in our body develop resistance to them.

4. Next time when we will be ill and require these antibiotics they will be less effective.

Chapter-3

Coal and Petroleum

1. Compressed Natural Gas (CNG) and Liquified Petroleum Gas (LPG) are easy to transport and use. They are less polluting and clean fuel.
2. Coal Tar.
3. **Formation of Coal :** Earth had dense forest in wetland areas about 300 million years ago. These forests got buried under the soil due to natural processes like flooding, earthquake, etc. As more soil deposited over them, they were compressed and sank deeper and deeper. Under high pressure and high temperature dead plants got slowly converted to coal due to carbonization.
4. (a) Coal, petroleum and coal gas (b) refining (c) CNG (Compressed Natural Gas).
5. (a) F, (b) F (c) T (d) T (e) F
6. The resources which are limited in nature are called exhaustible natural resources. Fossil fuels are limited in nature so it is an exhaustible natural resource.
7. **Characteristics of coke :** 1. Coke is a tough, porous and black substance.

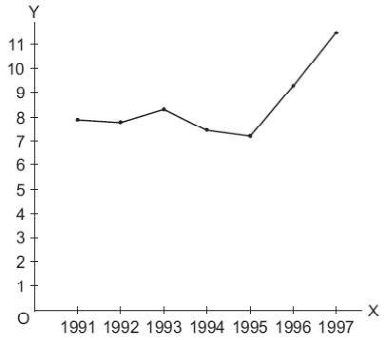
   2. It is almost a pureform of carbon.

   3. It is a fossil fuel.

   4. It is obtained by the processing of coal.

   Uses of Coke : Coke is used in the manufacturing of steel and in the extraction of many metals.
8. Petroleum is a fossil fuel. It was formed from organisms living in the sea. As these organisms died, their bodies settled at the bottom of the sea and got covered with layers of sand and clay. Over millions of years, absence of air, high temperature and high pressuretrans formed the dead organisms into petroleum and natural gas.

   Petroleum is a dark oily liquid and is a mixture of various constituents, such as petroleum gas, petrol, diesel, lubricating oil, paraffin wax etc.
9. Scale : Along X-axis 1 unit = 1 year
   Along Y-axis 1 unit = 1%



Chapter-4

Combustion and Flame

1. Combustion takes place under following conditions :

   (i) Some fuel is required for combustion. During combustion a fuel substance reacts with oxygen to give off heat.

   (ii) Oxygen, present in air is essential for combustion. Combustion cannot take place in the absence of oxygen.

   (iii) For combustion, an inflammable substance must be heated to its ignition temperature.
2. (a) pollution, (b) kerosene, (c) ignition temperature, (d) water.
3. Compressed Natural Gas (CNG) is now most usable fuel in automobiles; be cause it produce the harmful products in very small amount. It is a cleaner fuel.
4. Comparison between LPG and wood as fuels:

S.No.	Fertilizers	Manure
1.	It is a gaseous fuel.	It is a solid fuel.
2.	It is easily stored in cylinder.	It needs more space to store.
3.	It is smoke free fuel.	It produce lot of smoke which is cause of pollution.
4.	Its calorific value is 55000 kJ/g.	Its calorific value is 17000-22000 kJ/s.

5.	It does not cause of environment problem.	We get wood after deforestation which is harmful for environment.

5. **(a)** As extinguisher water works only when things like wood and paper are on fire. If electrical equipments on fire water may conduct electricity and harm those trying to stop the fire.

(b) LPG has more calorific value, produces no pollution and easy to store and use. So it is a better domestic fuel than wood.

(c) The paper by it self catches fire easily be cause its ignition temperature is low, while a piece of paper wrapped around aluminium pipe does not catch fire, because its ignition temperature rises.

6.

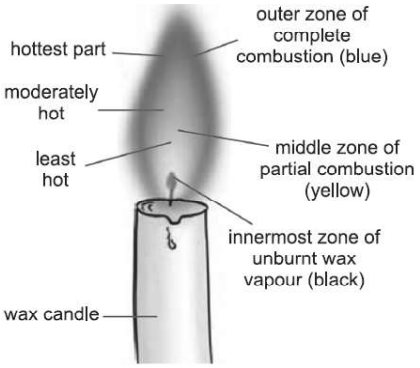


Fig. Different zones of Candle flame

7. Kilo Joule per kg (kJ/kg).

8. CO_2 is heavier than oxygen, it covers the fire like a blanket. Since the contact between the fuel and oxygen is cut off, the fire is controlled.

9. Green leaves consist water and moisture in them hence, it makes it difficult to catch fire. Where as dry leaves has lost all the water and moisture contained in it and hence, it catches fire easily.

10. The outer zone of flame or non-luminous zone of a candle is the hot test zone and has more temperature. So gold smith use this zone for melting gold and silver.

11. Heat produced = 180000 , kJ

amount of heat = 4 5 × kg

$$\text{Calorific value} = \frac{\text{heat produced}}{\text{amount of fuel}}$$

So, $$\text{Calorific value} = \frac{180{,}000\ \text{kJ}}{4{\cdot}5\ \text{kg}}$$

= 40 000 , kJ/kg

12. Rusting and combustion, both are chemical processes in which requirement of oxygen is necessary. But in rusting substance reacts with oxygen and gives its oxide and in combustion substance reacts with oxygen and give off heat. So both are different.

13. The water heated by Ramesh will take less time. Be cause he kept the beaker near the hottest zone of the flame.

Chapter-5

Conservation of Plants and animals

1. (a) wildlife sanctuary (b) endemic species (c) climate

2. (a)

Wildlife Sanctuary	Biosphere Reserve
1. Wildlife sanctuary is a place where wild animals are preserved and protected from poaching and hunting.	1. Biosphere reserves are the protecting areas meant for only conservation of biodiversity i.e. animals and plants and microorganism.
2. Wildlife sanctuary is the part of biosphere reserve.	2. It also helps to maintain the culture of that area.

(b)

Zoo	Wildlife Sanctuary
1. A zoo is a smaller place to display the animals for public view.	1. Wildlife sanctuary is an area that are reserve in a forest for the protection and preservation of wild animals.
2. The animals are kept in cage.	2. Animals live freely in their habitat.

(c)

Endangered Species	Extinct Species
1. Endangered species are those species which are at the verge of extinction and which are protected and conserved. Example : Tiger, barasingha.	1. Extinct species are those which no more exist on the earth presently. Example : Dinosaurs.

(d)

Flora	Fauna
1. The plants that are found in a particular area are called flora, for example; sal, teek, jamun mango etc. are flora of Pachmarhi biosphere reserve.	1. The animals that are found in a particular area are called flora, for example; chinkara, blue bull, barking deer, leopard are the fauna of Pachmarhi biosphere reserve.

3. Adverse effects of deforestation on the following :

(a) Wild Animals : The deforestation leads to the change in the national climate or habitat for the animals. So many species become endangered and finally extinct in the near future.

(b) Environment : Deforestation effects the environment adversely due to disturbance of ecological balance. It in creases the temperature and pollution level on the earth. It in crease the level of carbon dioxide in the atmosphere. Ground water level also gets lowered. Deforestation is the cause of decreased rain fall and soil in fertility and in creased chances of natural calamities, such as floods and droughts. It is also the cause of desertifica tion and polluted environment.

(c) Villages : Deforestation is the cause of drought and flood so, villages nearby forests suffers from these. Some adjoining villages have to face the wrath of wild animals as unagitated animals run to nearby villages and cause danger to them. Village people get essential material for their livelihood from forests like fruits, fuel etc. they do not get this fordeforestation.

(d) Cities : Deforestation is the major cause of global warming. It leads to an in crease of carbon dioxide concentration in the atmosphere. Natural calamities like floods, droughts ef fects city life.

(e) Earth : Deforestation leads to soil erosion. Change in the physical properties of the soil, removal of humus layer by which the hard and rockey layer exposes. All these ultimately convert the fertile land into desert.

(f) The next generation : Deforestation with prove very harmful for next generation. The environment changes, global warming and drought be came as peak in future. All these things directly effects the human life. Food problem, pollution, physiological problem all will be dominate the humans.

4. **(a)** If we go as cutting tree :

(i) Carbon dioxide concentration will increase and oxygen concentration will decrease.

(ii) Decrease pollution level and temperature becomes high.

(iii) Water cycle gets disturbed and chances of drought and flood will rise high, so natural calamities will disrupt our life.

(iv) Soil erosion and desertification will occur.

(b) If the habitat of an animal is disturbed then,

(i) The survival of animals becomes difficult due to of natural conditions.

(ii) animals will lose their natural habitat and ultimately at the periphery to become endangered.

(c) If the top layer of soil is exposed then:

(i) the lower, hard and rocky layer exposed.

(ii) The lower layer has less humus and less fertile, so it will not be useful for vegetation.

(iii) Gradually, the fertile land gets converted into deserts.

5. **(a)** Biodiversity is necessary to conserve and to save it from extinction and to maintain ecological balances.

(b) Protected forest are also not completely safe for wild animals be cause poching and capturing of the animals will be easy for the people who are living in the nearby and depends on animals for food, domestic use and amusement.

(c) Some tribals depend on the jungle. They usually resides there and dependent on it for food, shelter, clothes and other requirements.

(d) The causes and consequences of forests are :

(i) It increase carbon dioxide concentration which is the cause of pollution and global warming.

(ii) It decreases oxygen concentration in atmosphere.

(iii) The rainfall and fertility of soil gets decreased.

(iv) It changes the soil properties.

(v) It is the cause of desertification.

(e) The Red Data Book is the source book which keeps a re cord of all the endangered animals and plants.

(f) The terms migration means the phenomenon of movement of a species from its own habitat to some other habitat for a particular time period every year for specific purpose like breeding.

Concentration will be increased in atmosphere. This will lead to global warming as carbon dioxide traps the heat rays reflected by the earth. The increase in temperature on the earth disturbs the water cycle and may reduce rainfall. Less rainfall is the cause of drought.

6. Do yourself

7. Do yourself

8. Do yourself

9. See summary, the list of National Parks is given. Select of your state.

10. Paper is made by wood pulp. We require it from green trees to produce one tonne of paper. To save deforestation, we should minimize the use of paper.

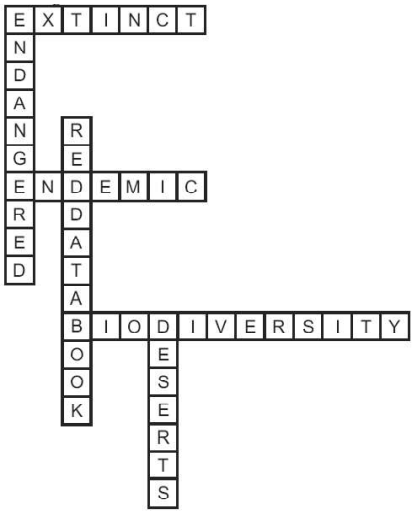
How we save paper ?

(i) We should not throw blank paper here and there.

(ii) Paper should not be burnt. Old newspapers, books and magazines should give to 'raddiwale' for recycling of paper.

(iii) Use paper economically.

11.



Chapter-6

Reproduction in Animals

1. Reproduction is necessary for the continuation of species.

2. Humans are viviparous. There is sexual reproduction in human beings. Male reproductive organs produce sperms (male gamete) and the female organ produce ova (female gamete). The sperms are ejected in side female bodies where they fuse with ovum and form zygote. The single called zygote begins to develop into an embryo which at taches to the female uterus wall. The embryo further multiples into many cells and develop further which is called foetus.

3. (a) (i) (b) (ii) (c) (i).

4. (a) F (b) T (c) T (d) F (e) T (f) F (g) F (h) T (i) T (j) F

5. Difference between zygote and foetus

S.No.	Zygote	Foetus
1.	Zygote is single cellular.	Foetus or embryo is multicellular.
2.	No differentiation of cells.	Well defined limbs and other body parts.
3.	It is formed during fertilization when the sperm fuses into the ovum.	Embryo formation is a post fertilization process in which zygote multiples into multi-cellular body.

6. A sexual reproduction is a mode of reproduction in which only one parent is in volved to reproduce off spring. In asexual reproduction, the offspring produced are exact copies of their parents.

It is generally observed in very small sized organisms. Binary fission, Budding, fragmentation are the types of asexual reproduction.

1. Budding : In this mode of asexual reproduction a part of the organism starts bulging out. Slowly it grows and develops into a separate individual. Examples: Hydra, yeast etc.

2. Binary Fission : It is a type of asexual reproduction in which a sin gle cell divides into two halves. Organisms that reproduce through binary fission are bacteria and amoeba.

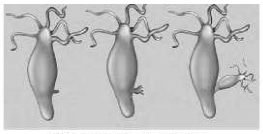


Fig. : Budding in Hydra

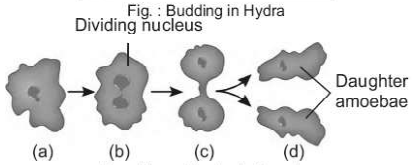


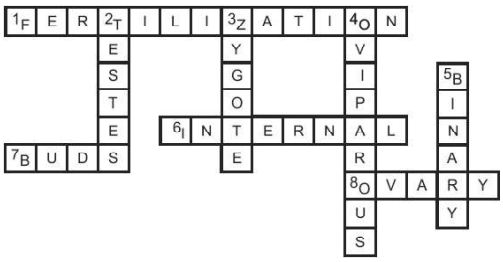
Fig. : Binary Fission in Amoeba

7. In walls of the uterus, the embryo once attached to uterus gradually develops various body parts, such as hands, legs, head, eyes etc., into an embryo.

8. Metamorphosis is a biological process in which a larva transforms into adults. It in volves sudden and abrupt changes in the body structure of the animals by cell growth and differentiation. It is generally ob served in am phibians (for example frog) and insects (for example butterflies) etc.

9. Internal fertilization takes place in side the body of the female while the external fertilization takes place out side the body of the females.

10.



Chapter-7

Reaching the Age of Adolescence

1. The secretions of endocrine glands responsible for changes taking place in the body are called hormones. Hormones are chemical substances, which are released by endocrine glands directly into the blood stream. The changes which occur at on set of puberty and adolescence are controlled by hormones.

2. Adolescence is the period of life when the body under goes changes. leading to reproductive maturity. Adolescence begins around the age of 11 and lasts upto 18 or 19 years of age. Since, this period covers the 'teens' (13 to 18 or 19 years of age), adolescents are also called 'teenagers'. In girls adolescence may begin a year or two earlier than in boys. Also the adolescence period varies from person to person. The adolescence is marked by the on set of puberty in which growth of the reproductive organs, change in body size, change in body height, change in voice etc. take place.

3. In females the reproductive phase of life begins at puberty (10 to 12 years of age) and generally lasts till the age of approximately 45 to 50 years. In a female the ova begins to mature with the on set of puberty. One oven matures and is released by one of the ovaries once in about 28-30 days. During this period, the wall of the uterus becomes thick so as to receive the egg, in case it is fertilized it begins to develop. If 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 which is called menstruation. Menstruation occurs in once about 28-30 days.

4. Following are the changes that take place at puberty.

1. Increase in height.
2. Change in body shape.
3. Voice change, Adam's apple visible in boys.
4. Increased activity of sweat and sebaceous glands.
5. Increased hormonal activities.
6. Development of sex organs.
7. Reaching mental, intellectual and emotional maturity.

5.

S.No.	Endocrine Glands	Hormones
1.	Adrenal	Adrenalin
2.	Thyroid	Thyroxin
3.	Testes	Testosterone
4.	Ovary	Oestrogen
5.	Pancreas	Insulin
6.	Pituitary	Growth Hormones Stimulate other glands to secrete hormones Secretes hormone to control other glands secretion

6. Hormones which constitute the secondary sexual character are called sex hormones.

In general hormones work instantly when they are released in the blood stream. Sex hormones are different because they work later on. They gradually prepare the body for reproduction.

The sex hormones are responsible for the fundamental change in growth and development and stimulate the development of secondary sexual character. The testes and the ovaries are the reproductive organs and both are stimulated by the pituitary hormones in puberty. That is the reason these are called sex hormones.

Function of sex Hormones

1. In male the testes produce the male sex hormone testosterone. This hormone helps in the development and maintenance of the primary and secondary sexual characters and function of sperm.

2. In female the ovaries secrete estrogen and progesterone responsible for the primary and secondary sexual characters.

7. (a) (ii), (b) (i), (c) (ii).

8. **(a) Adam's apple :** The protruding part of the throat is called Adam's apple. It is the enlarged voice box or larynx which gets enlarged and is visible from outside in boys at the on set of puberty. This makes the voice of boys hoarse.

(b) Secondary sexual characters : Second ary sexual characters one those characters which distinguish a boy from a girl. A few of these are be low.

Boys :

(i) Facial hairs such as beared and moustaches develop.

(ii) Hair develop under the armpit, on the chest and in the pubic regions.

(iii) Voice becomes deep.

(iv) Muscles develop and shoulders become broad.

(v) Increase in weight.

Girls :

(i) Development and enlargement of breasts.

(ii) Hair develops under the armpit and in the pubic regions.

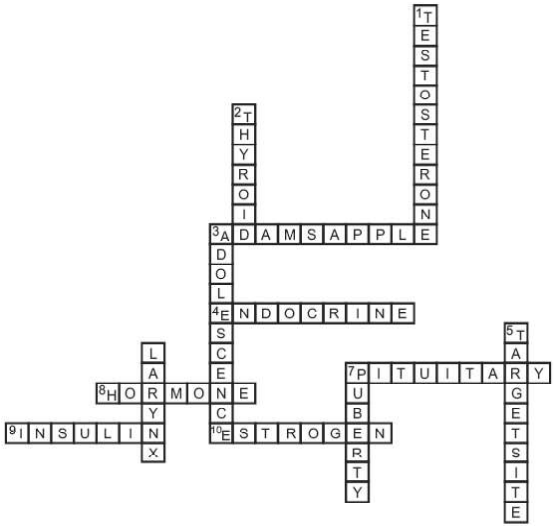
(iii) Hips broader and pubic region wider.

(iv) Initiation of menstruation cycle.

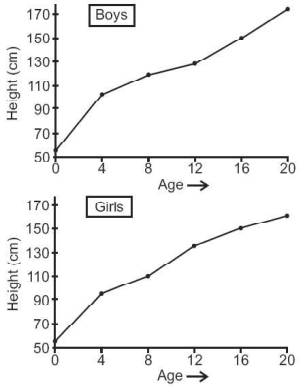
(v) Deposition of fat around hips.

(c) Sex determination in the unborn baby: All human beings have 23 pairs of chromosomes in the nuclei of their cells. Two chromosomes out of these are the sex chromosomes X and one Y chromosome. A female has two X chromosomes, while a man has one X and one Y chromosome. The gamets (egg and sperms) have only one set of chromosomes. The unfertilized egg always has one X chromosome. But sperms are of two kinds. One kind has an X chromosomes and the other kind has Y chromosome. When a sperm containing X chromosome fertilizes the egg the zygote would have two X chromosome and develop into a female child. If the sperms contribute a Y chromosomes to the egg for fertilization, the zygote would develop into a male child. This concludes that the sex chromosomes of the father determine the sex of an unborn baby.

9.



10. Conclusion



(i) Girls are taller than boys till they reach the age of 12 years.

(ii) Till the age of 16 years the height of both boys and girls remain the same.

(iii) After 16, both boys and girls have an increase in their height. In general, boys are taller than girls.

Chapter-8

Force and Pressure

1. (i) We push on pad dles of bicycle to move it.

(ii) We pull the table to change its position.

2. (i) Mak ing a chapati from a ball of dough.

(ii) When we stretch a spring, its shape is changed.

3. (a) pull (b) at tracts (c) pull/push (d) repels.

4. (a) shape (b) muscular (c) non-contact (d) gravity, friction.

5.

S. No.	Agent exerting the force	Object on which it acts	Form of Effect
(a)	Fingers	(i) Lemon as whole	Change in shape
		(ii) Juice inside	Change in state of motion
(b)	Fingers	(i) Tube as whole	Change in shape
		(ii) Paste inside	Change in state of motion.

(c)	Load	Spring	Change in shape
(d)	Ground from which athlete takes jump	Athlete itself	Change in state of motion

6. The force due to hammering causes the change in shape of the iron and it can be moulded in the shape of the required tool.

7. Electrostatic force.

8. Force due to gravity does not bring a change in its state of motion be cause equal amount of force is being applied vertically up wards. One can observe the effect of the force acting on the bucket or on our body in the form of falling of the object towards the earth when the force applied on any object above the ground to lift it is with drawn.

9. The two forces that are acting on the rocket immediately after leaving the launching pad are :

(i) Force due to gravity acts vertically downwards.

(ii) Force to push acting upwards.

10. (a) Pressure of water.

Chapter-9

Friction

1. (a) relative motion (b) smoothness (c) heat (d) reduces (e) smaller

2. (c) static, sliding, rolling

3. (a) wet marble floor, dry marble floor, news paper and towel.

4. The book move downwards. The frictional force is acting opposite to the movement of the book. So it acts up wards.

5. The layer of soap makes the floor smooth due to which the friction is reduced and the foot can not make a paper grip on the floor. There fore it is difficult to walk on a soapy floor and we start to slip on the floor.

6. Sports men use shoes with spikes be cause spikes produce the desired frictional force and thus help in holding the ground firmly.

7. We know that the force of friction is in creased if the two surfaces are pressed harder. A heavier box will apply more pressure on the floor and hence Seema will experience more frictional force.

8. The sliding friction is less than static friction because of the interlocking of irregularities in the two surfaces. When the objects starts sliding the contact points on its surface, do not get enough time to lock into the contact points on the floor. So the sliding friction is slightly less than the static friction.

9. **1. Friction as a friend (Friction is a necessary evil) :** Friction is very useful in several situations :

(i) To hold a glass tumbler we have ridges on our palm, which increases the friction between palm and tumbler.

(ii) Friction allows us to grip and catch different objects.

(iii) Friction allows us to write anything with pen or pencil because there is a friction between the surface of paper and point of pen or pencil.

(iv) Friction helps us to walk comfortably on the surface.

(v) Friction helps to minimize the speed or to stop the moving objects.

(vi) No building could be constructed without friction.

(vii) It is not possible to light a matchstick without friction.

2. Friction as a Foe (Friction as an evil): Friction is harmful in some situations.

(i) Friction wears out materials, whether they are screws, ball-bearings or soles of shoes.

(ii) Friction can also produce heat, which increases wear and tear at machine parts. It also causes much wastage of energy, because this heat is not utilized .

10. The objects moving in fluids must have a special shape. This type of shape is called stream lined shape. The stream lined shape helps to over come the friction between

objects and fluids. The objects have pointed fronts with little broader middle portion which gets tapered at the back.

Chapter-10

Sound

1. (d) solids, liquids and gases

2. (a) baby girl

3. (a) True, (b) False, (c) False, (d) True, (e) False, (f) False, (g) True.

4. (a) time period (b) amplitude (c) hertz (Hz) (d) noise (e) frequency.

5. Number of oscillation = 40

Time taken = 4 seconds

Time period = time taken in one oscillation

$$= \frac{\text{time taken}}{\text{total numbers of oscillation}}$$

$$= \frac{4}{40} = \frac{1}{10} = 0{\cdot}1 \text{ second}$$

= Number of oscillation per second

$$= \frac{\text{number of vibration}}{\text{time taken}}$$

$$= \frac{40}{4} \text{second} = 10 \text{ per second}$$

$$= 10 \text{ Hz.}$$

6. Number of vibration/second = 500

Time period = time taken for one vibration

$$= \frac{\text{Total time}}{\text{number of vibration}}$$

$$= \frac{1}{500} \text{ Hz}$$

$$= 0.002 \text{ Hz.}$$

7. (a) Dholak — stretched membrane

(b) Sitar — string of sitar

(c) Flute — Air column.

8. The unpleasant sound is called noise, where as pleasant sound is called music. Noise can produce many health hazards, where as music brings about soothing effect. Yes, music can become a noise sometimes when the musical instruments produce very high volume sounds.

9. Sources of noise pollution are :

(i) The sound produced by buses, trucks, trains and aeroplanes.

(ii) The sound produced at construction sites.

(iii) The sound produced by the playing of T.V., radio and loud speakers, at very high volume.

(iv) Honking of horns.

(v) Loud sound of machines in factories.

(vi) Bursting of crackers.

10. The noise pollution may cause many health related problems. Lack of sleep, hypertension (high blood sure), anxiety, etc. are some of the problems that may be caused due to noise pollution. Morever, a person when is exposed to a loud sound continuously may get temporary or even permanent deafness.

11. I will suggest my parents to buy the house which is three lanes away from the road side. It is why the house on the road side will receive the unwanted sounds of vehicles and peoples where as the house which is three lanes away from the road side will be free from noise pollution.

12. The sound is produced by the voice of sound box or the larynx in human. It is located in the throat. Below to it is the wind pipe. The two vocal cords, are stretched across the voice box or larynx in such a way that it leaves a narrow slit between them for the passage of air when the lung force air through the slit, the vocal cords vibrate and the vibration results in sound.

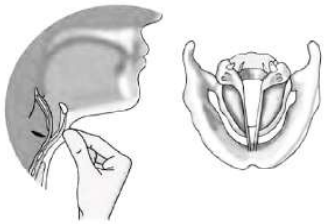


Fig. : Voice box in humans

13. The speed of light is more than that of sound, i.e the speed of light is 3×10^8 m/s while the speed of sound is 332 m/s in air. Due to more speed the light reaches us be fore the sound does. So light ning is seen ear lier and thun der is heard later.

Chapter-11

Chemical Effects of Electric Current

1. (a) acids, bases, salts, (b) chemical, (c) negative, (d) electroplating.

2. Yes, the magnetic needle will show deflection when the circuit is complete and the circuit will be completed only if the solution conducts electricity. The deflection of the magnetic needle shows that the solution is good conductor of electricity.

3. (a) Tap water (b) Sodium chloride solution (c) Hydrochloric acid

4. List of possible reasons :

(i) The connections of the circuit may be loose.

(ii) The liquid may be poor conductor.

(iii) Through the solution, liquid may be conducting electricity, but the current produced is too small, so that the filament of the bulb does not get heated and the bulb does not glow.

(iv) Cells may be used up.

(v) Bulb may be fused.

5. (i) Liquid A is a better conductor than liquid B.

6. No, pure water does not conduct electricity. But pure water can be made conducting, if salts are dis solved in it.

7. The water used in water hoses by firemen is not pure water and it conducts electricity. Firemen shut off the main electrical supply for the area because if the supply of electricity continues there may be high risk of electrocution due to water.

8. Yes, sea water contains higher amounts of salts than drinking water, hence, sea water is a better conductor of electricity. This is the reason that the compass needle deflects more in case of sea water.

9. No, it is not safe for the electrician to carry out electrical repairs during heavy down pour. It is be cause during heavy down pour there is a higher risk of electrocution.

10. Rain water is, of course, as good as distilled water but, when it passes through atmosphere, it dissolves a lot of dust, dirt and other impurities and becomes conducting. So, when Paheli used a tester, its compass showed deflection.

11. The objects which are electroplated are : (i) Bath taps (ii) Rims of vehicles (iii) Handle bars of cycles and motorcycles (iv) Bottom of cooking utensils (v) Pots of metals (vi) Handles of doors (vii) Tin cans (viii) Kitchen gas burners.

12. The thick rod of impure copper should be attach to the positive terminal of battery. This is because when electric current is passed through the copper sulphate solution, it dissociates into copper and sulphate. The free copper drawn to the negative terminal of the battery gets deposited on it. On the other hand the loss of copper from the solution would be regained from the impure copper rod which is connected to the positive terminal of the battery.

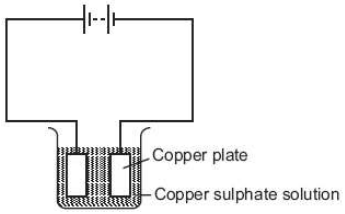


Fig. 14.3 : A simple circuit showing electroplating

Chapter-12

Some Natural Phenomena

1. (b) A copper rod.

2. (b) becomes positively charged while the cloth has a negative charge.

3. (a) False (b) True (c) False (d) False.

4. A crackling sound is heard be cause, there is an electric discharge that takes place be tween body and sweater. At the time of electric discharge some energy is released. In this situation energy is released in the form of crackling sound.

5. When we touch a charged body, it loses its charge due to process of earthing. Our body is a good conductor of electricity. It transfers the charges to the earth.

6. The scale used to mea sure earth quake is **Richter scale**. Yes, it would be recorded by a seismograph. But it is not likely to cause much damage.

7. During lightning and thunder storm no open place is safe. There are three measures to protect ourselves from light ning.

(i) Hearing thunder without lightning is an alert to rush to a safe place,

(ii) After hearing the last thunder, wait for sometime before coming out of the safe place.

(iii) A house or a building is a safe place. If you are traveling by a car or by bus, you are safe inside with windows and doors of the vehicle closed.

8. A charged balloon is repelled by another charged balloon because both balloon have the same charge. We know that similar charges repel each other.

But a charged balloon attracts an uncharged balloon and lose its own charge to the other balloon. A balloon is charged while other is uncharged so they have no same charge. Therefore charged balloon attracts uncharged balloon.

9. Electroscope is an instrument used to detect the presence on charge of an object. It works on the principle that like charges repel while unlike charges attract each other.

An electroscope has a metal rod with thin metal strip attach to it at the bottom. The rod enters in the metallic cup, at the top. The lower part of the rod and metal strip are enclosed in a glass box or bottle for protection. When the knob of the electroscope is touched with a charged ebonite or glass rod, the strips open out or diverge. Extent of divergence depends upon the amount of charge on the electroscope.

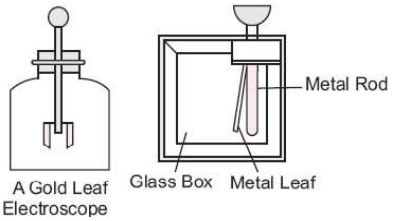


Fig. 15.1 : A simple Electroscope

10. (i) Kash mir (ii) Rajasthan (iii) Gujarat.

11. Following precautions should be taken to protect ourselves in a earth quake, if we are out side home :

(i) We should move to an open space.

(ii) We should not take shelter under trees or buildings.

(iii) If we are driving, we should slow down the vehicle and move slow away from that place to a clear place.

12. No, taking umbrella will increase the risk of lightning. The wide objects are more prone to light ning strike. So, we will not take an umbrella at the time of thunder storm.

Chapter-13

Light

1. We can see only those objects from which reflected rays of light enter our eyes. The light may be emitted by the object or may have been reflected by the object. Thus we can not see an object which is placed in a dark room. If it does not emit light of its own. Where as an object out side the dark room can be seen if there is either light out side the dark room or the object emits its own light.

2.

S.No.	Zygote	Foetus
1.	It occurs from smooth and shiny surfaces.	It occurs from unpolished and rough surface.
2.	In this, reflected rays are parallel to each other.	In this, reflected rays are not parallel to each other.

Diffused reflection is not due to the failure of the laws of reflection. It is caused by the irregularities in the reflecting surface.

3. (a) A regular reflection takes place on a polished wooden table because its surface is smooth.

(b) A diffused reflection takes place on a chalk powder because its surface is uneven.

(c) A diffused reflection takes place on a cardboard surface because it has minute irregularities on it.

(d) Marble floor with water spread over it acts as a surface for a regular reflection as it will act like a plane surface.

(e) A regular reflection takes place on a mirror because mirror has smooth and Shiny surface.

(f) An irregular or diffused reflection takes place on a piece of paper because it has uneven surface.

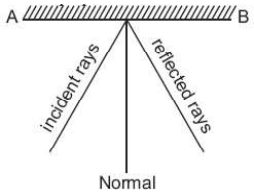
4. There are two laws of reflection :

1. The incident ray, the normal at the point of incidence and the reflected ray all lie in the same plane.

2. Angle of incidence is always equal to the angle of reflection.

i.e. $\angle i = \angle r$

5. For this activity take a plane mirror and stand it on a plane sheet of paper with a block. Now draw an incident line AB on paper. See in the mirror and mark the point on the paper, where you feel the line is travelling after getting reflected from the mirror. Remove the mirror and draw a perpendicular (a line making an angle of 90 degree) on the mirror line. Join the points to make the reflected ray you will see that incident ray, reflected ray and the normal will be in the same plane, i.e., on the sheet of paper.

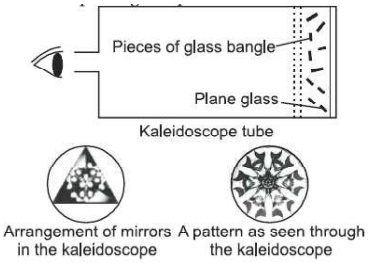


6. (a) 2 (b) left, left hand (c) large (d) lesser.

7. (a) Always

8. (b) Virtual, behind the mirror and of the same size as the object.

9. Kaleidoscope is made up of three rectangular mirror strips each about 15 cm long and 4 cm wide. These strips are joined to gether to form a prism. This structure is fixed in a circular card board tube. Make sure that the tube is slightly longer than the mirror. One end of the tube is closed by a card board disc having a hole in the centre. To make the disc durable, a piece of transparent plastic sheet is pasted under the card board disc. At the other end, touching the mirror, fix a circular plane glass plate.



10.

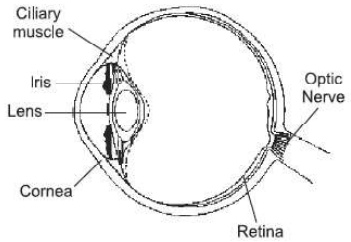


Fig : Human eye

11. Laser light is harmful for our eyes and can cause a permanent defect in eyes. So use of laser light can lose Gurmit's eye sight.

12. It is necessary that we take proper care of our eyes. If there is any problem we should go to an eye specialist. Have a regular checkup.

(i) If advised, use suitable spectacles.

(ii) Too little or too much light is bad for eyes. Insufficient light causes eyestrain and headaches. Too much light, like that of the sun, a powerful lamp or a laser torch can injure the retina.

(iii) Do not look at the sun or a powerful light directly.

(iv) Never rub eyes. If particles of dust go into eyes, wash eyes with clean water. If there is no improvement go to a doctor.

(v) Wash eyes frequently with clean water.

(vi) Always read at the normal distance for vision. Do not read by bringing the book to close to your eyes or keeping it to far.

13. The angle of incident ray will be 45°

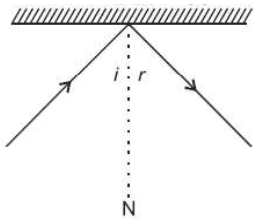
Given that, $\angle i + \angle r = 90°$ ...(i)

We known that, $\angle i = \angle r$ (Law of reflection)

Replacing $\angle i$ in equation (i) with $\angle i$

$$\angle i + \angle i = 90°$$

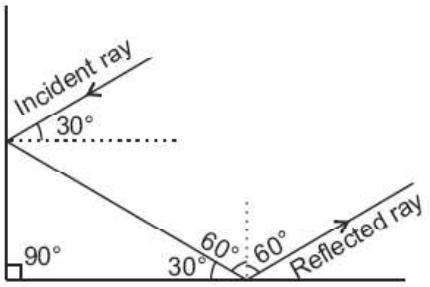
or $$2 + \angle i = 90°$$



or $\angle i = \frac{90°}{2}$ or $\angle i = 45°$

14. Infinite number of images will be formed.

15.



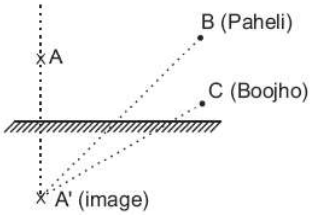
16. He can not see his im age him self. He can see only the image of *P* but not *Q* and *R*.

17. (a)

(b) Yes, Paheli can see the image at B.

(c) Yes, Boojho can see the image at C.

(d) No change as position of A is not changing.



■■