



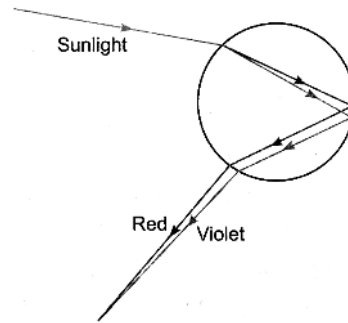
**Scholars Den Mock Test: Sure Success Recipe**  
**CBSE Class 10 Science**  
**Answer Key & Solutions**

1. (c)
2. (c)
3. (c)
4. (d)
5. (a)  $2\text{NaCl} + 2\text{H}_2\text{O} \longrightarrow 2\text{NaOH} + \text{Cl}_2 + \text{H}_2$   
(b) Anode: Chlorine gas  
Cathode: Hydrogen gas  
(c) Chlorine is used to purify water.  
Hydrogen gas is used as a fuel.  
(d) When a cold and concentrated solution of sodium chloride reacts with ammonia, carbon dioxide, and water, sodium hydrogencarbonate (baking soda) and ammonium chloride is formed.  
$$\text{NaCl} + \text{NH}_3 + \text{H}_2\text{O} + \text{CO}_2 \longrightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$$

Baking soda
6. (a) (iv) both (ii) and (iii)  
(b) (i)  $\text{O}_2, \text{O}_3$   
(c)  $\text{O}_2 \xrightarrow{\text{UV}} [\text{O}] + [\text{O}]$   
$$\text{O}_2 + [\text{O}] \longrightarrow \text{O}_3$$

ozone

  
(d) (iii)  $\text{O}_3$
7. Two magnetic field lines of force never intersect each other. If the lines intersect, then at the point of intersection there would be two directions (the needle would point towards two directions) for the same magnetic field, which is not possible.
8. A uniform magnetic field in a region is represented by drawing parallel and equidistant straight lines, all pointing in the same direction.
9. (c)
10. (d)
11. (b)
12. (c) **OR** (c)
13. (d) **OR** (d)
14. Denatured alcohol is ethyl alcohol which has been made unfit for drinking purposes by adding poisonous substances like methanol, pyridine, copper sulphate, etc.
15. A rainbow is a natural spectrum appearing in the sky after a rain. It is produced by dispersion of sunlight by tiny water droplets, present in the atmosphere. The water droplets act like small prisms. When a ray of light falls on water drop (or raindrop) it undergoes refraction and dispersion to form a spectrum. This spectrum undergoes internal reflection (inside the raindrop) and finally refracted again when it comes out of the raindrop. After the dispersion of light and internal reflections, the band of colours reaches observer's eye in the form of a rainbow.  
A rainbow is always formed in the direction opposite to that of the sun.



**OR**

(a)  $u = -60 \text{ cm}$ ,  $f = -30 \text{ cm}$ ,  $v = ?$

Now,  $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

$\therefore \frac{1}{v} = \frac{1}{f} + \frac{1}{u} = \frac{1}{-30} + \frac{1}{-60} = \frac{-3}{60}$

$\therefore v = -20 \text{ cm}$

Magnification,  $m = \frac{v}{u} = \frac{-20 \text{ cm}}{-60 \text{ cm}} = \frac{1}{3}$

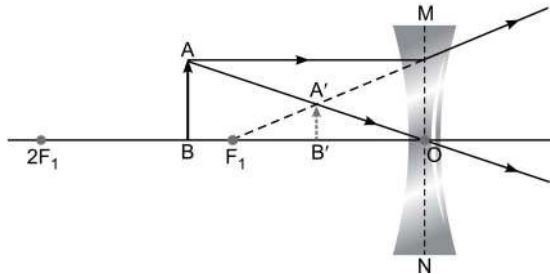
(b) Nature: Virtual

Position: 20 cm from lens on the same side as the object

Size: Diminished

Erect/Inverted: Erect

(c)



16. Water harvesting is a technique of capturing rain water when it falls and taking measures to keep water clean.

- The advantages associated with water harvesting at community level are:
  - (i) Recharging of the ground water.
  - (ii) Mitigation of floods and droughts.
- The causes for the failure of sustained availability of ground water are:
  - (i) Overuse of ground water.
  - (ii) Deforestation or loss of vegetation cover.

**OR**

When the solar energy falls on the top surface of the atmosphere then the following happens:

- (a) Some solar energy is reflected back into the space by the atmosphere, and
- (b) The atmosphere also absorbs a lot of solar energy; for example, most of the ultraviolet rays are absorbed by the ozone layer.

So, the solar energy which reaches us through the Earth's atmosphere are mainly in the form of heat rays (infra red rays) and visible light, which is a small part of the solar energy.

17. Electrical resistivity of the material of a conductor is the resistance offered by the conductor of length 1 m and area of cross-section 1 m<sup>2</sup>.

And,  $\rho = \frac{RA}{l}$   $\therefore$  Unit of  $\rho = \frac{\text{ohm metre}^2}{\text{metre}} = \text{ohm metre}$ .

Resistance of wire is doubled if its length is doubled.

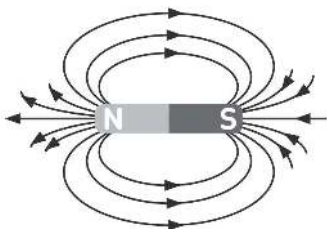
Hence, current is reduced to half.

$\therefore$  Ammeter reading =  $\frac{100 \text{ mA}}{2} = 50 \text{ mA}$

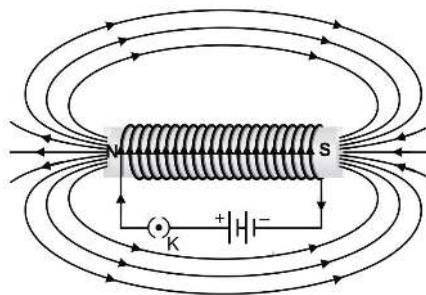
**OR**

A coil of many circular turns of insulated copper wire wrapped closely in the shape of a cylinder is called a solenoid.

**Diagrams:**



Magnetic field of a Bar Magnet



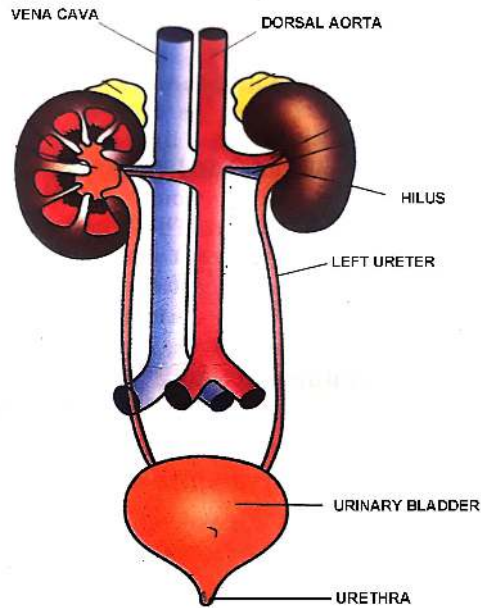
Magnetic field of Solenoid

**Distinguishing features-**

Solenoid	Bar Magnet
(i) Field disappear on stopping the current.	(i) No effect of current on magnetic field.
(ii) Strength of the field can be changed by changing the current.	(ii) Strength cannot to changed.
(iii) Direction can be reversed by changing the direction of current through it.	(iii) Direction is fixed and cannot be reversed.

18. (a) Monohybrid  
 (b) Genotype  $\rightarrow$  Tt  
 Phenotype  $\rightarrow$  Tall  
 (c) The rule for inheritance of traits is Law of independent Assortment which states that when two or more pair of contrasting characters are taken together than the factors controlling different characters assort independently.

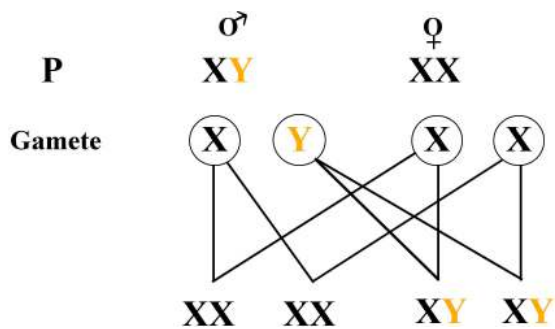
19.



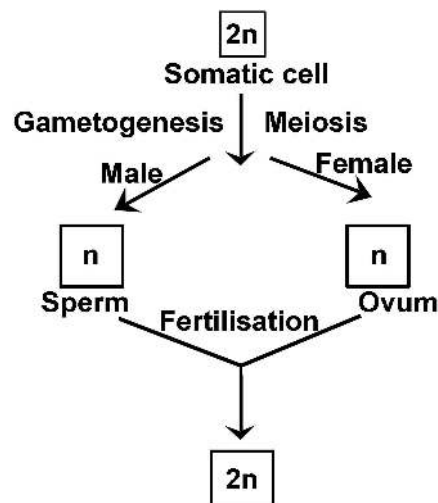
**Excretory system of man**

**OR**

- (a) Sex of the child depends on the genetic composition of his sex chromosome or Allosome. In order to be a male it need to have both sex chromosomes i.e. X and Y, however Y chromosome is present only in male so it is said that sex of a child is determined by father not mother



- (b) Chromosome number is restored in Zygote as it is a result of fertilisation i.e. fusion of male and female gametes. Gametes are always haploid in nature and are formed by meiosis so when two haploid cells fuse they give rise to a Diploid





23. (a) Compound A – Ethanol (ethyl alcohol)  
Compound B – Ethanoic acid (acetic acid)



24. Atomic number of X = Mass number of X - Number of neutrons  
= 35 - 18  
= 17

Therefore, electronic configuration of X = 2, 8, 7

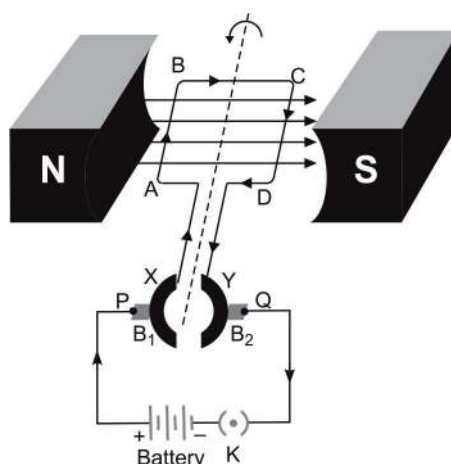
Group number = 17

Period number = 3

Valency = 8 - 7 = 1

25. An electric motor is a device which converts electrical energy into mechanical energy.

**Principle:** The electric motor works on the magnetic effect of current. Its principle is when a rectangular coil is placed in a magnetic field and current is passed through it, a force acts on the coil, due to which the coil rotates. When the coil rotates the shaft attached to it also rotates. The rotating shaft has mechanical energy. In this way electric energy supplied to motor is converted into mechanical energy.



**Construction:** An electric motor has the following parts:

1. **Field Magnet:** It is a permanent U-shaped magnet NS; whose north and south poles are N and S respectively.
2. **Armature:** It is a rectangular coil ABCD which contains a large number of turns of insulated copper wire wound on a soft iron core. This coil is free to rotate between the pole pieces of the magnet.
3. **Split Rings and Brushes:** Split rings (X and Y) are simply a brass (or copper) ring which is divided into two parts. These both parts are separated from each other and are soldered to the two ends of the coil. These split rings are mounted on the shaft of the motor and can rotate with the shaft.

The split rings touch the two strips of graphite  $B_1$ ,  $B_2$ ; these strips of graphite are called the brushes. These brushes are connected to two connecting screws P and Q. The brushes are fixed to the base of the motor and are in contact with the half rings lightly. The screws are connected to terminals of battery. When current is passed by means of battery, the current enters the coil from one brush and leaves through the other.

**Working:** Initially let coil ABCD be horizontal as shown in Figure. When key is closed, the current begins to flow in the coil. Initially the sides AD and BC of coil are parallel to magnetic field, so no magnetic force acts on them.

By Fleming's left hand rule, the force on arm AB of coil is vertically downward and on side CD of coil, it is vertically upward. These two forces are equal and opposite and hence form a couple. This tends to rotate the coil in anticlockwise direction. When rotating coil becomes perpendicular to its initial position, then couple becomes zero. But due to inertia the coil continues to rotate along the same direction. As the split rings also rotate with the coil, therefore, the split rings come in contact with other brushes. [That is initially

$B_1$  had contact with X and  $B_2$  had contact with Y; now  $B_1$  has contact with has contact with X.] When this happens the direction of current in the coil is reversed.

This in turn reverses the direction of forces in AB and CD. The side of the coil will be on left hand side with a downward force on it and the side AB of coil will be on right hand side with an upward force on it. Thus a couple acts on the coil which rotates the coil in the same direction (anti-clockwise). This process is repeated again and again and the coil rotates continuously.

Due to rotation of coil, its shaft gains kinetic energy; which may be used to run electric fan, water pump, washing machine, mixer and grinder etc.

OR

$$(a) R = \frac{R_1 R_2}{R_1 + R_2} = \left( \frac{8 \times 8}{8 + 8} \right) = 4 \Omega$$

$$(b) I = \frac{V}{R} = \frac{8}{4 + \left( \frac{8 \times 8}{8 + 8} \right)} = \frac{8}{8} = 1A$$

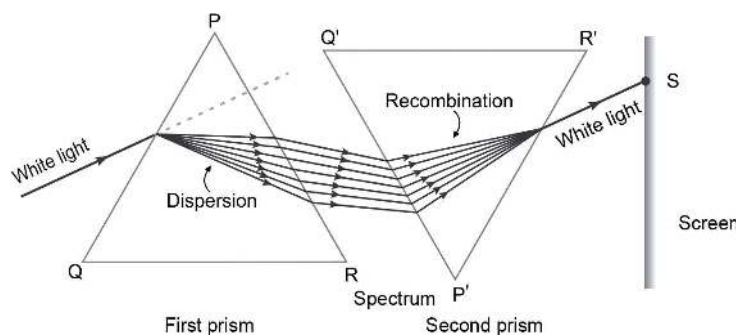
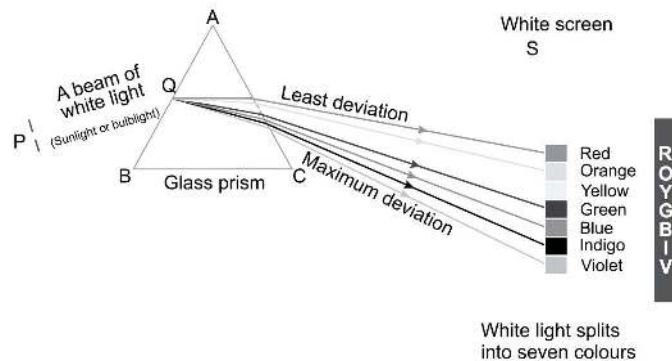
$$(c) V = IR = 1 \times 4 = 4V$$

$$(d) P = I^2 R = 1^2 \times 4 = 4W$$

(e) No difference, same current flows through each ammeter in the given circuit.

26. The splitting up of white light into its constituent colours on passing through a refracting medium like a glass prism is called dispersion of light.

The dispersion of white light occurs because different colours of light bend through different angles with respect to the incident ray, as they pass through a prism. The red light bends the least while the violet the most as shown below.



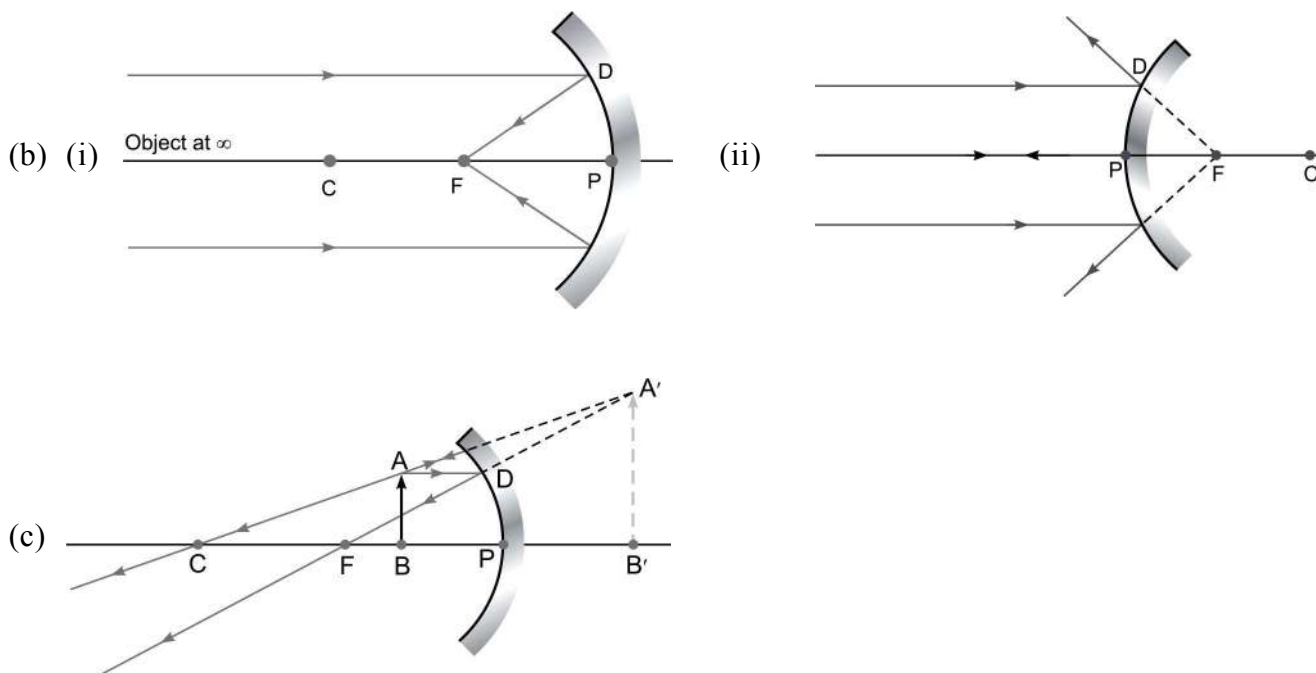
The second prism can be considered to be placed in an inverted position with respect to the first. The first prism splits the white light into its seven colour components. When these colour components fall on the second prism, it recombines them to form white light.

OR

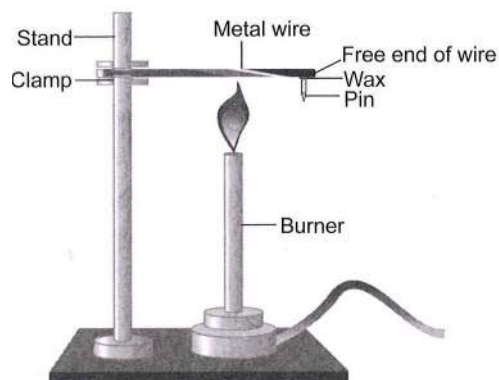
(a) (i) **Pole:** It is the centre of the reflecting surface of the spherical mirror.



- (ii) **Centre of curvature:** It is the centre of the sphere of which mirror forms a part.
- (iii) **Radius of curvature:** It is the radius of the sphere of which mirror forms a part.
- (iv) **Principal axis:** It is an imaginary straight line passing through the pole and the centre of curvature of the mirror.



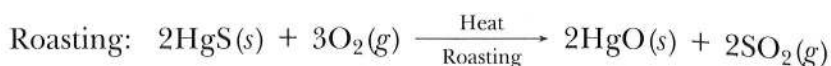
27. (a)

**Procedure:**

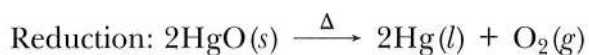
- Take a copper wire and clamp it on a stand as shown in figure.
- Stick an iron pin to the free end of the wire, with the help of wax.
- Heat the wire with a burner in the middle.
- What happens to the pin when the wire is heated?

**Observation:** Heat is transferred from one end of metal wire to the free end of wire which melts the wax and pin falls. This shows that metals conduct heat.

(b) HgS or cinnabar is the ore of mercury metal which on heating changes to HgO. This metal oxide (HgO) gets reduced to mercury metal (Hg) on further heating.







OR

(a)

Metals	Non-metals
1. They lose electrons to form positive ions and are electropositive in nature.	They gain electrons to form negative ions and are electronegative in nature
2. They react with dilute acids to liberate hydrogen gas.	They do not react with dilute acids.
3. Generally, metal oxides are basic in nature.	Generally, non-metal oxides are acidic in nature.

(b) Rusting of iron can be prevented by:

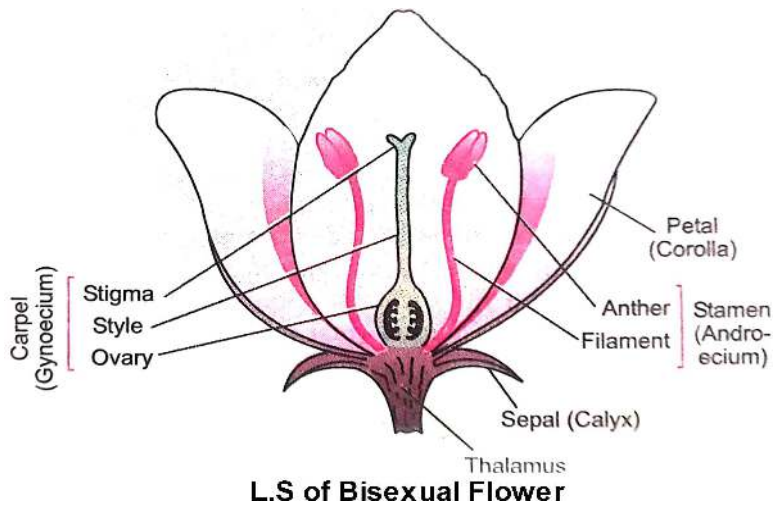
- (i) Painting                                      (ii) Oiling                                      (iii) Galvanization                                      (iv) Alloying

28. (a) The vertical column in the periodic table are called 'groups', the horizontal rows in the table are called periods. There are 18 groups and 7 periods in periodic table.
- (b) (i)  $N < M$ , as the atomic size decreases on moving from left to right as tendency to lose electrons decreases due to decrease in atomic size.
- (ii) M is more metallic than N because metallic character goes on decreasing from left to right as tendency to lose electrons decreases due to decrease in atomic size.
- (iii) The valencies of M and N are 1 and 2 respectively, valency across the period first increases then decreases.
- (iv)  $MCl, NCl_2$

OR

- (a) (i) Increasing order of atomic mass and similarities in chemical properties of elements.  
(ii) The formula of oxides and hydroxides formed by elements.
- (b) Mendeleev's Periodic law: Properties of elements are the periodic function of their atomic masses.
- (c) Hydrogen had no fixed position in Mendeleev's Periodic table because it resembles alkali metal by forming positive ions and resembles halogens by forming diatomic molecule.
- (d) (i) Atomic size decreases from left to right, as the valence electrons are attracted by the nucleus due to increase in nuclear charge.  
(ii) The atomic size increases from top to bottom in a group because the number of shells keep on increasing.

29. (a)



- (i) Male reproduction organ → Stamen  
 (ii) Female reproduction organ → Pistil  
 (iii) Showy part which helps in → Corolla  
 Pollination

- |  |  |                              |
|--|--|------------------------------|
| (b) (i) Arteries                               | Veins  | Capillaries                  |
| They are thick walled                          | They are thin walled as compared to arteries | They are thinnest            |
| (ii) Flow of blood is from heart to body parts | Flow of blood from body parts to Heart       | Connects Arteries with Veins |

30. (a) Adrenaline is a hormone released by Adrenal gland, it initiates body response against emergency condition such as-fight and flight. Responses involved are -

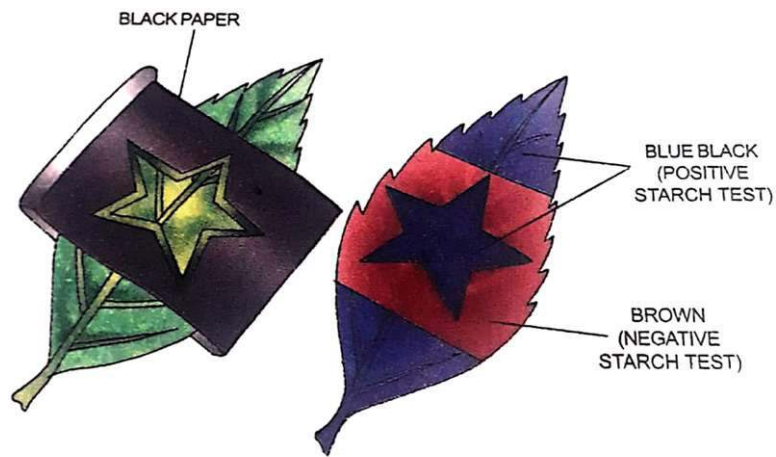
- (i) Increase in heart beat  
 (ii) Increase in Breathing rate  
 (iii) Dilation of pupil  
 (iv) Decreases salivation

These response prepare body for an expected emergency situation so called Emergency hormone.

(b) AIM : To demonstrate that light is necessary for photosynthesis.

Procedure:

- (i) Take a plant with destarched leaves.  
 (ii) Cover one of the leaves with black paper on which a design is cut.  
 (iii) Keep the plant with fixed light screen in light at least for 6 hours.  
 (iv) Perform the starch test.



Experiment to prove that light is necessary for photosynthesis.

Observation: It is observed that the middle portion of the leaf in which design (star) is made as well as those parts that were left uncovered by the paper, allows the light to fall on them and give a positive starch test.

Inference : Light is necessary for photosynthesis.

- (c) Direction of nerve stimulus is unidirectional as it is a property of nerve cell (neuron) which receive nerve stimulus at dendritic end and pass it on to another neuron with the help of neurotransmitters released at synaptic knobs so as Axonal Ends release neurotransmitters not the dendritic ends direction of nerve stimulus is unidirectional.