LIBERTY PAPER SET

STD. 10 : Science [N-011(E)]

Full Solution

Time : 3 Hours **ASSIGNTMENT PAPER 4**

Section-A

1. (B) Methanoic acid **2.** (B)In the presence of sunlight **3.** (C) Amylase **4.** (A) 4Ω **5.** (D) Between the mirror pole and the focal point **6.** (C) Atmospheric refraction **7.** Ethanol **8.** collecting duct **9.** protein **10.** violet **11.** Convex **12.** primary **13.** False **14.** True **15.** True **16.** False **17.** False **18.** Regeneration **19.** Deoxy Rebonucleic Acid **20.** Voltmeter **21.** Abscisic Acid **22.** Cerebellzem **23.** Silver Sulphide (Ag_2S) **24.** Fruit peels, paper

Section-B

25. In chemical reaction a more reactive metal removes that metal from the salt of less reactive metal, it is called displacement reaction.

➤ **Example :**

(a) $Zn(s) + CuSO_4(aq) \rightarrow ZnSO_4(aq) + Cu(s)$

zinc — copper sulphate — zinc sulphate — copper

(b) $Pb(s) + CuCl_2(aq) \rightarrow PbCl_2(aq) + Cu(s)$

lead — copper chloride — lead chloride — copper

26. ➤ (a) Mercury (Hg)

➤ (b) Sodium (Na) and Potassium (K)

27.

Aerobic Respiration		Anaerobic Respiration	
(1)	It takes place in presence of oxygen.	(1)	It takes place in absence of oxygen.
(2)	End products are CO_2 and water	(2)	End products are ethanol or lactic acid.
(3)	It takes place in cytoplasm and mitochondria	(3)	It takes place only in cytoplasm.
(4)	Aerobic respiration produces a considerable amount of energy.	(4)	Much less energy is produced.

28. ➤ Both binary fission and multiple fission are asexual reproduction and occur with the presence of only one parent.

➤ In binary fission, the parent cell divides itself into two equal and identical daughter cells.

➤ It is the most common form of a reproduction in prokaryotes such as bacteria, Amoeba.

➤ In multiple fission, a single parent cell is divided into many daughter cells.

➤ It is the most common form of reproduction in plasmodium.

29. ➤ Menstruation occurs when a girl becomes 10 to 12 years old.

➤ The eggs become mature due to sex hormones.

➤ After every 28 days one mature egg is released from the ovary into the fallopian tube which is known as ovulation.

➤ Before ovulation, the uterus; inner wall becomes thickened and spongy with capillaries.

➤ If there is a fertilization at this stage then the fetus must be nourished.

➤ If the egg is not fertilized then this lining is not needed any longer.

➤ So lining slowly breaks and comes out through the vagina as blood and mucous.

➤ This cycle takes place roughly every month and is known as menstruation.

➤ It usually lasts for about two to eight days.

30. (i) Myopia (ii) Concave lens

31. I = 0.5 A

$Q = It$
$= 0.5 \times 600$
$Q = 300$ c

t = 10 min = 600 sec

32. **Disadvantage of Series-connection :**

- The current is constant throughout the series electric circuit. So impractical to connect an electric bulb and an electric heater in series, because they need currents of widely different value.
- When one component fails the circuit is broken and none of the component works.
- eg. If one of the three bulbs in the series goes off, the next two bulbs do not light up.
- **Advantages of Parallel connection :**
- In parallel combination each appliance gets the full voltage.
- It one appliance is switched on/off other one is not affected.
- The parallel circuit divide the current through the appliances each appliance gets proper current depending on its resistance.
- In a parallel combination it is very easy to connect or disconnect a new appliance without affecting the working of other appliances.

33. The magnetic field of the magnet exerts force on both the poles of the compass needle. The forces experienced by the two poles are equal and opposite. These two forces form a couple which deflects the compass needle.

34. The main responsible compounds in ozone depletion are chlorofluorocarbons (CFCs)

- Chloroflurocarbons (CFCs) are used in refrigerators as well as fire-extinguishers.

35.

- With the use of several pesticides and other chemicals to protect our crops from diseases and pests, these chemicals are either washed down into the soil or into the water bodies.
- From the soil, these are absorbed by the plants along with water and minerals, and from the water bodies these are taken up by aquatic plants and animals.
- This is one of the ways in which they enter the food chain.
- As these chemicals are not degradable, they get accumulated progressively at each trophic level. The maximum concentration of these chemicals gets accumulated in human bodies. This phenomenon in known as biological magnification.
- As human beings occupy the top-level in any food-chain, the maximum concentration of these chemicals get accumulated in our body.

36.

- Haemoglobin is the respiratory pigment that transports oxygen to the body cells for cellular respiration.
- Therefore, deficiency of haemoglobin in the blood can affect the oxygen supplying capacity of the blood.
- This can lead to a deficiency of oxygen in the body cells. It can also lead to a disease called anaemia.
- The haemoglobin deficient person feels weak, lethargic and unable to do heavy physical work.

37.

- Earth wire is a safety measure that provides a low resistance conducting path to the current. Sometimes due to excess heat or wear and tear, the live wire comes in direct contact with the metallic cover of the appliances, which can give an electric shock on touching them. To prevent then from the shock, the metallic part is connected to the earth through a three-pin plug due to which the current flows to the earth the movment there is a short circuit.
- It is necessary to earth metallic appliances because it ensures that if there is any current leakage in the metallic cover, the potential of the appliance becomes equal to that of the earth. The potential of the earth is zero. As a result, the person handling the appliance will not get an electric shock.

Section-C

38. Combination Displacement

(i) $3H_2 + N_2 \rightarrow 2NH_3$ (ii) $Pb + CuCl_2 \rightarrow PbCl2 + Cu$

39. (i) Silver is latest Recetive (ii) H_2 is produced (iii) Sodium is highly Reactiv

40.

- Calcium hydroxide ($Ca(OH)_2$) is used to whiten the walls of the house.

➤ Calcium hydroxide ($Ca(OH)_2$) is formed by the reaction of calcium oxide (CaO) with water and produces heat.

$$CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + \text{heat}$$

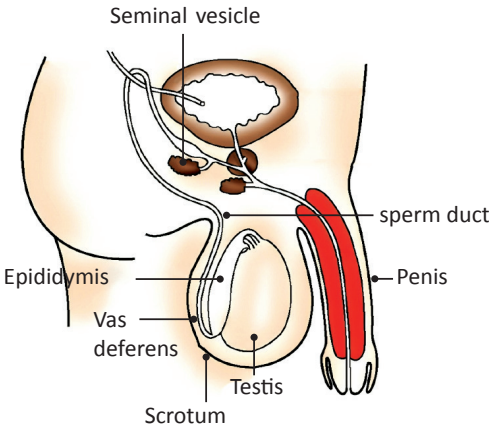
calcium oxide — water — calcium hydroxide

41. Steps are as follows :

➤ Sense of Injury at points of receptors at legs
➤ Seding Messages and sense to spinal chord
➤ Interpretation by sersory nerves
➤ Message received by Brain & send appropriate output.

42. ➤ Newly wed couple can adopt, Surgical method, chemical Method, Mechanical Barrier to avoid having children.
➤ To prevent from sexually transmitted disease they must go with mech. Barrier condom.

43.



Male-Reproductive System :

➤ The male reproductive system consists of portions which produce the germ cell and other portions that deliver the germ-cells to the site of fertilization.
➤ Male reproductive system includes organs such a the testis, scrotum vas deferens, prostate gland, the seminal vesicle and penis.
➤ The formation of sperm take place in the testes.
➤ These are located outside the abdominal cavity in scrotum.
➤ Sperm formation requires a lower temperature (approx 2 °C to 3 °C) than the normal body temperature.
➤ The testes secrete the sex-hormone testosterone which regulates sperm production.
➤ The sperms formed are delivered through the vas-deferns which unites with a tube coming from the urinary bladder.
➤ Along the vas deferens, glands like the prostate, and the seminal vesicles add this secretion so that the sperms are now in a third which makes their transport easier and this fluid also provides nutrition.
➤ The sperm are tiny bodies that consist of mainly genetic materials and a long tail that helps them to move towards the female germ-cell.

44. u = 30 cm

f = 15 cm

V = 9

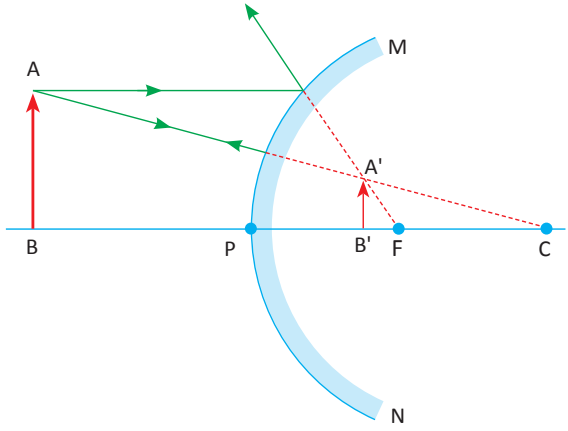
$$\frac{1}{v}+\frac{1}{u}=\frac{1}{7}$$

$$\frac{1}{v}+\frac{1}{-20}=\frac{1}{15}$$

$$\frac{1}{v}+\frac{1}{15}=\frac{1}{20}$$

$$\therefore \frac{1}{v}=\frac{4+3}{60}$$

$$\therefore v=\frac{60}{7}=8.6 \text{ cm}$$

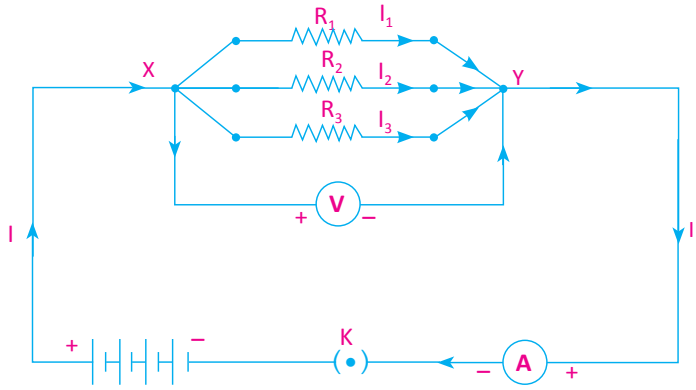


45. **Power of lens :** The reciprocal of focal-length of the lens is known as power of lens (P)

➤ Power of lens $P = \frac{1}{f}$

- SI unit of power of lens is Diopter (D)
- The instrument used to measure power of lens is known as Dioptermeter.

46. ➤ If two or more resistor are connected in such a way that the ends on one side of them are connected to one common point and the ends on the other side are connected to another common point, then the connection of such resistor is parallel.



- As shown in figure connect R_1, R_2 and R_3 resistor in parallel with combination of cells.
- The total current I, is equal to the sum of the separate currents through each branch, of the combination.
- $I = I_1 + I_2 + I_3$ ... ... (1)
- Let R_p be the equivalent resistance of the parallel combination of resistors. By applying Ohm's law to the parallel combination of resistors we have
- $I = \frac{V}{R_p}$ ... ... (2)
- On applying Ohm's law to each resistors.
- $I_1 = \frac{V}{R_1}$
- $I_2 = \frac{V}{R_2}$
- $I_3 = \frac{V}{R_3}$ ... ... (3)
- From equation no. (1) and (2)
- $\frac{V}{R_p} = \frac{V}{R_1} + \frac{V}{R_2} + \frac{V}{R_3}$ OR
- $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ ... ... (4)
- Thus, we can conclude that the reciprocal of the equivalent resistance of a group of resistance joined in parallel is equal to the sum of the reciprocals of the individual resistances.

Section-D

47. Activity 1 : Conduct an experiment showing that carbon dioxide gas is produced by passing of metal carbonate and metal hydrogen carbonate with acid

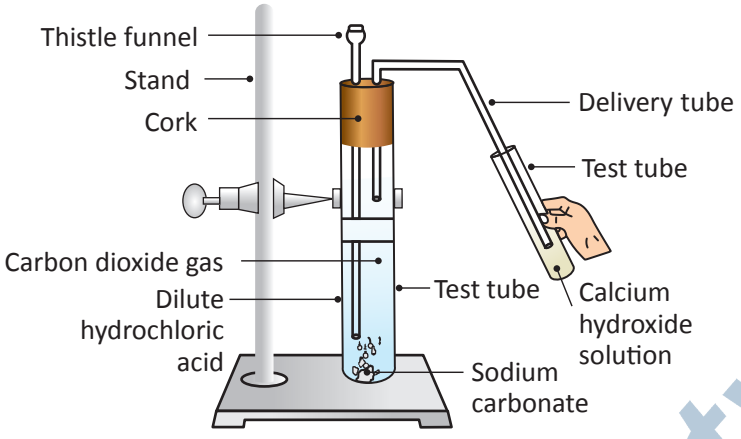
- Procedure
- Take two test tubes, label them as A and B.
- Take about 0.5 g of sodium carbonate (Na_2CO_3) in test tube A and about 0.5 g of sodium hydrogen carbonate ($NaHCO_3$) in test tube B.
- Add about 2 mL of dilute HCl to both the test tubes.
- Reaction during this process can be written as follows.

$$Na_2CO_3(s) + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + CO_2(g)$$

$NaHCO_3(s) + HCl(aq) \rightarrow NaCl(aq) + H_2O(l) + CO_2(g)$

- Here the produced CO_2 will be transferred to another test tube filled with Calcium Hydroxide $Ca(OH)_2$ as shown in figure below via delivery tube.
- Then we can observe the reaction as follows which is as same as given in observation below :
- Observation
- As the gas passes through the lime water (calcium hydroxide) to form calcium carbonate the solution become milky in colour, indicating that the gas produced is carbon dioxide.

$Ca(OH)_2(aq)$	+	$CO_2(g)$	$\rightarrow$	$CaCO_3(s)$	+	$H_2O(l)$
Calcium hydroxide		Carbon dioxide		Calcium carbonate		Water



- Conclusion
- This activity shows that the processing of metal carbonate and metal hydrogen carbonate with acids produces carbon dioxide gas.
- In this way it can be confirmed that reaction of acid with metal carbonate and metal hydrogen carbonate gives carbon dioxide CO_2 as a product.

48. Baking Soda : baking soda is the common name of sodium bicarbonate. The chemical formula of baking soda is $NaHCO_3$.

- **Preparing baking soda :**
- Baking soda is prepared from common salt, when it reacts with water, carbon dioxide and ammonia.

NaCl	+	NH_3	+	H_2O	+	CO_2	$\rightarrow$	$NaHCO_3$	+	NH_4Cl
sodium chloride		Ammonia		Water		carbon dioxide		Sodium hydrogen carbonate		Ammonium chlorate

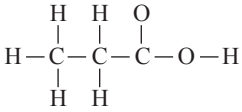
- When baking soda is heated one of the products obtained is sodium carbonate.

$2NaHCO_3$	$\xrightarrow{HEAT}$	Na_2CO_3	+	CO_2	+	H_2O
Sodium hydrogen carbonate (baking soda)		sodium carbonate		carbon dioxide		Water

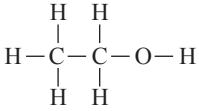
- **Properties of sodium bicarbonate.**
- It is non-flammable.
- Powder dust is not as explosive.
- It has a melting point of 50°C
- $NaHCO_3$ is a white crystalline solid which is odorless.
- It is basic in nature.
- **Uses of baking soda**
- Reduces acidity in stomach
- Acts as an antacid which is used to treat stomach upset and indigestion.
- Used in the process of washing as a water softener.
- Due to the formation of soapy foam, it is used in fire extinguishers.

- Removes the dirt off materials without damaging the properties of the material.
- Used in baking industries as carbon dioxide is generated (due to the decomposition of $NaHCO_3$) which helps in the rising of the dough.
- It is used to neutralize the effect of acid.

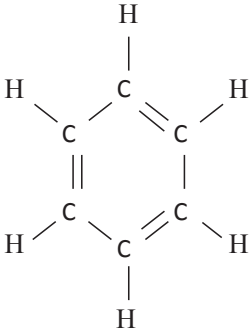
49. (i) Proparoic Acid



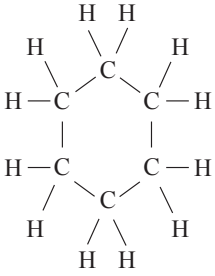
(ii) Ethanol



(iii) Benzene



(iv) Cyclohexane



50. The main organs of human digestive system are mouth, food-pipe, stomach, small intestine and large intestine.

- **Mouth :**
- As we put food in mouth it will start to digest.
- The food has to be processed to generate particles which are small and of the same texture, This is achieved by crushing the food with our teeth.
- The food is also wetted to make its passage smooth by Saliva secreted by salivary gland. This is actually not only water but a fluid.
- The saliva contains biological catalyst called salivary amylase that breaks down the starch which is a complex molecule to give simple sugar.
- The lining of the canal has muscles that contract rhythmically in order to push the food forward.
- These peristaltic movements occur all along the gut.
- **Esophagus (Food-Pipe) :**
- From the mouth the food is taken to the stomach through the food pipe or oesophargus.
- **Stomach :**
- The stomach is a large organ which expands when food enters it.
- The muscular walls of the stomach help in mixing the food thoroughly with more digestive juices.
- The digestion in stomach is taken care of by the gastric glands present in the wall of the stomach.
- These release hydrochloric acid (HCl), pepsin and mucus.
- The hydrochloric acid creates an acidic medium which facilitates the action of the Enzyme pepsin and kill the bacteria which enters along with food in stomach.

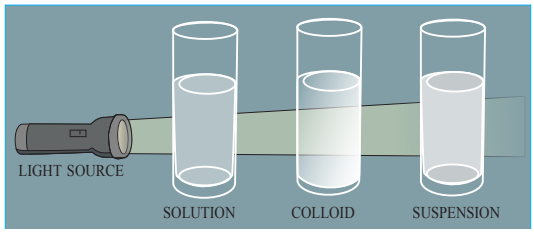
- The mucus protects the inner lining of the stomach from the action of the acid under normal condition.
- **Small Intestine :**
- Now, food enters in small intestine from stomach.
- The exit of the food from stomach is regulated by a sphincter muscle.
- This is the longest part of the alimentary canal.
- Its the site of complete digestion of carbohydrates, proteins and fats.
- It receives a secretion of the liver and pancreas,
- The food coming from the stomach is acidic and has to be made alkaline for the pancreatic enzymes to act this is done by Bile juice released from liver.
- Bile salt break down large globular of fats into smaller globular increasing the efficiency of Enzyme action.
- The pancreas secret pancreatic juice which contains enzymes like.
- Trypsin for digesting protein
- Lipase for breaking down emulsified fat.
- Amylase for breaking down of starch.
- The wall of the small intestine contains glands which secrete intestinal juice.
- The enzymes present in it finally convert the proteins to amino acids, complex carbohydrate into glucose and fat into fatty acid and glycerol.
- After a complete digestion the inner lining of the small intestine has numerous finger-like projections called villi. Which increase the surface area for absorption.
- The villi are richy supplied with blood vessels which take the absorbed food to each and every cell of the body.
- Digested food is utilized for obtaining energy building up new tissues and the repair of old tissues.
- **Large Intestine :**
- The unabsorbed food is sent into the large intesitne where its walls absorb more water from this material.
- The rest of the material is removed from the body via a the anus
- The exit of this waste material is regulated by anal sphincter.

51. Blood circulates throughout the body along definite routes through blood vessels.

- Arteries and veins are such blood vessels.
- Arteries carry blood away from heart to different organs.
- Veins carry blood away from different organs towards heart.
- Since the blood is pumped into the arteries by the heart, it is under high pressure and therefore, arteries have thick elastic walls.
- Veins collect the blood from different parts of the body and bring it back to heart.
- In the veins, blood is not under pressure and hence, wall of vein is thin. In order to prevent backward flow of blood, valves are present in veins.
- On reaching to the organs or tissues, the artery divides into many smaller vessels to bring the blood in contact with all the individual cells.
- These smaller vessels have single cell thick walls and are known as capillaries.
- Exchange of materials between blood and surrounding takes place through capillaries.
- Capillaries then join together to form veins.

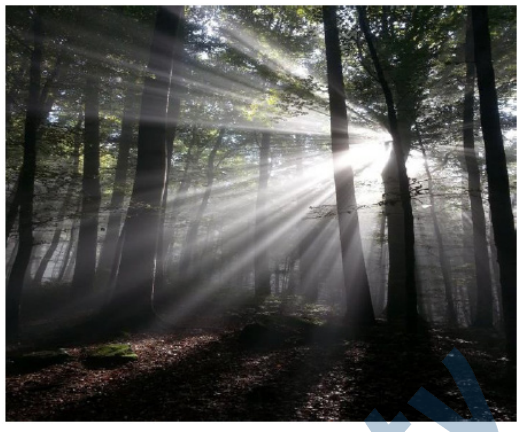
52. When a beam of light strikes such fine particles, the path of the beam becomes visible. The light reaches us, after being reflected diffusely by these particles. The phenomenon of scattering of light by the colloidal particles gives rise to Tyndall effect.

- This phenomenon is seen when a fine beam of sunlight enters a smoke-filled room through a small hole. Thus, scattering of light makes the particles visible. Tyndall effect can also be observed when sunlight passes through a canopy of a dense forest.



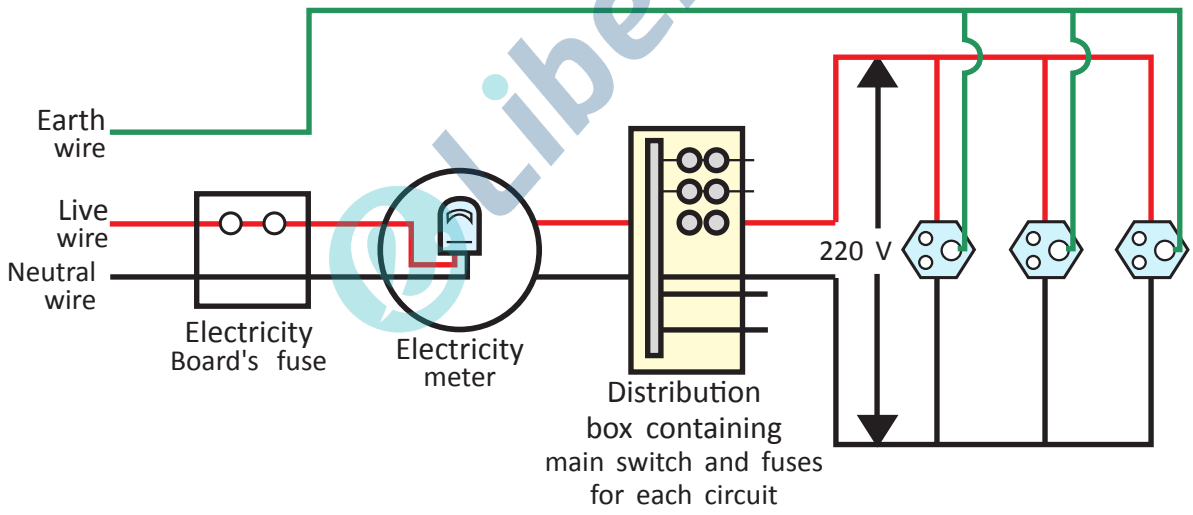
lIGHT BEAM :	NOT VISIBLE	VISIBLE	VISIBLE
EXAMPLE :	WATER	MILK	FLOUR AND WATER

THE TYNDALL EFFECT



- The colour of the scattered light depends on the size of the scattering particles.
- Very fine particles scatter, mainly blue light, while particles of larger size scatter light of longer wavelength.
- If the size of the scattering particles is large enough, then the scattered light may even appear white.

53.

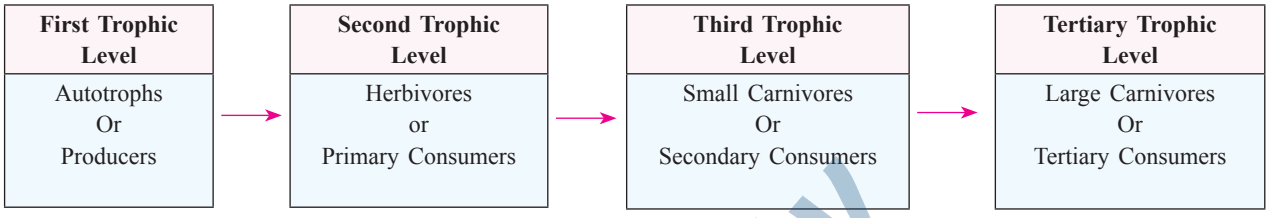


- **The main characteristics domestic electric circuit is given below :**
- Three types of wires used are in domestic electric circuit.
  - (i) Live-wire (Positive) : It has red insulation cover.
  - (ii) Neutral-wire (Negative) : It has black insulation cover.
  - (iii) Earthing wire : It has green colour insulation cover
- In our country the potential difference between live wire and neutral wire is 220V
- These wires pass into an electricity meter through a main-fuse.
- Through the main switch they are connected to the line-wires in the house.
- Those wires supply electricity to separate circuits within the house.

- Often, two separate circuits are used, one of 15A current rating for appliances with hight power rating such as geyser, air coolers etc.
- The other circuit is of 5A current rating for bulbs, fans etc.
- In each separate circuit, differed appliances can be connected across the live and neutral wires.
- Each appliance for has a separate switch ON/OFF the flow of current through it.
- In order that each appliance has equal potential difference, they are connected parallel to each other.

54. The series of organisms taking part at various biotic level form the food chain.

- Each level of the food chain forms a trophic level.
- The autotrophs or the producers are at the first trophic level. They fix up the solar energy and make it available for heterotrophs or the consumers.
- Herbivores or the primary consumers form the second level.
- Small carnivores or the secondary consumers at the third.
- Larger carnivores or the tertiary consumers form the fourth trophic level.



- Different food chains are formed in nature. For example,
- Green plants in forest → Deer → Tiger
- Green plants in grass land → Grass hopper → Frog → Snake → Eagle.
- Green plants in lake → Scorpion → Fish → Duck.

- **Trophic Levels :**
- The various steps in a food chain at which the transfer of food (or energy) takes place are called trophic levels.
- **Example :** A food chain operating in a grassland is given below :
- Grass → Insects → Frogs → Birds
- **In this food chain**

a. Grass represents first trophic level.
b. Grasshopper represents second trophic level.
c. Frog represents third trophic level.
d. Eagle represents fourth tropic level.