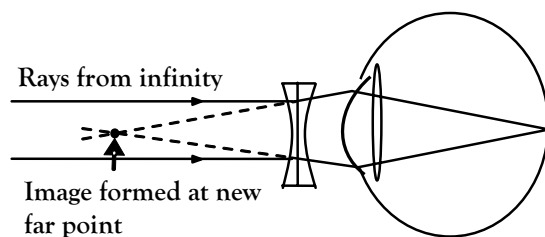


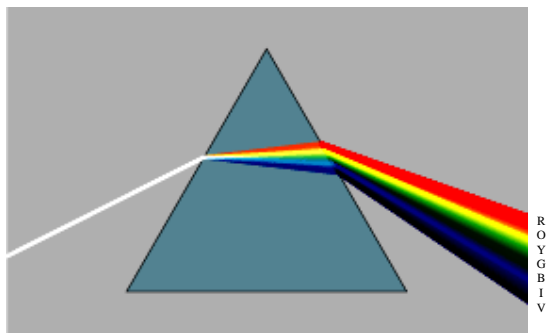
1.  $\text{FeCl}_2 + \text{H}_2\text{S} \rightarrow 2\text{HCl} + \text{FeS}$
2. Hydrogen gas,  $\text{H}_2$
3. below 5.5, because at this pH the enamel is corroded.

4



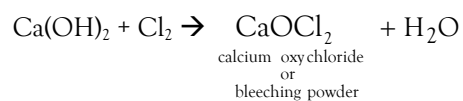
5. The eye lens changes its focal length such that the image distance is constant, i.e., the image is formed on the retina.

6.

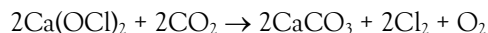


7. (i) Yellow  
(ii) Lead (II) Iodide  
(iii)  $2\text{KI}(\text{aq}) + \text{Pb}(\text{NO}_3)_2(\text{aq}) \rightarrow 2\text{KNO}_3(\text{aq}) + \text{PbI}_2(\text{s})$   
(iv) Double displacement reactions

8. Bleaching powder is produced by the action of chlorine on dry slaked lime  $[\text{Ca}(\text{OH})_2]$

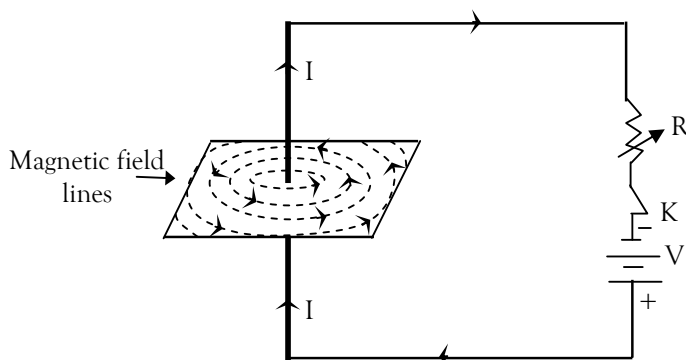


- (i) Because bleaching powder reacts with carbon dioxide to form calcium carbonate and release chlorine.



- (ii) Because it is a weak electrolyte.

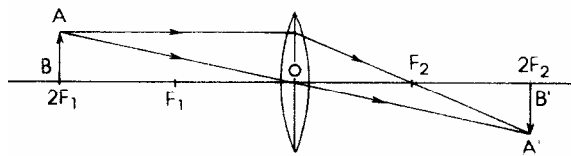
9. Take a thick copper wire and pass it through the center of a square card board. Then connect a small voltage source  $V$  through a variable resistance  $R$  and a key  $K$  across it as shown in figure below.



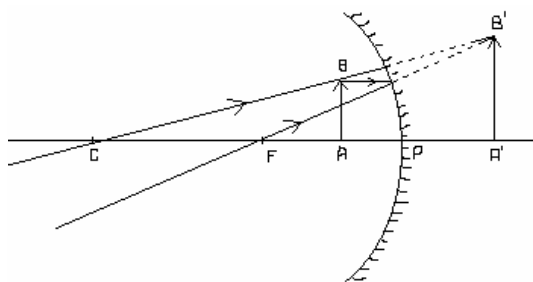
Figure

If we try to draw magnetic field lines using a compass, the pattern would come out to be concentric circles with straight conductor passing perpendicularly through the center. We can also sprinkle iron fillings and tap the board to align the fillings along field lines to get the pattern.

10. (a)

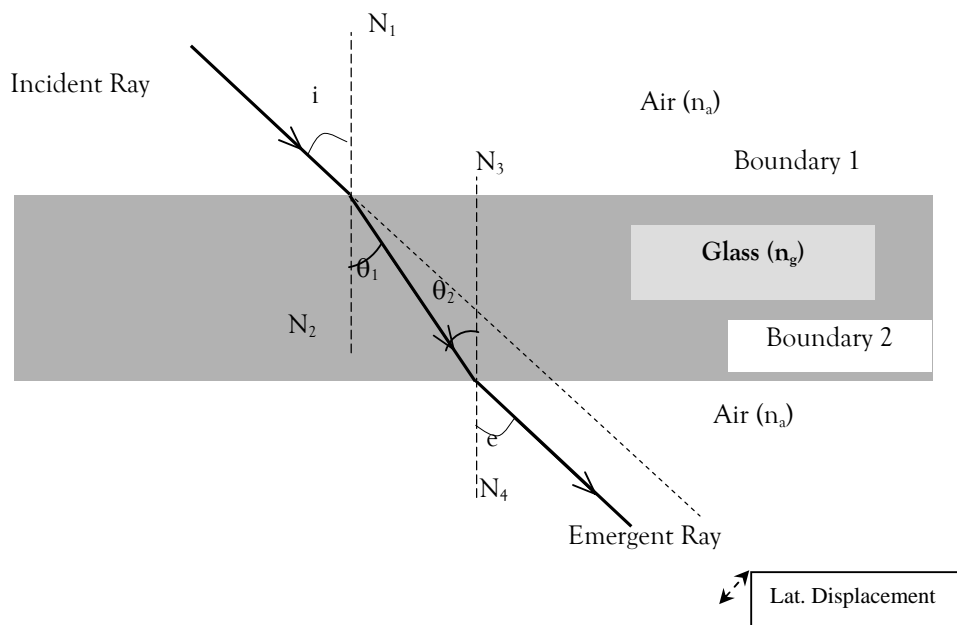


- (b)



11. (i) Na would have physical and chemical properties similar to H, Li, and K as they belong to the same group.
- (ii) **Electronic configuration of N**
- It belongs to period 2 which indicates 2 shells.
  - Valence electrons are given by group number.  
So, the configuration is 2, 5
- For P, using similar arguments, the configuration is 2, 8, 5
- (iii) They react with hydrogen to give strong acids.
12. (i) Because Zinc is higher in activity series than copper.
- (ii) This is because silver reacts with sulphur in the air to form a coating of silver sulphide.
- (iii) Metals in the middle of the activity series such as iron, zinc, lead etc are moderately reactive. These metals are usually present as sulphides or carbonates in nature. But it is easier to obtain a metal from its oxide as compared to its sulphide and carbonate. Therefore, prior to reduction, metal sulphides and carbonates have to be converted into metal oxides.
13. Heat,  $Q = I^2Rt$
- (i) Heat developed =  $I^2Rt$
- $$= 15^2 \times 10 \times 2 \times 3600 \text{ J}$$
- $$= 16.2 \text{ MJ}$$
- (ii) Power of the heater =  $I^2R$
- $$= 15^2 \times 10 \text{ W}$$
- $$= 2250 \text{ W}$$
- $$= 2.25 \text{ kW}$$

14.



15. (a) It is impossible for the carbon atom to lose 4 electrons and form  $C^{4+}$  cation because it requires a large amount of energy to remove 4 electrons, leaving behind a carbon cation with 6 protons in its nucleus, holding on to just 2 electrons.

If a carbon atom gains four electrons, forming a  $C^{4-}$  anion, it will be difficult for the nucleus with 6 protons to hold on to ten electrons. i.e. four extra electrons.

Since it is impossible for the carbon atom to lose 4 electrons or to gain 4 electrons, carbon atom shares its valence electrons with other atoms of carbon or with atoms of other elements to attain an octet and form molecules.

(b) In the covalent compounds, the intra molecular force of attraction is strong. But the intermolecular force of attraction is weak.

E.g. In methane ( $CH_4$ ) the force of attraction between carbon and hydrogen atoms is strong. But the force of attraction between methane molecules is weak.

(c) Esters are compounds formed by reaction of carboxylic acids with alcohols. They have general formula  $R_1COOR_2$

#### Activity

- Take 1 ml ethanol (absolute alcohol) and 1 ml ethanoic acid and add a few drops of concentrated sulphuric acid in a test tube.
- Heat this test tube in a water bath.
- Pour this hot mixture into a beaker, containing 20 – 50 ml of water and smell the resulting mixture.

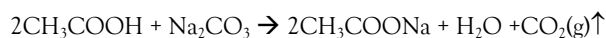
#### Observations

The resulting mixture has a sweet smell, similar to that of the fruits.

This sweet smell is produced because alcohol reacted with the acids to form sweet smelling compound ester.

**OR**

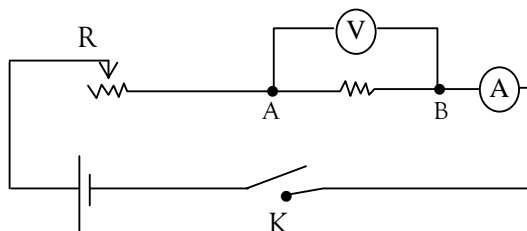
- (a) The molecular mass of the two successive compounds in a homologous series differs by 14u (or differ by CH<sub>2</sub>). The chemical properties of the compounds present in a homologous series remain similar. But their physical properties shows gradual variation.
- (b) (i) The carboxylic acids are different from mineral acids in the sense that mineral acids like HCl completely ionize whereas carboxylic acids ionize to lesser extent and hence are weak acids.
- (ii) Take 2 - 3 ml of ethanoic acid in a test tube. To this add a pinch of sodium carbonate. Brisk effervescence is produced with the liberation of CO<sub>2</sub> gas.



Pass the gas through lime water

Lime water turns milky. The milkiness disappears on passing excess of gas. This confirms that the gas evolved is CO<sub>2</sub>.

16. (a) (i) It means that 1 joule of work is to be done to move a unit coulomb charge from the point at lower potential to the point at higher potential
- (ii) Energy = charge x potential difference = 5C x 12 V = 60 J



- (b) In the above circuit we would connect the metallic rods between points A and B.

The points A and B can be adjusted according to the size of the rod.

We will vary only one parameter from below at a time.

- (a) Material of the rods.                      (b) Length of the rods.                      (c) Cross section of the rods.

The resistance would be calculated as the reading of voltmeter in (V) ÷ reading of ammeter in (A)

We will see that

- (a) for the same material if cross sectional area is constant and length varied.

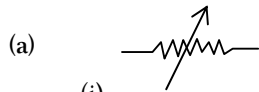
$$\text{Resistance} \propto \text{length}$$

- (b) For the same material if length is kept constant and cross sectional area is varied then

$$\text{Resistance} \propto \frac{1}{\text{Area of cross section}}$$

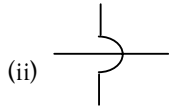
- (c) If we take two rods of equal dimensions but of different materials then the resistance varies in both cases.

**OR**



(i) represents a variable resistor.

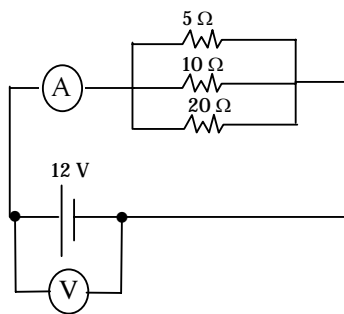
It can be used to control current cross a circuit



represents a wire crossing.

It is used to jump a line over as electricity isolated wire.

(b)



(c) (i) We can control each device separately when connected in series.

(ii) They can operate under a uniform potential difference.

17. Genetic drift is the phenomenon of chance selection of some individuals in a species over others, though without having any survival advantage.

- 18.
1. Generation of variations
  2. Accumulation of variations
  3. Speciation and development of species over generations

19. Platelet cells help in blood clotting whenever there is an injury to the blood vessels.

- 20.
- (a) CNG is non-renewable and Hydrogen is renewable.
  - (b) Hydrogen has more calorific value than CNG. CNG produces  $\text{CO}_2$  on burning which may lead to green house effect while hydrogen produces  $\text{H}_2\text{O}$  on burning.

- 21.
- |                    |                   |
|--------------------|-------------------|
| 1. TV              | 2. Radio stations |
| 3. Scientific work | 4. Satellites     |

22. Ozone layer absorbs the harmful U.V. radiations of the sun and thus prevents them from falling on the earth's surface.

It is produced by the action of U.V. radiations on O<sub>2</sub> molecules. These radiations split some molecular O<sub>2</sub> into free O atoms. These atoms then combine with molecular O<sub>2</sub> to form ozone.

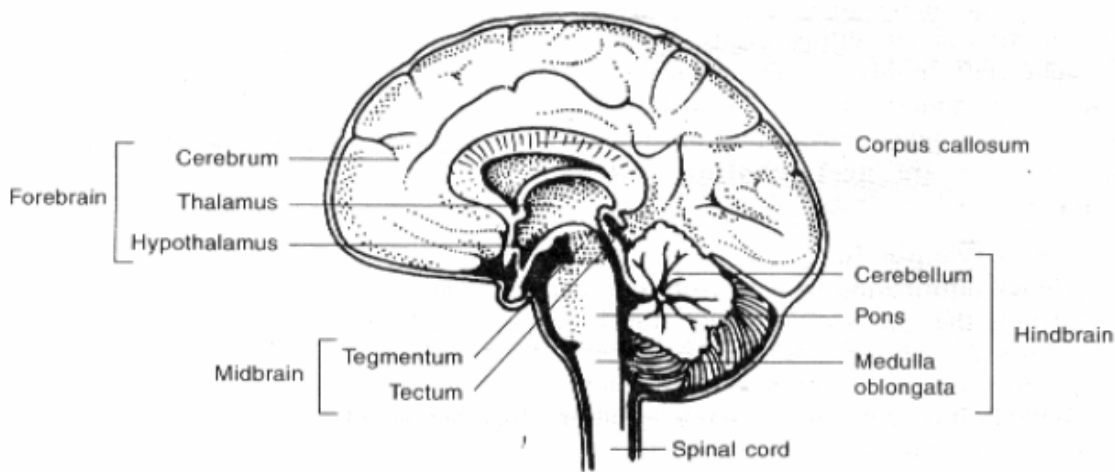


Compounds responsible for the depletion of ozone layer are chloro fluoro carbons and fluoro carbons. These chemicals are present in the aerosol spray propellants, refrigeration and aeroplane exhausts, which release them into the atmosphere.

23. 1. To follow the three R's - reuse, recycle and reduce concerning the use of natural resources.  
 2. prevent overexploitation of natural resources and overuse of fossil fuels.  
 3. Not to throw garbage plastic bags, food wrappers anywhere. Rather make pits to dump garbage.  
 4. Proper tuning of automobiles for complete combustion of fuel.  
 5. Not to let domestic waste run off to nearby water bodies.  
 6. Prevent hunting or poaching of wild animals.  
 7. Not to cut trees without any purpose.

24. Variations may occur in some of the individuals in a pre-existing species. Under pre-existing conditions, any unfavourable variation will not allow survival of the organism  
 But at the onset of any unfavourable condition, only variations that have an added advantage favourable to the new conditions will survive, others will not.

25. (a) and (b)



- (c) Cerebellum: Control coordination of body movements thus maintaining posture and equilibrium of the body.

26. Vegetative propagation is the simplest and rapid way of producing new plants from the vegetative (or non-germinal) parts of a plant like stems, roots or leaves.

Examples where it is used:-

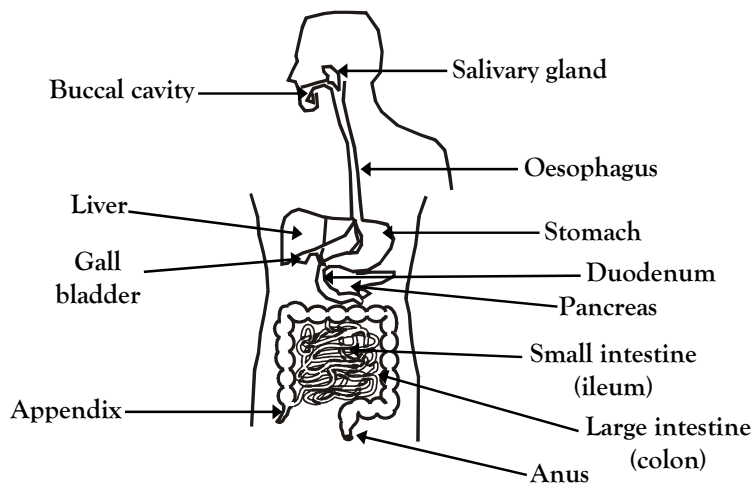
- Roots of guava, carrot, sweet potato give out shoots that develop into a new plant.
- Underground stems of potato, onion and garlic, etc when buried in the ground, develop into a new plant
- In adventitious buds present along the notches of the leaf develop young plantlets which can grow independently in soil.

Reasons for practicing vegetative propagation:-

- Plants produced are identical to the parent plant thus maintains specific heredity of the plant species.
- Seedless plants or plants with non-viable seeds can be propagated through this method.

27. (a) Diagram of Human Alimentary canal

(b)



- (i) Role of Hydrochloric acid in our stomach- It provides the acidic medium in which the gastric enzymes (pepsin) can function properly and kills the germs which come into the stomach from mouth.
- (ii) Digestive enzymes break down complex food particles into simpler and easily digestible forms. e.g. salivary amylase breaks down complex sugars like starch into simpler ones like maltose. Further action of pancreatic amylase and intestinal amylase convert starch to maltose and ultimately to glucose, which is readily assimilated by the body.



e.g. pepsin of stomach converts complex proteins into simpler peptides and peptones. Further action of trypsin of pancreatic juice and enzymes of intestinal juice break peptides and peptones to amino acids, which are easily digestible and assimilable forms

**OR**

(a)

Autotrophic	Heterotrophic
1. Autotrophic organisms can synthesise their own food	1. Heterotrophic organisms cannot synthesise their own
2. Raw materials is inorganic sources in the form of carbon dioxide and water	2. Raw material is itself in the form of organic matter (carbohydrates, proteins, etc.)
3. Raw material further undergoes anabolic reactions.	3. Food material once eaten undergoes further undergoes catabolic reactions..

(b) Diagram Showing Cross-Section of a Leaf

