

**CBSE Class 10 Science**  
**Sample Paper - 06**

---

**Maximum Marks: 80**

**Time Allowed: 3 hours**

---

**General Instructions:**

- i. The question paper comprises three sections – A, B and C. Attempt all the sections.
- ii. All questions are compulsory.
- iii. Internal choice is given in each section.
- iv. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- v. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
- vi. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
- vii. This question paper consists of a total of 30 questions.

**Section A**

1. Breaking and making of bonds in chemical reaction is called as-
2. By considering their position in the periodic table, which one of the following elements would you expect to have maximum metallic characteristic?  
Ga, Ge, As, Se and Br
3. **Answer the questions that follows on the basis of your understanding of the following paragraph and the related studied concepts:**

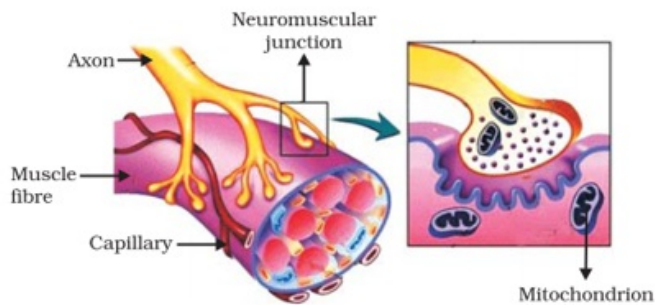
In ancient times, wood was the most common source of heat energy. The energy of flowing water and wind was also used for limited activities. The exploitation of coal as a source of energy made the industrial revolution possible. Increasing

industrialisation has led to a better quality of life all over the world. It has also caused the global demand for energy to grow at a tremendous rate. The growing demand for energy was largely met by fossil fuels – coal and petroleum. Our technologies were also developed for using these energy sources. But these fuels were formed over millions of years ago and there are only limited reserves. Fossil fuels are non-renewable sources of energy, so we need to conserve them. If we were to continue consuming these sources at such alarming rates, we would soon run out of energy. In order to avoid this, alternate sources of energy were explored.



- i. What do you mean by non-renewable sources of energy?
  - ii. Write five examples of non-renewable energy sources.
  - iii. Which is the main element in fossil fuels?
  - iv. Which type of environmental hazard is not contributed by the combustion of fossil fuels?
4. In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it, and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect smell. This information, acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in a

dendrite of the next neuron. This is a general scheme of how nervous impulses travel in the body. A similar synapse finally allows delivery of such impulses from neurons to other cells, such as muscles cells or gland.



Answer the following questions:

- a. What is the role of axon?
- b. From where electrical impulse travels?
- c. Name the chemical which released at the end of axon to transmit the signal to the other neuron.
- d. The nervous system uses the \_\_\_\_\_ to transmit message.
  - i. Electrical signal
  - ii. Chemical signal
  - iii. Both electrical and chemical signal
  - iv. None of the above
5. If the angle of incidence is increased for a pair of air – glass interface, then the angle of refraction will
  - a. increase
  - b. remains the same
  - c. decrease
  - d. first increases and then decreases

**OR**

The focal length of the eye lens increases when eye muscles

- a. Contract and lens becomes thinner

- 
- b. are relaxed and lens becomes thicker
  - c. are relaxed and lens becomes thinner
  - d. contract and lens becomes thicker
6. Opposition to the construction of large dams is due to-
- a. Environmental reasons
  - b. Social reasons
  - c. All of the above.
  - d. Economic reasons
7. The phenomena of electromagnetic induction is
- a. the process of generating magnetic field due to a current passing through a coil
  - b. the process of charging a body
  - c. the process of rotating coil of an electric motor.
  - d. producing induced current in a coil by the relative motion between a magnet and the coil
8. "Alcohols and glucose contain hydrogen but are not treated as acids"
- a. False
  - b. No plausible explanation
  - c. These two are exceptions
  - d. True

**OR**

What happens when two drops of phenolphthalein are added to a dilute solution of NaOH?

- a. solution turns colourless
- b. solution turns red

c. solution turns orange

d. solution turns pink

9. In a food chain, the third trophic level is always occupied by

a. Producers

b. Decomposers

c. Herbivores

d. Carnivores

10. What will happen if deer is missing in the given food chain?, Grass → Deer → Tiger.

a. Tiger will start eating grass.

b. The population of grass will decrease.

c. The population of tiger will decrease and the population of grass will increase.

d. The population of tiger will increase.

11. Which of the pairs of elements are members of the same group?

A. Na and K

B. Ar and Cl

C. Mg and Ca

D. O and S

a. All of these

b. B and C only

c. A, C and D

d. A and D only

12. Match the following with the correct response:

--	--

(1) Electrolytic reduction	(A) Sodium
(2) Electrolytic refining	(B) Zinc
(3) Reduction with carbon	(C) Impure copper
(4) Reduction with aluminium	(D) Chromium

- a. 1-C, 2-B, 3-D, 4-A
- b. 1-A, 2-C, 3-B, 4-D
- c. 1-B, 2-D, 3-A, 4-C
- d. 1-D, 2-A, 3-C, 4-B

13. **Assertion:** Propene reacts with HBr to give isopropyl bromide.

**Reason:** Addition of Br<sub>2</sub> to alkene takes place at the faster rate in the presence of ionizing substance.

- a. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
- b. Assertion is INCORRECT but, reason is CORRECT.
- c. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
- d. Assertion is CORRECT but, reason is INCORRECT.

14. **Assertion:** When the length of a wire is doubled, then its resistance also gets doubled.

**Reason:** The resistance of a wire is directly proportional to its length.

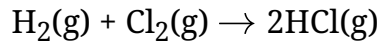
- a. Assertion is INCORRECT but, reason is CORRECT.
- b. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
- c. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
- d. Assertion is CORRECT but, reason is INCORRECT.

### Section B

15. With the help of a chemical equation, explain how a soda-acid fire extinguisher helps

in putting out a fire.

16. Identify the substance oxidized and substance reduced in the following reaction. Write the ionic equation for the substance oxidized and reduced.



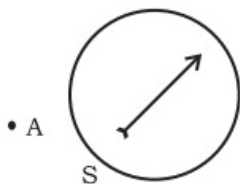
**OR**

What happens to lime water when  $\text{CO}_2$  gas is bubbled through it in excess?

17. Why do you think the noble gases are placed in a separate group?
18. What changes take place as blood enters the kidney tubule?

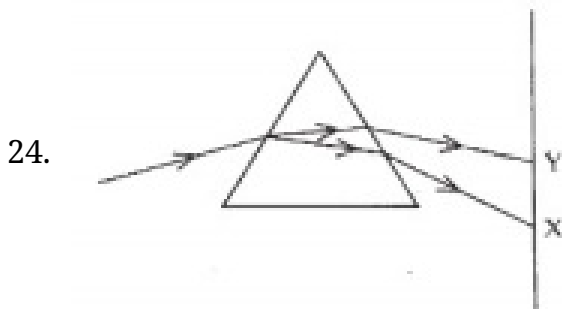
**OR**

- i. Transport of food in plants requires living tissues and energy. Justify this statement.
- ii. Name the components of food that are transported by the living tissues.
19. A person with myopic eye cannot see objects beyond 1.2 m distinctly. What should be the type of the corrective lens used to restore proper vision?
20. Differentiate heritable and non-heritable variations.
21. Represent schematically the path of a reflex action.
22. A magnetic compass needle is placed in the plane of paper near point A as shown in figure. In which plane a should a straight current carrying conductor be placed so that it passes through A and there is no change in the deflection of the compass? Under what condition is the deflection maximum and why?



23. Suppose your parents have constructed a two room house and you want that in the living room there should be a provision of one electric bulb, one electric fan, a

refrigerator and a plug point for appliances of power up to 2 kilowatts. Draw a circuit diagram showing electric fuse and earthing as safety devices.



- i. What is the visible spectrum?
- ii. Why is red used as the stopping light at traffic signals?
- iii. Two triangular glass prisms are kept together connected through their rectangular side. A light beam is passed through one side of the combination. Will there be any dispersion? Justify your answer.

**OR**

- i. Name the spherical mirror used as:
  - a. shaving mirror
  - b. Rear view mirror in vehicles
  - c. Reflection in search-light.
- ii. Write any three difference between a real and a virtual image.

### **Section C**

25. How will you get metal from concentrated ore?
26. Explain the mechanism of the cleansing action of detergents.
27. List the steps of preparation of a temporary mount of a leaf peel to observe stomata.
28. Describe regeneration in Planaria.

**OR**

Give reasons:

- i. Placenta is extremely essential for foetal development.



- 
- ii. Blocking of vas deferens prevents pregnancy.
  - iii. Wind acts as a pollinating agent.
  - iv. Use of condoms prevents pregnancy.
  - v. Blocking of Fallopian tubes prevents pregnancy.
29. Redraw the circuit putting an ammeter to measure the current through the resistors and voltmeter to measure the potential difference across  $12\ \Omega$  resistor. what would be the reading in the ammeter and the voltmeter?
30. How are the images formed when an object is moved from infinity to the convex lens?

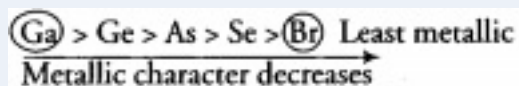
**OR**

- i. Define focal length of a spherical lens.
- ii. A divergent lens has a focal length of 30 cm. At what distance should an object of height 5 cm from the optical centre of the lens be placed, so that its image is formed 15 cm away the lens? Find the size of the image also.
- iii. Draw a ray diagram to show the formation of image in the above situation.

**CBSE Class 10 Science**  
**Sample Paper 02 (2019-20)**

**Answer**  
**Section A**

1. The breaking and making of bonds in chemical reaction is called as Chemical Bonding.
2. Given elements belong to the same period. Since, on moving from left to right, size decreases due to increase in nuclear charge. Due to this, the tendency to lose electrons decreases along the period. Hence, the metallic character of elements also decreases. Decreasing order of metallic character of metals follows the order:



Thus, Ga possesses maximum metallic character.

3.
  - i. **Non-renewable resources** are those found inside the earth, and they took millions of years to form.
  - ii. The five examples of non-renewable energy sources are fossil fuels, oil, natural gas, and coal and nuclear energy.
  - iii. Carbon is the main element in fossil fuels.
  - iv. Combustion of fossil fuel doesn't lead to the destruction of wildlife habitat.
4.
  - a. The role of axon is to conduct the action potential to the synaptic terminal.
  - b. The electrical impulse travels from the dendrite to the cell body, then along the axon to its end.
  - c. Acetylcholine released at the end of axon to transmit the signal to the other neuron.
  - d. (i) Electrical signal
5. (a) increase, **Explanation:** According to Snell's law, ratio of the sine of the angle of incidence to the sine of the angle of refraction is always constant for a given pair of media. Therefore, if the angle of incidence increases, the angle of refraction also increases proportionally to the increase of incidence.

**OR**

---

(c) are relaxed and lens becomes thinner, **Explanation:** When the ciliary muscles are relaxed, the eye lens becomes thin, the focal length increases, and the distant objects are clearly visible to the eyes.

6. (c) All of the above, **Explanation:** Disadvantages of construction of dams are:  
Environmental problems: The construction of dams across rivers leads to deforestation, which results in the loss of biodiversity. This creates a disturbance in the natural ecosystem.  
Social problems: The construction of dams involves the building of large reservoirs. In some cases, constructing a reservoir may result in the flooding of nearby towns and villages. A large number of people are displaced as a direct consequence of the construction of reservoirs. In such cases, the government rehabilitates the people of these areas, which in itself is a huge task.

Economic problems: The construction of dams requires huge amounts of monetary investments. A dam does not become profitable until it starts generating electricity. As a result of all these problems, there is a strong opposition to the construction of large dams. The opposition to the construction of the Tehri dam over the river Ganga and the *Narmada Bachao Andolan* (a protest against the proposed increase in the height of the Sardar Sarovar Dam over the river Narmada) are examples of such opposition

7. (d) producing induced current in a coil by the relative motion between a magnet and the coil **Explanation:** When a straight coil and a magnet are moved relative to each other, a current is induced in the coil. This phenomenon is known as electromagnetic induction.
8. (d) True, **Explanation:** This is true that alcohols and glucose contain hydrogen ions in them but they do not dissociate to produce hydrogen ions and hence are unable to show acidic behaviour.

**OR**

(d) solution turns pink, **Explanation:** Phenolphthalein is an acid base indicator that is pink in basic solutions and colourless in acidic solutions. NaOH is basic in nature, so when two drops of phenolphthalein are added to a dilute solution of NaOH its colour turn pink.

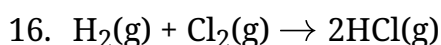
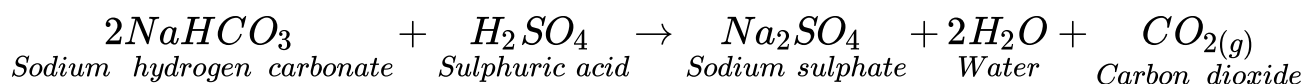
9. (d) Carnivores, **Explanation:** Carnivores  
10. (c) The population of tiger will decrease and the population of grass will increase.

**Explanation:** If deer is missing from the given food chain, the population of tiger will decrease and the growth of grass will increase. A missing link in a food chain will create an imbalance in the ecosystem.

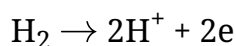
11. (c) A, C and D, **Explanation:** Sodium and Potassium are the group 1 elements as they have 1 valence electron in their outermost shells.  
Magnesium and Calcium are group 2 elements as they have 2 valence electrons in their outermost shells.  
Sulphur and Oxygen are group 6 elements.
12. (b) 1-A, 2-C, 3-B, 4-D, **Explanation:** Highly reactive metals like **sodium**, which cannot be obtained by reducing their oxides with carbon, are obtained by electrolysis of their chlorides (**electrolytic reduction**) in molten state. **Electrolytic refining** is used for refining impure copper. **Zinc oxide** can be reduced with **carbon** (or coke). **Chromium** can be obtained from its oxide ore by **reduction** with **aluminium powder**.
13. (a) Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion. Explanation: Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
14. (b) Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion. Explanation: Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.

### Section B

15. Soda-acid fire extinguisher contains sodium bicarbonate and sulphuric acid, which are present in separate containers inside the extinguisher. When the knob of the fire extinguisher is pressed, the sulphuric acid mixes with sodium bicarbonate solution and a lot of  $CO_2$  gas is produced.  
Carbon dioxide gas forms a blanket over the fire and cuts off the supply of air to the burning substance and the fire stops.



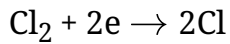
- a. Substance oxidized,  $H_2$



---

[Substance getting oxidized is  $H_2$ ]

b. Substance reduced,  $Cl_2$



[Substance getting reduced is  $Cl_2$ ]

**OR**

When carbon dioxide is passed in excess in lime water then initially it turns milky due to the formation of a precipitate of calcium carbonate, followed by formation of a clear solution in the end.

17. Nobel gases are placed in separate groups because of the following reasons

(i) During the period when Mendeleev discovered his periodic table noble gases were not discovered. When noble gases were discovered scientists gave the conclusion that noble gases could be placed at the extreme right of the periodic table.

(ii) The outer most shell contains eight electrons which is known as octet. (exceptional case: Helium which contains two electrons in this valence shell. Thus, it is known as Duplet)

(iii) Noble gases show similar chemical properties as the no. of electrons in the outermost shell is same. Hence they have similar chemical properties

(iv) Their valency is 0.

18. As the blood enters kidney tubules, it is filtered in the glomerulus. The nephric filtrate thus enters the body of tubule, the useful substances diffuse back into kidney and the waste salts along with excess water reaches the collecting tubule.

**OR**

i. Food is transported by sieve tubes (phloem) at the expense of ATP. As phloem is largely composed of living cells thus, it shows that food transport requires living tissues and energy.

ii. Components of food that are transported by the living tissues are:

a. Photosynthetic products or sucrose

b. Amino acids.

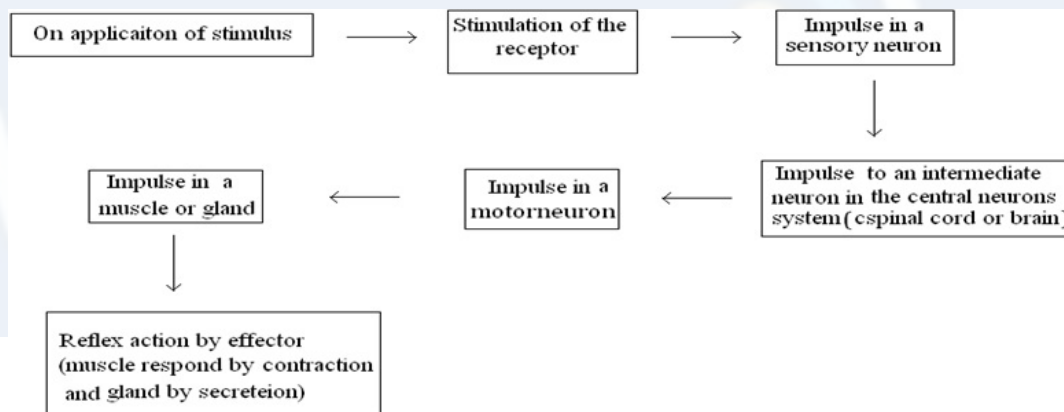
19.  $P = \frac{1}{f} = -\frac{1}{1.2} = -0.825D$

Person should wear specs of power -0.825D.

20.

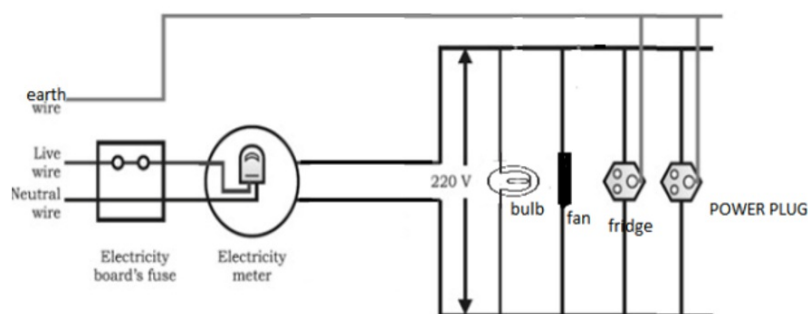
Heritable variations	Non-heritable variations
1) These variations affect the germ cells.	1) They affect somatic cells.
2) They are transmitted to the next generation.	2) They are lost with the death of organisms.
3) They are produced by new combination of characters, crossing over, change in number of chromosomes, radiations and chemicals.	3) They are produced by three types of factors: environment, use and disuse of organs and conscious efforts.
4) They are also called germinal variations.	4) They are termed as somatic variations.

21.



22. When the magnetic field and direction of electric current are in the same plane, there would be deflection in the compass. For maximum deflection, magnetic field and direction of current should be in mutually perpendicular plane. So, for no deflection, conductors should be kept parallel to the magnetic compass. For maximum deflection, it should be placed perpendicular to the compass.

23. The circuit diagram showing the electric fuse and earthing as safety devices is as follows:



24. i. Visible spectrum is the band of coloured components of a white light beam.  
 ii. Red light is scattered the least by air molecules and has longer wavelength. It travels the longest distance.  
 iii. The given setup will behave like a glass slab, resulting in recombination of the seven colours to produce white light.

OR

- i. a) Shaving mirror- Concave mirror  
 b) Rear view mirror - Convex mirror  
 c) Reflection in search-lights - Concave mirror.  
 ii. The three differences are:  
 a) Real image can be obtained on screen but a virtual image cannot be obtained.  
 b) Reflected/Refracted rays actually meet where the real image is formed while for virtual they only appear to meet.  
 c) A Real image is always inverted while the virtual image is always erect.

### Section C

25. Extraction of the metal from the concentrated ore. The metal is extracted from the concentrated ore by the following steps:  
 (i) Conversion of the concentrated ore into its oxide. This is usually done by calcination and roasting process. The method depends upon the nature of the ore. A carbonate ore is converted into oxide by calcination while a sulphide ore is converted into oxide by roasting.  
 (ii) Conversion of oxide to metal by reduction process.  
**(i) Conversion of ore into metal oxide:** It can be done by two methods  
**(a) Calcination:** It is the process of heating the concentrated ore in the absence of air. The calcination process is used to removed volatile impurities, water from the

hydrated ores and to convert carbonate ores into metal oxide.

For example :

(i) Zinc occurs as zinc carbonate in calamine ( $\text{ZnCO}_3$ ). The ore is calcinated (heated strongly) in the absence of air to convert it to zinc oxide. During calcination, carbon dioxide is expelled.

$\text{ZnCO}_3$	$\xrightarrow{\text{Calcination}}$	$\text{ZnO}$	+	$\text{CO}_2$
Zinc carbonate (Calamine ore)		(Zinc. Oxide)		

(ii) Aluminium occurs as  $\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$  in its bauxite ore. When the bauxite ore is calcined, water vapours are expelled and anhydrous aluminium oxide is obtained.

$\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$	$\xrightarrow{\text{Calcination}}$	$\text{Al}_2\text{O}_3$	+	$2\text{H}_2\text{O}$
Bauxite Ore		Aluminium Oxide		

**b) Roasting:** It is the process of heating the concentrated ore strongly in the presence of excess air. This process is used for converting sulphide ores to metal oxide.

For example, zinc occurs as sulphide in zinc blende ( $\text{ZnS}$ ). It is strongly heated in excess of air when it forms zinc oxide and sulphur dioxide gas is expelled.

$2\text{ZnS} + 3\text{O}_2$	$\xrightarrow{\text{Roasting}}$	$2\text{ZnO}$	+	$2\text{SO}_2$
Zinc sulphide (Zinc blende ore)		Zinc Oxide		

ii) Conversion of metal oxide to metal: The metal oxide formed after calcination or roasting is converted into metal by reduction. Some of the methods commonly used for the reduction of metal oxides to metals are discussed below:

**I) Reduction by heating in the air :** Metals low in the reactivity series can be obtained from their oxides by heating in air. For example, mercury is obtained from cinnabar ( $\text{HgS}$ ) ore by this method. The method involves the following steps:

i) The concentrated mercuric sulphide (cinnabar or) is roasted in air when mercuric oxide is formed.

--	--	--	--	--	--	--	--



$2\text{HgS}$	+	$3\text{O}_2$	$\xrightarrow{\text{Roasting}}$	$2\text{HgO}$	+	$2\text{SO}_2$
Mercuric sulphide (Cinnabar ore)				Mercuric oxide		
$2\text{HgO}$	$\rightarrow$	$2\text{Hg}$		+	$\text{O}_2$	
Mercuric oxide		Mercuric metal				

ii) Mercuric oxide is heated to about 300°C and it decomposes to give mercury metal.

**II) Chemical reduction:** The metal oxides from calcination or roasting processes are reduced to free metal by using chemical agents like carbon, aluminium, sodium or calcium.

**(a) Reduction with carbon:** The oxides of moderately reactive metals like zinc, copper, nickel, tin, lead etc. can be reduced by using carbon as reducing agent. In this process, the metal oxide is mixed with coke and heated in a furnace. Carbon reduces the metal oxide to free metal.

For e.g. when zinc oxide is heated with carbon, zinc metal is produced.

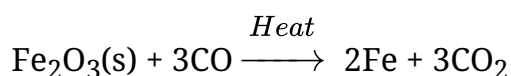
$\text{ZnO}$	+	$\text{C}$	$\xrightarrow{\text{Heat}}$	$\text{Zn}$	+	$\text{CO}$
Zinc oxide		Reducing agent		Zinc metal		Carbon monoxide

Similarly, lead is obtained from lead oxide by heating with carbon.

$\text{PbO}$	+	$\text{C}$	$\rightarrow$	$\text{Pb}$	+	$\text{CO}$
Lead oxide				Lead metal		

Coke is very commonly used as a reducing agent because it is cheap.

**(b) Reduction with carbon monoxide:** Metals can be obtained from oxides by reduction with carbon monoxide in the furnace. For example, iron is obtained from ferric oxide by heating with carbon monoxide.



**c) Reduction with aluminium:** Certain metal oxides are reduced by aluminium to metals. The method is known as aluminothermy or thermite process. For example, chromium, manganese, titanium, vanadium metals are obtained by the reduction of

their oxides with aluminium powder.

$3\text{MnO}_2$	+	$4\text{Al}$	$\xrightarrow{\text{Heat}}$	$3\text{Mn}$	+	$2\text{Al}_2\text{O}_3$
Manganese oxide				Manganese		
$\text{Cr}_2\text{O}_3$	+	$2\text{Al}$	$\xrightarrow{\text{Heat}}$	$2\text{Cr}$	+	$\text{Al}_2\text{O}_3$
Chromium oxide				Chromium		

Similarly, chromium is obtained by heating chromium oxide with aluminium powder.

**(d) Reduction by electrolysis or electrolytic reduction:** The oxides of active metals are commonly extracted by the electrolysis of their fused salts using suitable electrodes. This is also called electrolytic reduction. The process of extraction of metals by electrolysis process is called electrometallurgy.

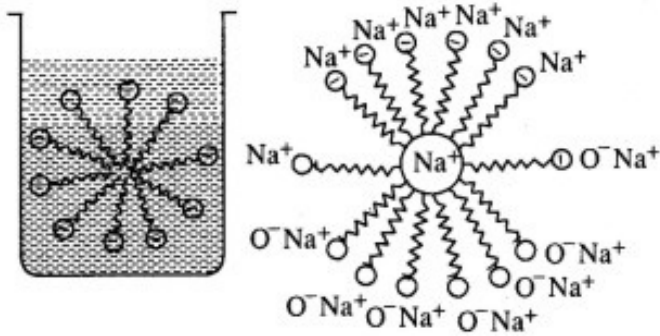
For e.g., aluminium oxide is very stable and aluminium cannot be prepared by reduction with carbon. It is prepared by the electrolysis of molten alumina ( $\text{Al}_2\text{O}_3$ ). In this process pure alumina is dissolved in molten cryolite ( $\text{Na}_3\text{AlF}_6$ ) in an iron tank lined with carbon. During electrolysis, the aluminium ions,  $\text{Al}^{3+}$  are reduced at cathode (by the electrons) to form aluminium.

$\text{Al}^{3+}$	+	$3\text{e}^-$	$\rightarrow$	$\text{Al}$
Aluminium ion (from molten alumina)				Aluminium (At cathode)

During electrolytic reduction of molten salts, the metals are always produced at the cathode (negative electrode).

26. The cleansing action of soaps and detergents follows the same principle: Soaps and detergents consist of large hydrocarbon tails with a negatively charged head. The hydrocarbon tails are hydrophobic and negatively charged head is hydrophilic. In solution, water molecules (being polar) aqueous, surround the ions and not the organic part of the molecule.

When a soap or detergent is dissolved in water, the molecules aggregate together as clusters, called micelles. The tails stick inwards and the heads outwards.

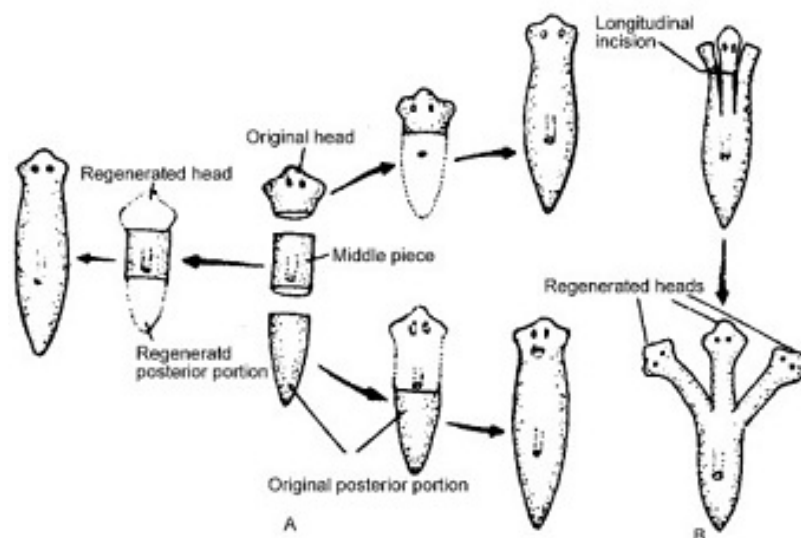


Mechanism of cleansing action: The hydrocarbon tail attaches itself to oily dirt. When water is agitated, the oily dirt tends to loosen from the dirty surface and dissociates into fragments and other tails to stick to oil. The solution now contains small globules of oil surrounded by soap or detergent molecules. The negatively charged heads present in water prevent the small globules from coming together forming aggregates. Thus, the oily dirt is removed from the object.

27. The steps are:

- i. Remove a healthy leaf from the potted plant.
- ii. Remove a part of the peel from the lower surface of the leaf. The peel can be removed by folding the leaf over and gently pulling the peel-apart using forceps. Place the peel in a watch glass containing water.
- iii. Add safranin to the watch glass to stain the peel lightly.
- iv. After 2-3 minutes take out the and place is on a clean slide.
- v. Put a drop of glycerine over the peel and place a clean coverslip gently over it with the help of a needle.
- vi. Remove the excess stain and glycerine with the help of blotting paper.
- vii. Observe the slide under the low-power and high-power magnifications of the compound microscope.

28. Regeneration in Planaria: When the anterior end of Planaria is cut along the length into two more parts, each part develops into a new head, resulting in a many-headed planaria.



If the body is cut into three, four or more pieces, each piece regenerates the missing parts. A noteworthy observation in this case is that a piece from the middle always regenerates a head towards its anterior side and tail towards its posterior side. In other words, each piece maintains its original polarity. A possible explanation of this fact is that in Planaria, the metabolic activity and hence capacity for regeneration, is the greatest at the anterior end, gradually decreases posteriorly and is minimum at the posterior end. Correspondingly, the anterior end of each piece, having greater metabolic activity, regenerative anterior part of the body and the posterior end remain as such.

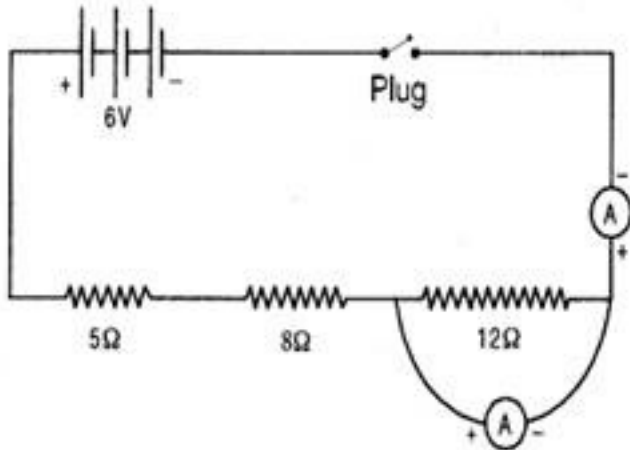
**OR**

- i. Placenta is a temporary organ which is extremely essential for foetal development because it helps in nutrition, respiration, excretion, etc., of the foetus through the maternal supply. Baby connects with placenta via umbilical cord.
- ii. Blocking of vas deferens is known as vasectomy which prevents passage of sperms, hence, there is no fertilisation thus it prevents pregnancy.
- iii. Anemophily or wind pollination is a form of pollination where, wind acts as a pollinating agent because it helps in transfer of pollen grains from anther to stigma of a flower. e.g. wheat, rice corn.
- iv. Condoms as physical barrier, which prevent entry of sperms into vagina, hence prevent pregnancy.
- v. If Fallopian tube is blocked surgically, which is better known by the name tubectomy, sperm and egg do not meet and fuse and fertilisation does not take

place.

29. Modified circuit is as shown. Since  $5\Omega$ ,  $8\Omega$  and  $12\Omega$  are in series, therefore the total resistance in series.

$$R_s = R_1 + R_2 + R_3 = 5 + 8 + 12 = 25\Omega$$



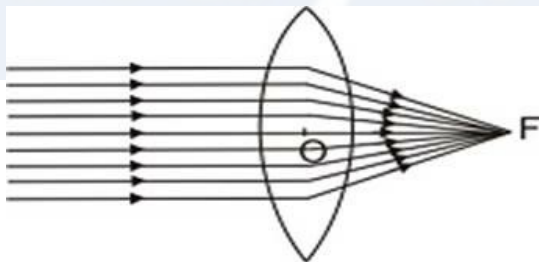
$$\text{Current through circuit } I = \frac{V}{R} = \frac{6}{25} = 0.24A$$

$$\therefore \text{Reading of ammeter} = 0.24A$$

$$= I \cdot R = 0.24 \times 12$$

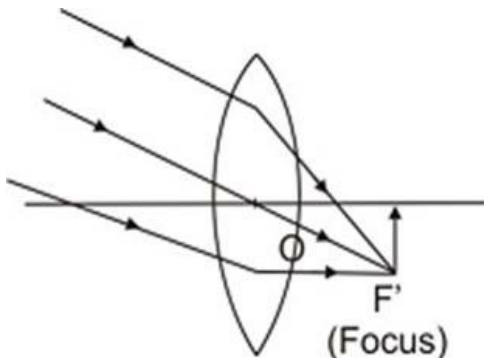
$$= 2.88\Omega$$

30. Object at Infinity. When object is at infinity, a real image is formed at F on the other side of the lens

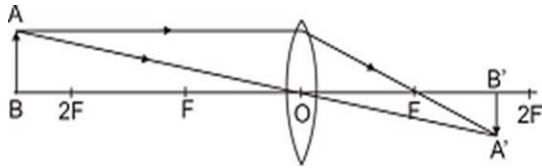


Object at infinity. Image at F on the other side of lens.

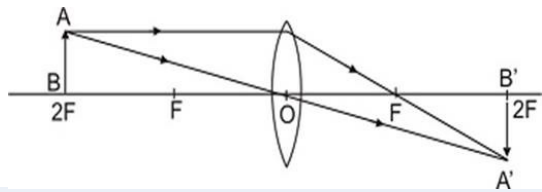
However if the rays are parallel to themselves but not parallel to principal axis, then these rays after refraction will form image at focus  $F'$  and not at principal focus F.



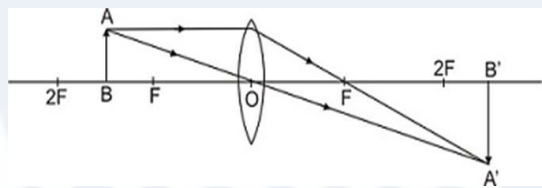
Object at infinity, rays parallel to themselves but not parallel to principal axis. Image is formed at  $F'$ , the focus on the other side of lens. Object beyond  $2F$ . When the object is beyond  $2F$ , a real, inverted, diminished image is formed between  $F$  and  $2F$ .



Object beyond  $2F$ , real, inverted, diminished image between  $F$  and  $2F$ . Object at  $2F$ . When the object is at  $2F$ , a real, inverted image of the same size is formed on the other side of the lens at  $2F$  as given in Fig.

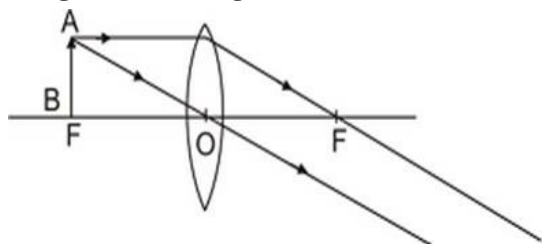


Object at  $2F$ , image at  $2F$  on the other side of the lens. Image is of size same as that of the object. When the object is between  $F$  and  $2F$ , its real, inverted, magnified image is formed on the other side of the convex lens as shown in fig.



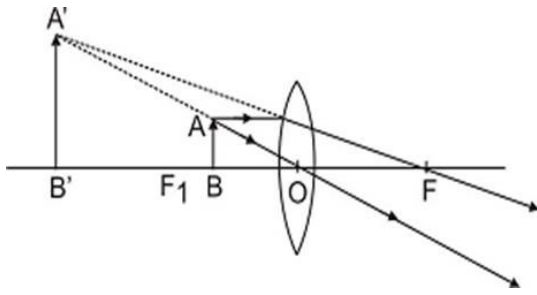
Object between  $F$  and  $2F$  real, inverted, magnified image is formed beyond  $2F$  on the other side of lens.

Object at  $F$ . When object is placed principal focus, a real, inverted, very highly magnified image is formed at infinity.



Object at  $F$ , a very highly magnified, real, inverted image is formed at infinity.

Object between  $F$  and  $C$ . When an object is placed between principal focus and optical centre of the lens, virtual, erect, magnified image is formed on the same side of the lens.



Object between F and C; a virtual, erect, magnified image is formed on the same side.

**OR**

i. The distance between the focus and optical centre of lens is called focal length of lens.

ii. Given

$$f = -30 \text{ cm}, v = -15 \text{ cm}, u = ?, h_0 = 5 \text{ cm}$$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow -\frac{1}{30} = -\frac{1}{15} - \left(\frac{1}{u}\right) \Rightarrow u = -30 \text{ cm}$$

$$\therefore m = \frac{v}{u} = \frac{h_i}{h_0}$$

$$\Rightarrow \frac{15}{30} = \frac{h_i}{5} \Rightarrow h_i = \frac{5}{2} \Rightarrow h_i = 2.5 \text{ cm}$$

iii.

