

CBSE
SAMPLE
PAPER
X
SCIENCE

(As Per Latest CBSE Syllabus)

CONTENTS

1.	Sample Paper (By CBSE)	1-13
2.	Sample Paper 1	14-28
3.	Sample Paper 2	29-44
4.	Sample Paper 3	45-59
5.	Sample Paper 4	60-76
6.	Sample Paper 5	77-92
7.	Sample Paper 6	93-107
8.	Sample Paper 7	108-120
9.	Sample Paper 8	121-136
10.	Sample Paper 9	137-152
11.	Sample Paper 10	153-167

CBSE Class 10 Science
Sample Paper (By CBSE)

Time allowed: 03 Hours, Maximum Marks: 80

General Instructions:

- The question paper has two sections. You are to attempt both the sections.
 - All questions are compulsory.
 - All questions of Section-A and B are to be attempted separately.
 - There is an internal choice in 2 questions of three marks each and 1 question of five marks.
 - Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 - Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 - Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 - Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 - Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief.
-

SECTION-A

1. Give an example of a flower which contains both stamens and carpels.
2. Mention any one point of difference between Pepsin and Trypsin.
3. An element “X” has mass number 35 and the number of neutrons, is 18. Identify the group number and period of “X”.
4. An object of height 1.2m is placed before a concave mirror of focal length 20 cm so that a real image is formed at a distance of 60cm from it. Find the position of an object. What will be the height of the image formed?
5. Why is there a need to harness non-conventional sources of energy? Give two main reasons.

6. Name the electric device that converts mechanical energy into electrical energy. Draw the labelled diagram and explain the principle involved in this device.

OR

- i. What is the function of earth wire in electrical instruments?
 - ii. Explain what is short circuiting an electric supply.
 - iii. What is the usual current rating of the fuse wire in the line to feed
(a) Lights and fans? (b) Appliances of 2kW or more power?
7. Draw a circuit diagram of an electric circuit containing a cell, a key, an ammeter, a resistor of 4Ω in series with a combination of two resistors (8Ω each) in parallel and a voltmeter across parallel combination. Each of them dissipate maximum energy and can withstand a maximum power of 16W without melting. Find the maximum current that can flow through the three resistors.
8. In the electrolysis of water,
- a. Name the gas collected at anode and cathode
 - b. Why is the volume of gas collected at one electrode double than the other?
 - c. What would happen if dil H_2SO_4 is not added to water?
9. Differentiate between the arrangement of elements in Mendeleev's periodic table and Modern periodic table.
10. Explain the ways in which glucose is broken down in absence of oxygen.

OR

List three differences between arteries and veins.

11. How do Mendel's experiments show that traits may be dominant or recessive?
12. Rohit focused the image of a candle flame on a white screen using a convex lens. He noted down the position of the candle, screen and lens as under
- Position of candle = 26.0 cm
Position of convex lens = 50.0 cm
Position of screen = 74.0 cm
- i. What is the focal length of the convex lens?
 - ii. Where will the image be formed if he shifts the candle towards the lens at a position of 38 cm?
 - iii. Draw a ray diagram to show the formation of the image in case (ii) as said above?

13. "pH has a great importance in our daily life" explain by giving three examples.

OR

A compound which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water. Identify the compound and write its chemical formula. Write the chemical equation for its preparation. Mention any one use of the compound.

14. Why are fossils considered important in the study of evolution? Explain two ways by which age of fossils can be estimated.
15. Our government launches campaigns to provide information about AIDS prevention, testing and treatment by putting posters, conducting radio shows and using other agencies of advertisements.
- To which category of diseases AIDS belong? Name its causative organism.
 - Which kind of value is government trying to develop in the citizens by conducting the above kind of programs.
16. With the help of a labelled circuit diagram wire describe an activity to illustrate the pattern of the magnetic field lines around a straight current carrying long conducting wire .
- Name the rule that is used to find the direction of magnetic field associated with a current carrying conductor.
 - Is there a similar magnetic field produced around a thin beam of moving (a) alpha particles and (b) neutrons? Justify your answer.
17. You are given balls and stick model of six carbon atoms and fourteen hydrogen atoms and sufficient number of sticks. In how many ways one can join the models of six carbon atoms and fourteen hydrogen atoms to form different molecules of C_6H_{14} .

OR

Draw the structural formulae of all the possible isomers of the compound with the molecular formula C_3H_6O and also give their electron dot structures.

18. a.
- Draw a neat diagram of human brain and
 - Label Medulla and Cerebellum
 - Write the functions of the above mentioned parts
 - "Both overproduction and underproduction of Growth hormone leads to disorders in

the body.” Explain.

19. Noopur needs a lens of power $-4.5D$ for correction of her vision.
- What kind of defect in vision is she suffering from?
 - What is the focal length and nature of the corrective lens?
 - Draw ray diagrams showing the (a) defected eye and (b) correction for this defect.
 - What are the causes of this defect?
20. a) What is reactivity series? How does the reactivity series of metals help in predicting the relative activities of various metals?
- b) Suggest different chemical processes used for obtaining a metal from its oxides for metals in the middle of the reactivity series and metals towards the top of the reactivity series. Support your answer with one example each.
21. a) “Improvements in our lifestyle have resulted in greater amounts of waste generation.” Give two examples to support the given statement. Suggest one change that we can incorporate in our lifestyle in order to reduce non-biodegradable waste.
- b) The following organisms form a food chain.
Insect, Hawk, Grass, Snake, Frog
Which of these will have highest concentration of non-biodegradable chemicals? Name the phenomenon.

OR

- What do you understand by “Watershed Management”? List any two advantages of watershed management.
- “Human beings occupy the top level in any food chain.” What are the consequences of this on our body?

SECTION – B

22. What do you observe when you drop a few drops of acetic acid to a test tube containing:
- Phenolphthalein
 - Universal indicator
 - distilled water
 - sodium hydrogen carbonate
23. Riya performs two set of experiments to study the length of the foam formed which are as follows:
- Set I: she takes 10 ml of distilled water in test tube “A” and adds 5-6 drops of liquid

soap in it and shakes the test tube vigorously.

2. Set II: she takes 10 ml of distilled water in a test tube “A” and adds 5-6 drops of liquid soap with half spoonful of CaSO_4 in it and shakes the test tube. Write your observation and reason.

24. A student observed a permanent slide showing asexual reproduction in yeast. Draw diagrams of the observations he must have made from the slide. Name the process also.
25. A student conducted an experiment to show CO_2 is released during respiration. List two precautions that he/she must take for obtaining correct observations.
26. The values of current I flowing in a given resistor for the corresponding values of potential difference V across the resistor are given below:

I (ampere)	0.5	1.0	2.0	3.0	4.0
V (volt)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of the resistor.

OR

In a given ammeter, a student sees that needle indicates 17 divisions in ammeter while performing an experiment to verify Ohm’s law. If ammeter has 10 divisions between 0 and 0.5A, then what is the value corresponding to 17 divisions?

27. Draw a path of light ray passing through a prism. Label angle of incidence and angle of deviation in the ray diagram.

CBSE Class 10 Science
Sample Paper (By CBSE)
Answer Key

1. Hibiscus/Mustard (or any other correct answer)

2.

Pepsin	Trypsin
Produced	Produced by pancreas
Acts in acidic medium	Acts in basic medium

3. Atomic number of X = Mass number of X – No. of neutrons = 35-18=17

Electronic configuration = 2, 8, 7

Group number = 17 , Period No. = 3

4. $h_o = 1.2 \text{ cm}$, $f = -20 \text{ cm}$, $v = -60 \text{ cm}$

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

$$\frac{1}{u} = \frac{1}{-20} - \frac{1}{-60}$$

$$\frac{h_i}{h_o} = \frac{-v}{u}$$

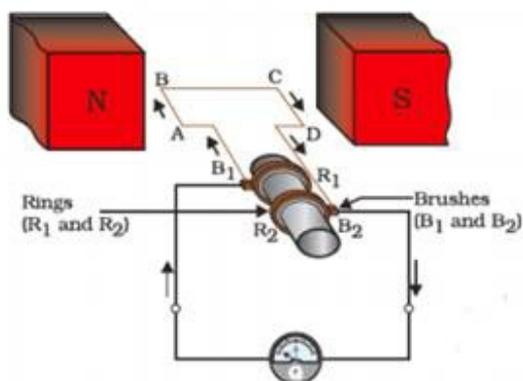
$$h_i = -\frac{-60}{-30} \times 1.2 = -2.4 \text{ cm}$$

5. i) Our demand for energy is increasing to improve quality of life and growth of population

ii) Fossil fuels are limited (or any other two)

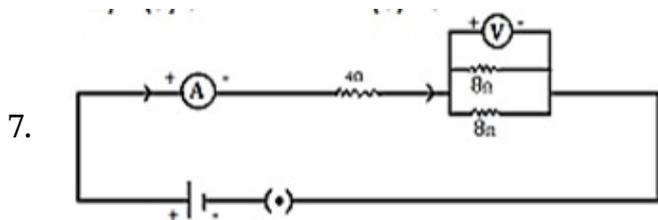
6. Electric generator

Principle electromagnetic induction which states that electric current is induced in a closed circuit because of changing magnetic field.



OR

- i. Earth wire in electrical instruments saves us from all possible electric shocks.
- ii. Accidentally, when live and neutral wires of an electric circuit comes into direct contact, it is called short circuiting.
- iii. (a) 5A (b) 15A



$$\text{Maximum current through } 4 \Omega \text{ resistor} = \sqrt{\frac{P}{r}}$$

$$= \sqrt{\frac{16}{4}} = 2A$$

$$\therefore \text{Maximum current through each } 8 \Omega \text{ resistor} = \frac{1}{2} \times 2 = 1A$$

8. a) In the electrolysis of water, the gas collected at cathode is: Hydrogen.
The gas collected at anode is: oxygen
- b) The gas which is collected in double the amount during the electrolysis of water is Hydrogen. This is because water contains two parts of hydrogen element as compared to one part of oxygen element by volume.
- c) Pure water is a bad conductor of electricity, by adding drops of sulphuric acid; we make it a good conductor of electricity.

9.

	Mendeleev's Periodic table	Modern periodic table
1.	The elements were arranged according to increased atomic Masses.	The elements were arranged according to increased Atomic numbers.
2.	Position of isotopes was not Justified.	There was no problem in the Placing of isotopes.
3.	Position of hydrogen was not Justified because it resembles Both with Alkali metals and Halogens.	Hydrogen has been given a unique position due to its resemblance with alkalis and Halogens.

10. There are two ways of anaerobic breakdown of glucose. First step is breakdown of glucose molecule into pyruvate which takes place in cytoplasm
The anaerobic breakdown in bacteria is called fermentation. During fermentation

pyruvate is broken down to ethyl alcohol and carbon dioxide. When there is lack of oxygen in our muscle cells pyruvate is broken down to lactic acid. Very less amount of energy is released in both the above cases.

OR

Arteries carry blood away from the heart while veins carry blood towards the heart. Arteries are thick walled while veins are thin walled. Valves are absent in arteries while valves are present in veins to ensure that blood flows in one direction only. (any other)

11. Mendel conducted a monohybrid cross with pea plants, and he observed that one of the contrasting characters disappears in F1 generation. This character reappears in F2 generation (obtained by selfing F1) in just 25% of the progeny.

Mendel concluded that the character which expresses itself in F1 is the dominant character while the other one which is not able to express through present in F1 individuals is recessive. This recessive character is able to express only in its pure form i.e. in 25% of F₂ individuals.

12. i) $u = 50 - 26 = 24\text{cm}$

$v = 74 - 50 = 24\text{cm}$

$\therefore 2f = 24\text{cm}$

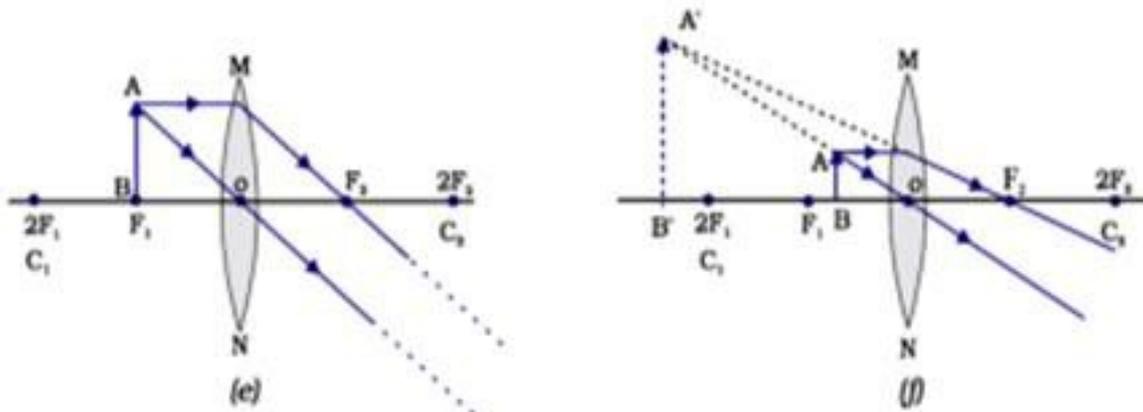
$\therefore f = \frac{24}{2} = 12\text{cm}$

ii) $u = 50 - 38 = 12\text{cm}$

i.e. Candle is at f

\therefore Image is formed at infinity.

iii)



13. Any three points given above

OR

The name of the compound is Plaster of Paris. Its chemical formula is $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$

Equation:



It is used in the hospitals mainly as plaster for supporting fractured bones in the right position

1. Plants and animals are pH sensitive. Living organisms can survive only in narrow range of pH change.
 2. pH of the soil. Plants require a specific pH range for their healthy growth.
 3. pH in our digestive system. Our stomach produces hydrochloric acid that helps in the digestion of food. During in digestion the stomach produces too much acid that cause pain and irritation.
 4. Change in pH causes tooth decay. Tooth decay start when the pH of the mouth is lower than 5.5. Tooth enamel gets corroded when the pH in the mouth is below 5.5.
 5. Self-defense by plants and animals through chemical warfare. Bee- sting leaves and acid causing pain and irritation. Applying a mild base like baking soda on the stung area provides relief.
14. Fossils provide evidence in favor of evolution/ establish evolutionary relationships by providing missing links.

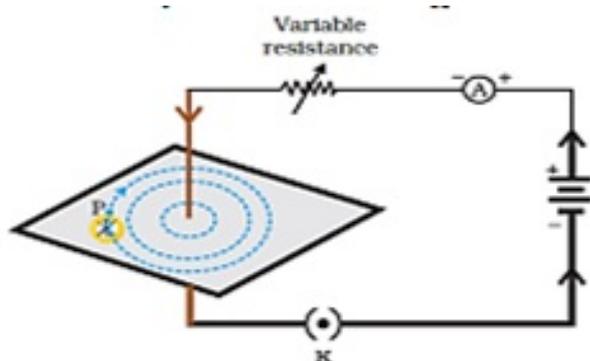
Two ways

1. Relative method – Fossils found closer to the surface are more recent than those in deeper layer.
 2. By detecting the ratios of different shapes of the same element in the fossils material.
15. a) Viral / STD HIV
b) Sensitivity and awareness among the citizens towards leading a healthy and fit life.
16. Activity (Refer circuit diagram given below)

Take a battery (12 V), a variable resistance (or a rheostat), an ammeter (0–5 A), a plug key, and a long straight thick copper wire. Insert the thick wire through the center, normal to the plane of a rectangular cardboard. Take care that the cardboard is fixed and does not slide up or down. Connect the copper wire vertically between the points X and Y, as shown in diagram in series with the battery, a plug and key. Sprinkle some iron filings uniformly on the cardboard. Keep the variable of the rheostat at a fixed position and note

the current through the ammeter. Close the key so that a current flows through the wire. Ensure that the copper wire placed between the points X and Y remains vertically straight. Gently tap the cardboard a few times.

Observe the pattern of the iron filings. It is observed that the iron filings align themselves showing a pattern of concentric circles around the copper wire. These represent the magnetic field lines.

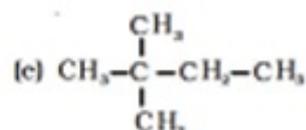
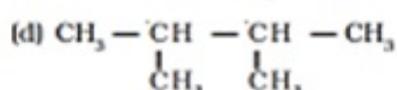
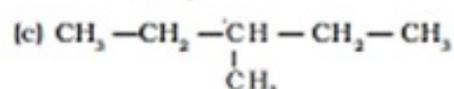
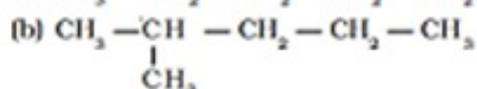
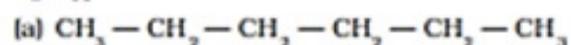


i) Right hand thumb rule

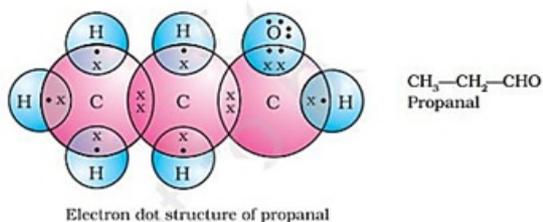
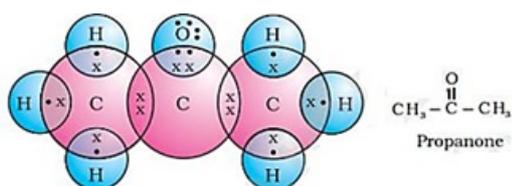
ii) Yes, Alpha particles being, positively charged constitutes a current in the direction of motion.

No, Neutron being electrically neutral constitute no current.

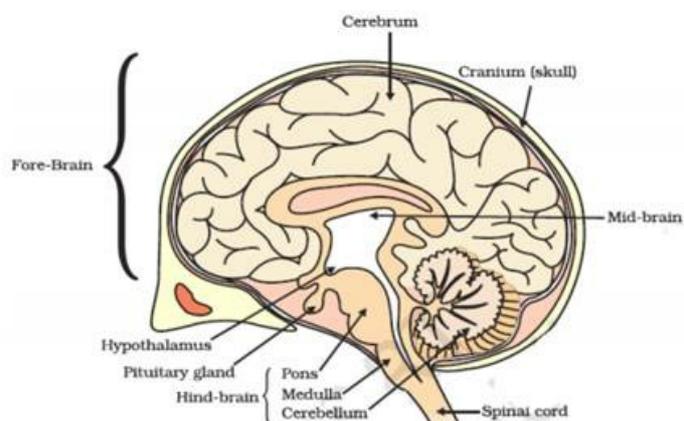
17.



OR



18. a)
i.



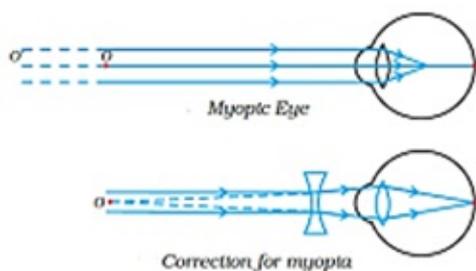
- ii. Correct labelling
- iii. Medulla controls blood pressure, salivation x vomiting.
Cerebellum controls precision of voluntary movements and equilibrium. (any one function each of Medulla and Cerebellum)
- b) Over production of growth hormone leads to gigantism and it's underproduction leads to dwarfism

19. a) Myopia

b) $f = \frac{-1}{45} = 0.22\text{cm}$

Concave lens

c)



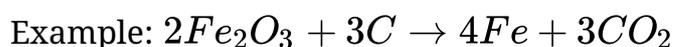
- d) Causes – i) Due to excess curvature of eye lens
ii) Elongation of the eye ball.

20.

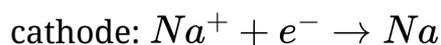
a. The arrangement of metals in the vertical column in the order of decreasing reactivity is called reactivity series or activity series. A metal placed above hydrogen in the activity series will displace hydrogen from water or acids. A metal placed at the top of the activity series would displace metal below it. Thus a more reactive metal displaces a less reactive metal from its salt solution.

b.

i. For obtaining metals that are in the middle of the reactivity series, oxides of such metals can be reduced with coke (carbon) which acts as a reducing agent.



ii. For obtaining metals that are high in the reactivity series, their oxides are reduced to metals by the process of electrolysis example: electrolysis of sodium chloride at



21. a. - More use of disposable items like paper plates, plastic items, polythene etc.
- Changes in packaging (or any other example)
Suggestion – Reuse of polythene bags, plastic containers. (or any other)

b. Hawk Biomagnification

OR

a. Scientific soil and water conservation is called watershed management. Advantages:

i. Increases production and income of watershed community.

ii. Mitigates droughts and floods.

iii. Increases the life of downstream dams reservoirs (any two)

1. Maximum level of bio magnification occurs here because of progressive accumulation.

2. We get very small amount of energy as only 10 % of the previous energy gets transferred at each trophic level

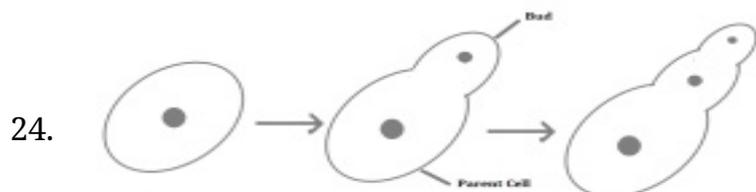
SECTION B

22. i. Acetic acid will remain colourless in phenolphthalein

- ii. Acetic acid will dissolve in distilled water forming a clear solution
- iii. Universal indicator gives orange colour with acetic acid.
- iv. Sodium hydrogen carbonate will give brisk effervescence due to the formation of CO₂ gas.

23. Set I will have more length of foam because it consist of soft water.

Set II will form less foam because it consist of hard water due to the presence of CaSO₄.



Budding

- 25. 1) The set up should be airtight
- 2) Germinating seeds (living) should be used

26. Graph

$$v = 4v(9v - 5v)$$

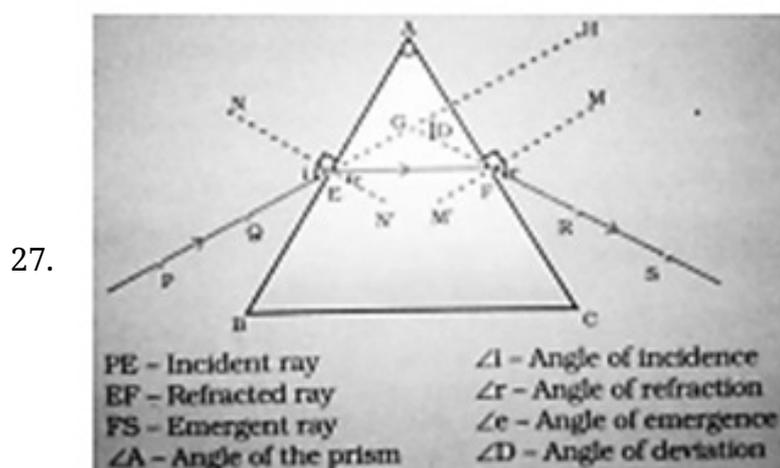
$$i = 1.25A(2.65A - 1.40A) R = \frac{v}{i} = \frac{4}{1.25} = 3.2\Omega$$

OR

An ammeter has 10 divisions between 0 to 0.5A. So,

$$1 \text{ Division} = 0.5A / 10$$

$$17 \text{ divisions} = 17/20 = 0.85A$$



CBSE Class 10 Science
Sample Paper 01

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in 2 questions of 3 marks each and 1 question of 6 marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. How many male gametes are produced by pollen grains?
2. Name the largest artery in the human body.
3. 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, Be
4. Light is incident at an angle of
(i) 30°
(ii) 45° , on the same face of a given rectangular slab. If the angles of refraction, at this face are r_1 and r_2 in the two cases. Obtain the relation in these angles?

5. State the important uses of solar cells.
6. (a) An aqueous solution has a PH value of 7.0. Is it acidic, basic or neutral?
(b) If H^+ concentration of a solution is $1 \times 10^{-2} \text{ mol L}^{-1}$ what will be its PH value?
(c) Which has higher PH value: 1 - M HCl or 1 - M NaOH

OR

Draw ray diagram showing the image formation by a concave mirror when an object placed at centre of curvature of the mirror.

7. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
8. How can three resistors of resistance 2Ω , 3Ω and 6Ω be connected to give a total resistance of (i) 4Ω , (ii) 1Ω ?
9. Write two major shortcomings of Mendeleev's periodic table? How have these been removed in the modern periodic table?
10. Describe double circulation in human beings. Why is it necessary?

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed at infinity.

11. Outline a project which aims to find the dominant coat colour in dogs.
12. A change in DNA that is useful for one property to start with, can become useful later for a different function. Explain.
13. Why is respiration considered as an exothermic reaction? Explain.

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed at twice the focal length of the lens.

14. A truck uses a convex mirror as view finder whose radius of curvature is 2.0 m. A maruti car is coming behind the truck at a distance of 10 m. What will be the position of the image of the car and size of the image of the car when observed by the driver of the truck through the convex mirror?
15. What are the major factors responsible for population explosion?
16. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes?
17. (a) Why does carbon form large number of compounds?
(b) Why are some of these called saturated and others are called unsaturated compounds?
(c) Which of these two is more reactive?
(d) Write the names of the following compounds:
 $\text{CH}_3 - \text{CH}_2 - \text{Br}$ $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{C} \equiv \text{CH}$

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed between optical centre and focus of the lens.

18. How phototropism does occur in plants?
19. (a) What is myopia? State the two causes of myopia. With the help of labelled ray diagrams show
(i) the eye defect myopia
(ii) correction of myopia using a lens.
(b) Why is the normal eye can't focus on an object placed within 10cm from eye?
20. An ore on treatment with dilute hydrochloric acid gives a smell like that of rotten eggs. What type of ore is this? How can it be concentrated? How can the metal be obtained from the concentrated ore?
21. Describe how ozone layer is formed.

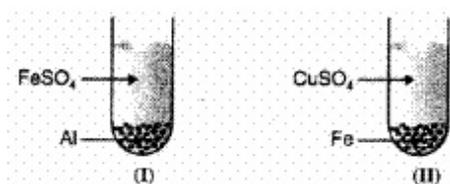
OR

Draw ray diagram showing the image formation by a concave lens when an object is placed beyond twice the focal length of the lens.

Section B

22. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. identify A, B and C.

23. The observation in I and II will be:



24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?

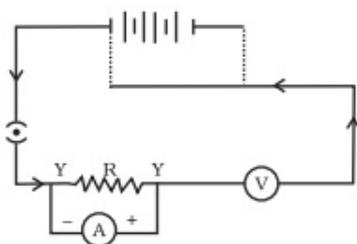
25. Can you, design any other experiment set-up for testing that CO_2 is produced during respiration?

26. Draw ray diagram showing the image formation by a convex lens when an object is placed at the focus of the lens.

OR

Draw a ray diagram showing the path of rays of light when it enters with oblique incidence (i) from air into water, (ii) from water into air.

27. A Child has drawn the electric circuit to study Ohm's law as shown in Figure.



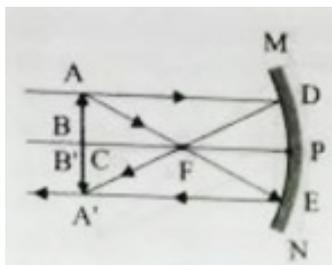
CBSE Class 10 Science
Sample Paper 01
Solution

Section A

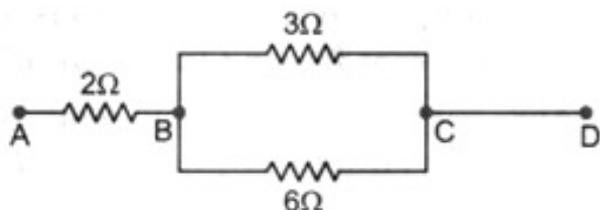
1. Two, One fuses with ovum and another fuses with other cell in ovule which nourishes the zygote formed
2. Aorta is the largest artery in the human body..
3. Metallic character of an element increases down a group and decreases from left to right in period. On this basis Be is expected to have maximum metallic character.
4.
$$n = \frac{\sin i}{\sin r} = \frac{\sin 30^\circ}{\sin r_1}$$
$$n = \frac{\sin 45^\circ}{\sin r_2}$$
$$\therefore \sin r_2 = \frac{\sin 45^\circ}{\sin 30^\circ} \sin r_1$$
$$\sin r_2 = \frac{1}{\sqrt{2}} \times (2) \sin r_1$$
$$= \sqrt{2} \sin r_1$$
5. Important uses of solar cells are as follows..
 - (i) for providing electricity in artificial satellites.
 - (ii) for lighting the street lights, traffic signals, running television sets and radio sets in remote areas.
 - (iii) for providing electricity in lighthouses.
 - (iv) for operating electronic watches and calculators.
6. (a) The solution is neutral in nature.
(b) $[H^+] = 1 \times 10^{-2} \text{ molL}^{-1} = 1 \times 10^{-2} \text{ molL}^{-1}$
$$= 10^{-2} \text{ M}$$
$$\text{pH} = \log \left[\frac{1}{[H^+]} \right]$$
$$= -\log [H^+]$$
$$= -\log [10^{-2}]$$
$$= -(-2)\log 10 = 2$$

- (c) 1 M NaOH solution (basic) higher PH. Value
1 M HCl solution (acidic) lower PH. Value

OR



7. Advantages of connecting electrical devices in parallel with the battery are as follows:
- The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
 - Separate on/off switches can be applied across each device.
 - Total resistance in parallel circuit decreases, hence, a great current may be drawn from the cell.
 - If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.
8. (i) As the total resistance (equivalent resistance) is 4Ω , the 6Ω resistor cannot be in series as in series combination the equivalent resistance is greater than the largest individual resistance. So, it must be in parallel with the other resistors. In parallel connection, the equivalent resistance (4Ω) has to be less than all the resistances. So, the resistors of 2Ω and 3Ω cannot be in parallel at one time with 6Ω . So, the resistors have to be in a mixed combination. Let us consider the combination shown in the figure.



The equivalent resistance between B and C (which are in parallel).

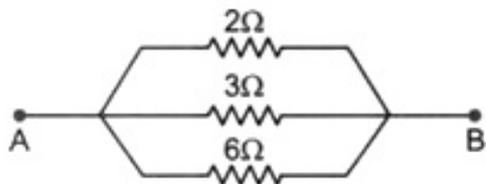
$$= \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega}$$

$$= \frac{18\Omega}{9\Omega} = 2\Omega$$

The resistance between A and D = $2\Omega + 2\Omega = 4\Omega$.

So, the combination shown in the figure is true.

(ii) Here, $R_1 = 2\Omega$, $R_2 = 3\Omega$, $R_3 = 6\Omega$, and $R = 1\Omega$



Since the equivalent resistance of the combination is of lesser value than any of the resistors of the combination, it is clear that the resistors should be connected in parallel. It can be further confirmed by using the formula

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$= \frac{1}{2} + \frac{1}{3} + \frac{1}{6} = \frac{3}{6} + \frac{2}{6} + \frac{1}{6} = \frac{6}{6}$$

$$= 1\Omega, \text{ i.e., } R = 1\Omega$$

Therefore, resistors should be connected in parallel.

9. The two major shortcomings of Mendeleev's periodic table were

(i) It could not justify the position of hydrogen in the periodic table whether in group 1 or group 8

(ii) It could not assign proper position to the different isotopes of the same element. The main reason for these shortcomings was the basis of the Mendeleev's periodic table. It regarded atomic masses of the elements as the basis of classification. The modern periodic table regards atomic numbers of the elements as the basis of classifying the elements. It removed both the shortcomings from the table.

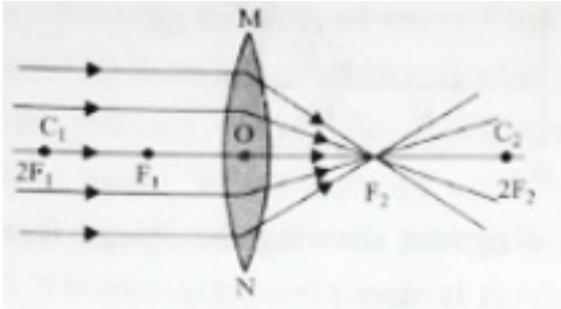
10. In mammals and birds the blood goes through the heart twice during each cardiac cycle. This is known as double circulation.

Deoxygenated blood which enters right auricle and then it enters the right ventricle from where it is pumped to lungs for oxygenation. From lungs after oxygenation it comes to left auricle and then enters left ventricle from where it is pumped to various parts of body.

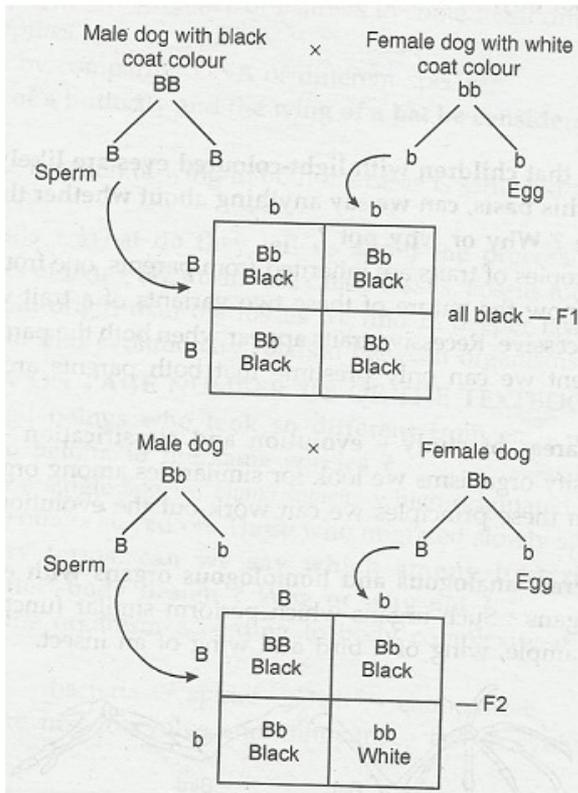
Such system of circulation does not allow mixing of oxygenated and deoxygenated

blood which allows efficient supply of oxygen to the body.

OR

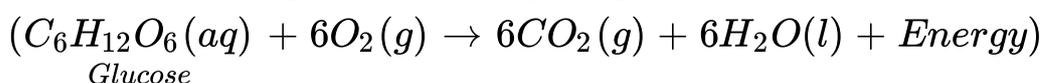


11.

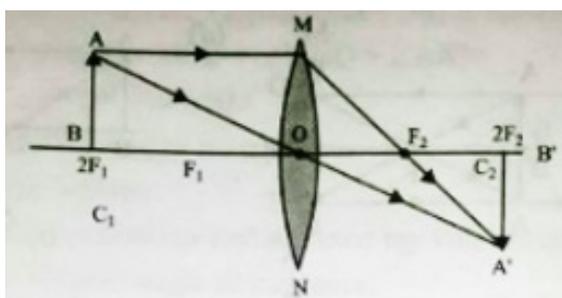


- i. Select two varieties of dogs one with white coat colour, the other with black coat colour.
- ii. Crossbreed them taking male dog from one variety and bitch (female dog) from the other variety.
- iii. Observe the colour of offsprings of F_1 generation.
- iv. Now, bring about breeding among the organisms of F_1 generation.

- v. Observe the coat colour of organisms (pups) of F₂ generation and note the variations in coat colour.
- vi. Draw conclusions on the basis of your study. One of the probable inheritance pattern may be as given below. Phenotypic ratio = 3 : 1, Black coat colour (3) : White coat colour (1)
12. A change/feature/property of an organism that may have helped it to adapt to an environmental condition can also become useful for a completely different function in the future. For example: feathers in birds, a character developed and selected during natural selection because it provided insulation in cold weather have become useful in later stages for flight. Some dinosaurs had feathers, but they could not fly. Birds later adapted the feathers to flight.
13. Rice, potatoes and bread contain carbohydrates. During digestion, these carbohydrates are broken down into simpler substances called glucose. Digestion follows respiration. During respiration, the glucose combines with oxygen in the cells of our body and provides energy. Thus, respiration is an exothermic process because energy is produced during this process.



OR



14. For convex mirror, we have given, $u = -10$ m, $R = 2.0$ m

$$\text{So, } f = \frac{R}{2} = \frac{2.0\text{m}}{2}$$

$$\text{Using the mirror formula, } \frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$\text{We get, } \frac{1}{v} = \frac{1}{f} - \frac{1}{u} \Rightarrow \frac{1}{v} = \frac{1}{f} - \frac{1}{-10}$$

$$\frac{1}{1.0} = \frac{11}{10}$$

$$\text{or, } v = \frac{10}{11} = 0.9 \text{ m}$$

Thus, the car would appear at 0.9 m from the convex mirror. We know that

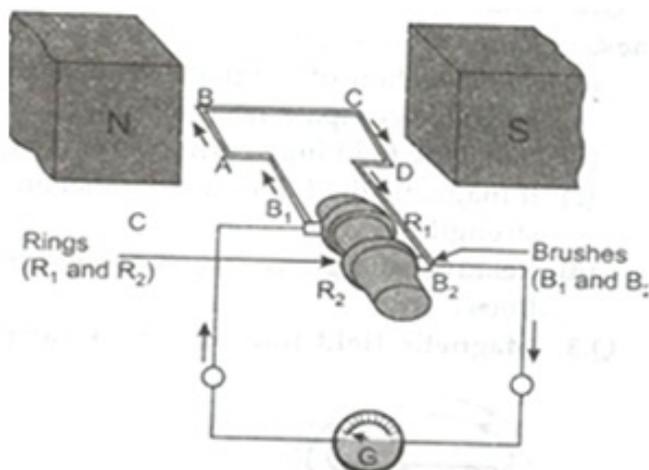
$$m = -\frac{v}{u} = \frac{-10}{-10}$$

Thus, size of the image of the car will be a fraction of $\frac{1}{11}$ the actual size of the car through the convex mirror.

15. Reason for population explosion-

- i. Better medical facilities- Better medical facilities have resulted in fall of death rate.
- ii. Lack of education and awareness- This is a major factor since people become prey to ignorance
- iii. Religion- For some people, family planning is against the norms set by their religion.
- iv. Control over epidemics- Various medical technologies has made it possible to fight against epidemics.
- v. Sanitary conditions- There is a lot of improvement in sanitary conditions which led to increase in population.

16. Electric generator labelled diagram is as follows:



Principle: An electric generator works on the principle of electromagnetic induction.

Working: Let in the beginnings brushes B_1 and B_2 are kept pressed separately on rings R_1 and R_2 respectively. Let the axle attached to the rings is rotated such that

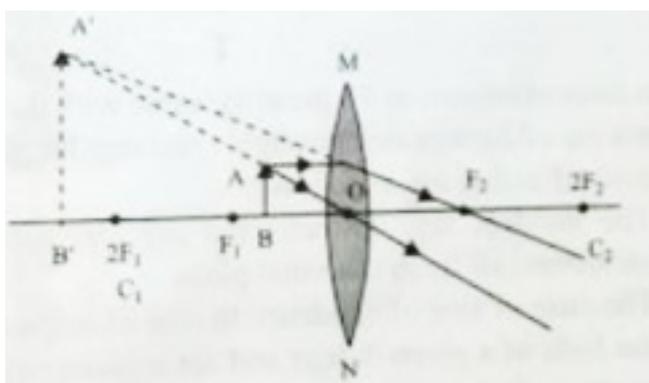
arm AB of the coil moves up and arm CD moves down in the magnetic field. Due to rotation of arms AB and CD induced current are set up in them. As per Fleming's right hand rule, induced current in these arms along the directions AB and CD respectively and current flows into B_1 and B_2 .

After half rotation, arm AB moves downward and arms CD upward to change the direction opposite to first case. Thus, after every half rotation current changes its direction and an alternate current is obtained in the generator.

Brushes are kept pressed on the two slip rings separately. Outer ends of the brushes are connected to the galvanometer. Thus, brushes help in transferring current from the coil ABCD to external circuit.

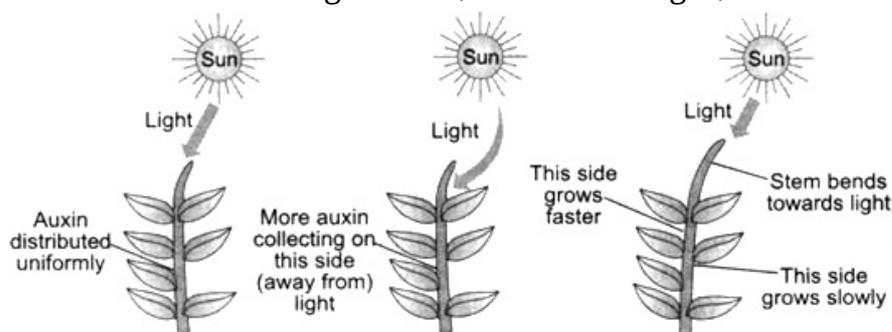
17. (a) Carbon forms a large number of compounds called organic compounds due to the self linking property called **catenation**. Carbon can combine with other carbon atoms and form long chains. The long chain forms the backbone to which other atoms can attach in a number of ways. Tetravalent carbon is capable of bonding with four other atoms of carbon or some other mono-valent element(s). The bond formed by carbon is exceptionally strong due to its small size.
- (b) Compounds which have only $-C-C-$ (single bond) are **saturated compounds** whereas those compounds which have $(-C=C-)$ bonds (double bonds) or $-C\equiv C-$ bonds (triple bonds) are called **unsaturated compounds**.
- (c) **Unsaturated compounds** are more reactive than saturated compounds. E.g. ethene ($H_2C=CH_2$) is more reactive than ethane H_3C-CH_3 .
- (d) (i) CH_3-CH_2- is **Bromoethane**
- (ii) $CH_3-CH_2-CH_2-CH_2-C\equiv CH$ is **Hex-1-yne**

OR



18. The directional movement of a plant part/plant in response to light is called phototropism. The shoot responds by bending towards light while roots respond by bending away from the light. We know that the plant stem responds to light and bends towards it due to the action of auxin hormone. When sunlight comes from above, then the auxin hormone present at the tip of the stem spreads uniformly down the stem. Due to the equal presence of auxin, both the sides of the stem grow straight and with same rapidity. This is because auxin hormone moves away from the light.

Thus, more auxin hormone is present in the left side of stem as compared to the right. The left side of stem, grows faster than its right side and therefore, the stem bends towards the right side (direction of light).



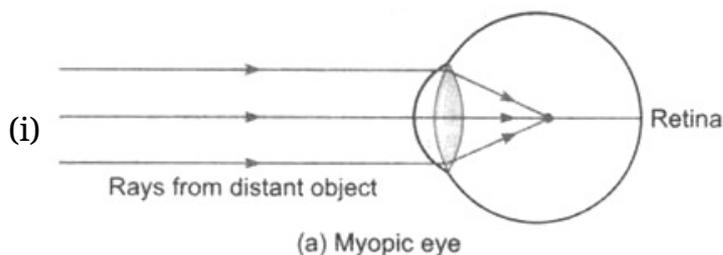
Experiment to show the effect of auxin on the growth of a plant in response to light (Phototropism)

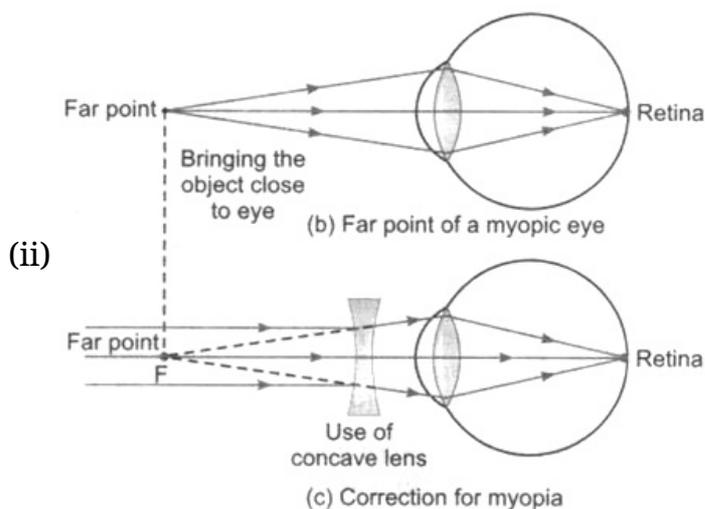
The effect of auxin on the growth of a root is exactly opposite to that on a stem. Auxin hormone increases the rate of growth in stem but it decreases the rate of growth in a root. The side of root away from light will have all the auxin concentrated in it. Due to this, the side of root which is away from light will grow slower than the other side and make the root bends away from light.

19. (a) Myopia is the defect of the eye vision due to which a person can see the near by objects clearly but cannot see the far objects so distinctly.

Causes of myopia: Myopia is caused due to:

- (i) the elongation of the eyeball.
- (ii) decrease in the focal length of the eye lens.



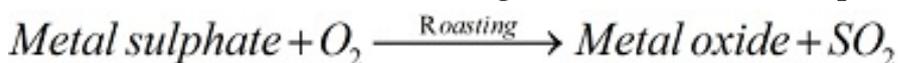


Myopia can be corrected by using a **concave lens** of suitable focal length in the spectacles of such a person.

(b) The ability of the eye lens to adjust its focal length is called power of accommodation. However, the focal length of the eye lens cannot be decreased below a certain limit. The maximum accommodation of a normal eye is reached when the object is at a distance of 25 cm from the eyes. Thus, the normal eye is unable to focus an object placed within 10 cm from the eye because the nearest distance of distinct vision for a normal eye is 25cm.

20. The gas which smells like that of rotten eggs is H_2S . Hence, the ore is a sulphide ore. It is concentrated by froth-floatation process. The metal is obtained from the concentrated ore in the following two steps:

(i) Roasting: Heating the ore strongly in the presence of air. The metal sulphide is converted into metal oxide along with evolution of sulphur dioxide gas.



(ii) Reduction with carbon: On heating the metal oxide with carbon, it is reduced to free metal.

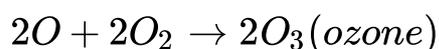


21. Formation of the ozone layer-

(a) During the origin of life Earth, some of underwater photosynthetic micro-organisms released molecular oxygen O_2 in air as a by product of photosynthesis .

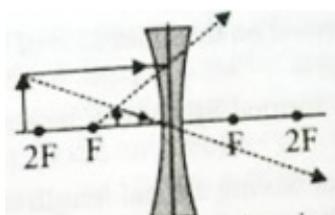
(b) This oxygen is released to stratosphere where it began to react with ultraviolet radiations from sun to form free oxygen (O).

(c) Free oxygen combines with molecular oxygen (O_2) to form (O_3) in presence of U.V. light.



Formation of ozone.

OR



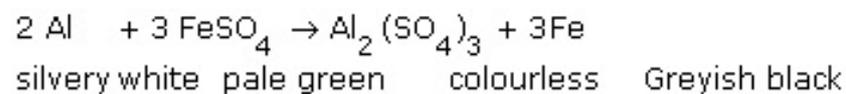
Section B

22. Salt A is sodium hydrogen carbonate (baking soda). When it is heated, it turns into sodium carbonate; which is salt B. In this reaction, carbon dioxide gas is also produced; which is the gas C.

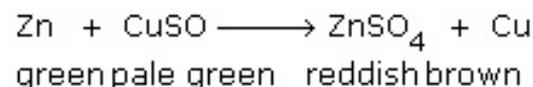


Sodium hydrogen carbonate is used in bakery products. Sodium carbonate is used for removing hardness of water.

23. The solution becomes colourless in I and grayish coloured iron metal gets deposited, in II, blue colour changes to pale green and reddish brown copper metal gets deposited.



Al is more reactive than Fe.

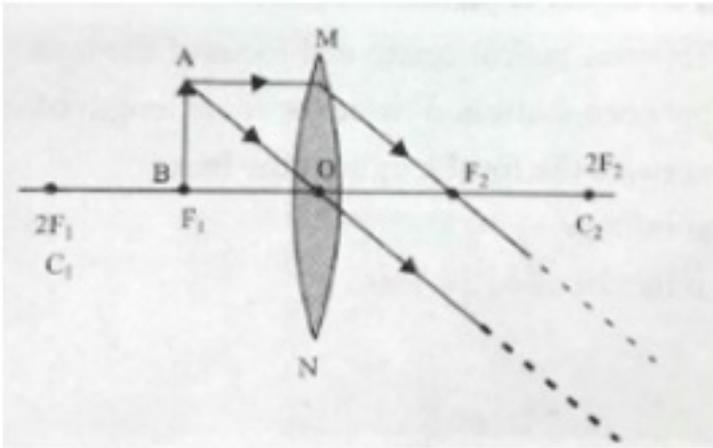


Fe is more reactive than Cu.

24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.

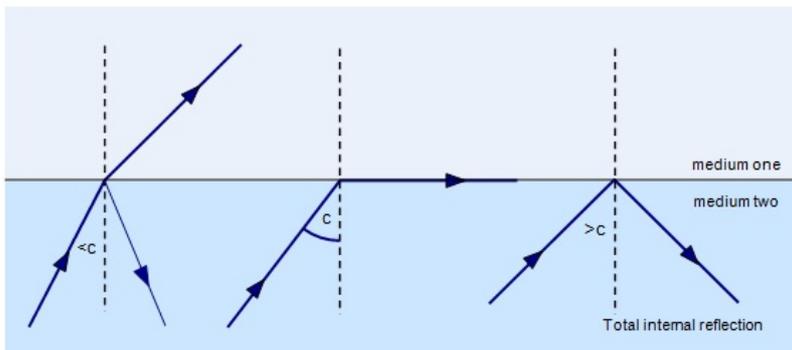
25. Yes, an experiment set-up by using two-head bottle, water reservoir, germinating seed, lime water, beaker and delivery tube.

26.

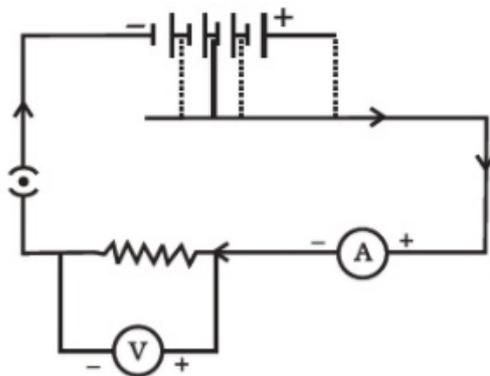


OR

The following figure shows a ray of light incident obliquely. Every medium has a critical angle. When angle of incidence is more than critical angle, the ray of light comes back in the same medium. This phenomenon is called total internal reflection.



27. Correct diagram is as follows:



CBSE Class 10 Science
Sample Paper 02

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. Name the causative organism of AIDS?
2. What do you understand by peristaltic movements?
3. Why do elements in a group show same valency?
4. What is the relationship between the refractive index of two media?
5. What are the advantages of nuclear energy?
6. What is meant by water of crystallisation? Explain that crystalline salts contain water of crystallisation.

OR

Give two important uses of washing soda and baking soda.

7. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
8. How can three resistors of resistance 2Ω , 3Ω and 6Ω be connected to give a total resistance of (i) 4Ω (ii) 1Ω ?
9. Would you place the two isotopes of chlorine, Cl-35 and Cl-37 in different slots because of their different atomic masses or in the same because their chemical properties are the same? Justify your answer.
10. Describe the structure of human kidney.

OR

What is the role of following in human digestive system-

- a) mucus
- b) Bile
- c) Trypsin

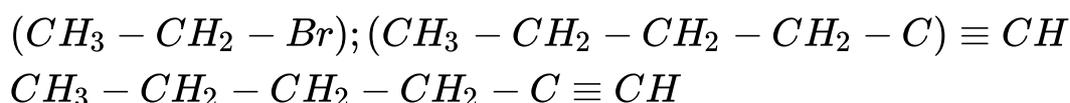
11. Why is variation beneficial to the species but not necessary for the individual?
12. A change in DNA that is useful for one property to start with, can become useful later for a different function. Explain.
13. Balance the following chemical equations:-
 - (i) $2HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$
 - (ii) $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
 $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$
 - (iii) $AgNO_3 + NaCl \rightarrow AgCl + NaNO_3$
 - (iv) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$
 $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$

OR

Few pieces of marble were dropped by a student accidentally in a test tube containing dilute Hydrochloric acid. The gas evolved in this chemical reaction was passed

through lime water. Indicate the change observed in limewater. Write the balanced chemical equations for both the reactions.

14. Find the position, nature and size of the image formed by a convex lens of focal length 12 cm of an object 5 cm high placed at a distance 20 cm from it.
15. What are the major factors responsible for population explosion?
16. Explain the principle, construction and working of an electric motor with a help of labelled diagram?
17. (a) Why does carbon form large number of compounds?
(b) Why are some of these called saturated and others are called unsaturated compounds?
(c) Which of these two is more reactive?
(d) Write the names of the following compounds:



OR

Explain the mechanism of the cleaning action of soaps.

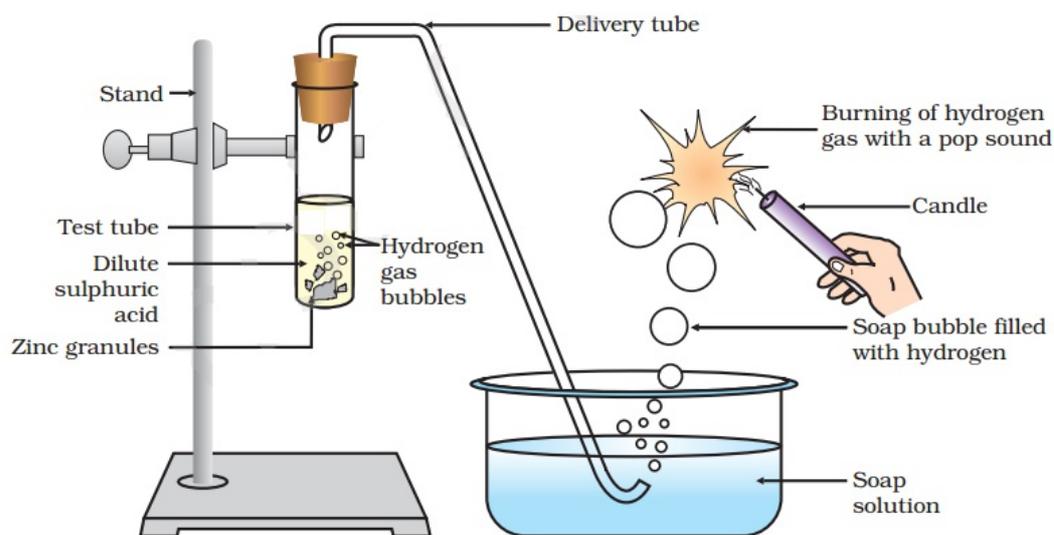
18. How phototropism does occur in plants?
19. A reporter records the following observations of an astronaut from his space ship.
(a) The length of the day is same as observed on the earth.
(b) Sky appears black in colour.
(c) The star appears to twinkle while the planets do not do so as they do on the earth.
Justify each statement
20. (i) Hydrogen is not a metal but it has been assigned a place in the reactivity series of metals. Explain.
(ii) How would you show that silver is chemically less reactive than copper?
21. What is the difference between a food chain and a food web?

OR

Why there should be equitable distribution of our resources? What forces would be working against an equitable distribution of our resources.

Section B

22. In the following schematic diagram for the preparation of hydrogen gas as shown in fig, what would happen if following changes are made?



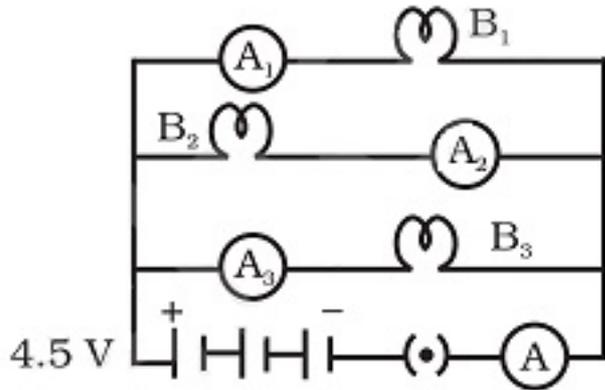
Instead of dilute sulphuric acid, dilute hydrochloric acid is taken.

23. A piece of granulated Zinc was dropped into copper sulphate solution. After some time, the colour of the solution will change. Mention the changes thereon.
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. List the precautions for the experiment "light is necessary for photosynthesis".
26. Draw ray diagram showing the image formation by a convex lens when an object is placed at infinity.

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed at the focus of the lens.

27. B_1 , B_2 and B_3 are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3A is recorded by the ammeter A.

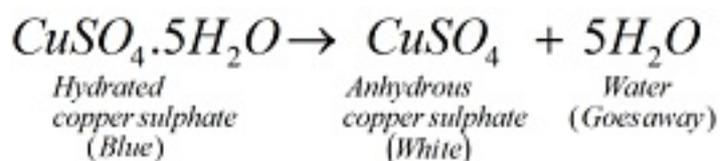


How much power is dissipated in the circuit when all the three bulbs glow together?

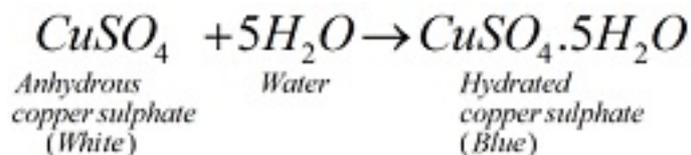
CBSE Class 10 Science
Sample Paper 02
Solution

Section A

1. HIV - Human Immunodeficiency virus.
2. The contraction and expansion of the walls of the oesophagus (food-pipe) which helps to carry the food to stomach is called peristaltic movements.
3. The valency of an element is related to the valence shell electronic configuration of its atom. Since the elements present in a group have the same valence shell electronic configuration. (ie same number of electrons in outer most shell) they show the same valency.
4. The refractive index for the light going from medium ' 1' to medium '2' is n_{21} to the reciprocal of the refractive index for light going from medium '2' to medium '1'.
$$n_{12} = \frac{1}{n_{21}} \quad n_{21} = \frac{1}{n_{12}}$$
5. Advantages of nuclear energy-
 - (i) A small quantity of nuclear fuel provides large amount of energy.
 - (ii) The nuclear fuel once inserted in nuclear power plant gives large amount of energy for a longer period of time.
6. **Water of crystallisation** is a fixed number of water molecules present in one formula unit of a salt which form part of the structure of a crystal (of a salt). The salts which contain water of crystallisation are called hydrated salts. When hydrated salts are heated strongly, they lose their water of crystallisation. The water of crystallisation gives the crystals of the salts their shape and in some cases, imparts them colour.
E.g. One formula unit of copper sulphate pentahydrate contains five molecules of water of crystallisation ($5H_2O$). It is blue in colour. On strong heating, the blue copper sulphate crystals turn white (due to loss of water of crystallisation).



Anhydrous copper sulphate turns blue when water is added.



OR

Uses of washing soda (sodium carbonate) are as follows:-

- (i) Washing soda is used as a cleansing agent for domestic purposes. It can remove dirt and grease from dirty clothes.
- (ii) It is used for removing permanent hardness of water.
- (iii) It is used in glass, soap and paper industries.

Uses of baking soda (sodium hydrogen carbonate) are as follows:-

- (i) It is used for making baking powder which is used for making cakes, breads, etc.
- (ii) It is used as an ingredient of an antacid (for removing acidity in the stomach).

7. Advantages of connecting electrical devices in parallel with the battery are as follows:

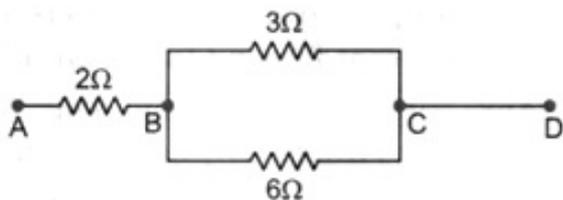
- (i) The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
- (ii) Separate on/off switches can be applied across each device.
- (iii) Total resistance in parallel circuit decreases, hence, a great current may be drawn from the cell.
- (iv) If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.

8. (i) As the total resistance (equivalent resistance) is 4Ω , the 6Ω resistor cannot be in series as in series combination the equivalent resistance is greater than the largest individual resistance. So, it must be in parallel with the other resistors.

In parallel connection, the equivalent resistance (4Ω) has to be less than all the resistances.

So, the resistors of 2Ω and 3Ω cannot be in parallel at one time with 6Ω

So, the resistors have to be in a mixed combination. Let us consider the combination shown in the figure.



The equivalent resistance between B and C (which are in parallel).

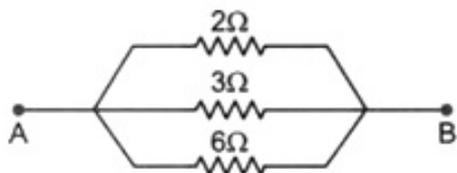
$$= \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega} = \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega}$$

$$= \frac{18\Omega}{9\Omega} = 2\Omega$$

The resistance between A and D = $2\Omega + 2\Omega = 4\Omega$.

So, the combination shown in the figure is true.

(ii) Here, $R_1 = 2\Omega$, $R_2 = 3\Omega$, $R_3 = 6\Omega$, and $R = 1\Omega$



Since the equivalent resistance of the combination is of lesser value than any of the resistors of the combination, it is clear that the resistors should be connected in parallel. It can be further confirmed by using the formula

$$\left(\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \right)$$

$$= \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{6} \right)$$

$$= \left(\frac{3+2+1}{6} = \frac{6}{6} \right)$$

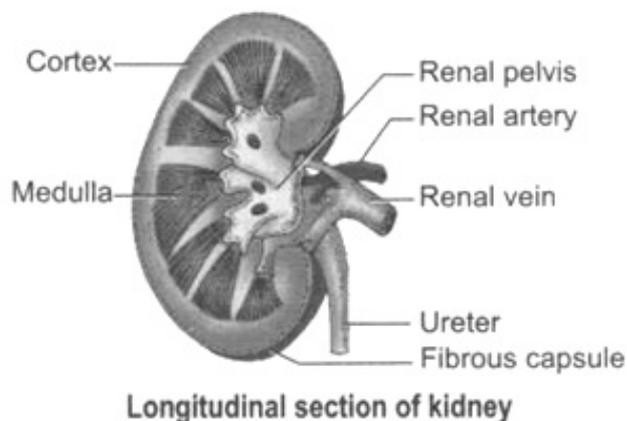
$$= 1 (\Omega)$$

i.e, $R=1(\Omega)$

Therefore, resistors should be connected in parallel.

9. In Mendeleev's Periodic Table the two isotopes of chlorine, Cl-35 and Cl-37 would be placed in different slots because they have different atomic mass . But because of their similar chemical properties which is a more reliable property as it is based on the number of valence electrons, they would be placed in the same slot.
10. Kidneys are bean-shaped and located at the back of abdomen, one on either side of backbone. The kidney is enclosed by a thin layer of fibrous connective tissue called renal capsule. Its inner concave surface has a depression called hilum through which

renal artery enters while the renal vein and ureter leaves the kidney. Kidney has two regions: outer cortex and inner medulla. Each kidney has a large number of filtering units called nephrons.

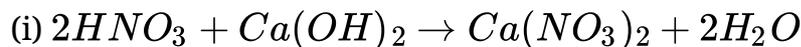


OR

- a) Mucus – It protects the inner lining of stomach from HCl.
 - b) Bile – It makes the acidic food alkaline so that pancreatic enzymes act on it. It also helps in emulsification of fats.
 - c) Trypsin – It is an enzyme which helps in digestion of proteins into amino acids.
11. The importance of variation in organism introduced during reproduction so that it helps the species of various organisms to survive and flourish even in adverse environment. If all the organisms of a population living in that habitat are exactly identical, then there is a danger that all of them may die and no one would survive under those conditions. This will eliminate the species from the habitat completely. However, if some variations are present in some individual organism to tolerate excessive heat or cold, then there is a chance for them to survive and flourish even in adverse excessive heat or cold. Thus, variation is useful for the survival of a species over time.
12. A change/feature/property of an organism that may have helped it to adapt to an environmental condition can also become useful for a completely different function in the future. For example: feathers in birds, a character developed and selected during natural selection because it provided insulation in cold weather have become useful in later stages for flight.
- Some dinosaurs had feathers, but they could not fly. Birds later adapted the feathers

to flight.

13. Balanced chemical equation are:

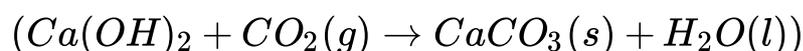


OR

When Calcium carbonate commonly known as marble reacts with dil. HCl, CO_2 gas is evolved.



When CO_2 gas is passed through lime water ($Ca(OH)_2$), a milky white precipitate of Calcium Carbonate ($CaCO_3$) is formed.



14. $f = 12 \text{ cm}$

$$h = 5 \text{ cm}$$

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

$$\left(\frac{1}{f} = \frac{1}{v} - \frac{1}{u}\right)$$

$$\left(\frac{1}{12} = -\left(\frac{1}{-20}\right) + \frac{1}{u}\right)$$

$$\left(\frac{1}{v} = \frac{1}{20} - \frac{1}{12}\right)$$

$$\left(\frac{1}{v} = -\frac{12+20}{240} = \frac{08}{240}\right)$$

$$(v = \frac{240}{8} = 30 \text{ cm}).$$

The positive sign of v shows that the image formed on the other side of the optical centre of the lens.

$$(m = \frac{v}{u} = \frac{30}{-20} = -1.5)$$

m is negative so the image is real and inverted hence it is formed below principal axis.

$$\frac{h_1}{h} = \frac{v}{u}$$

$$\frac{h_1}{5} = -1.5$$

$$(h_1 = -1.5 \times 5)$$

$(h_1 = -7.5\text{cm})$. The image is enlarged,

15. Reason for population explosion-

(i) Better medical facilities- Better medical facilities have resulted in fall of death rate.

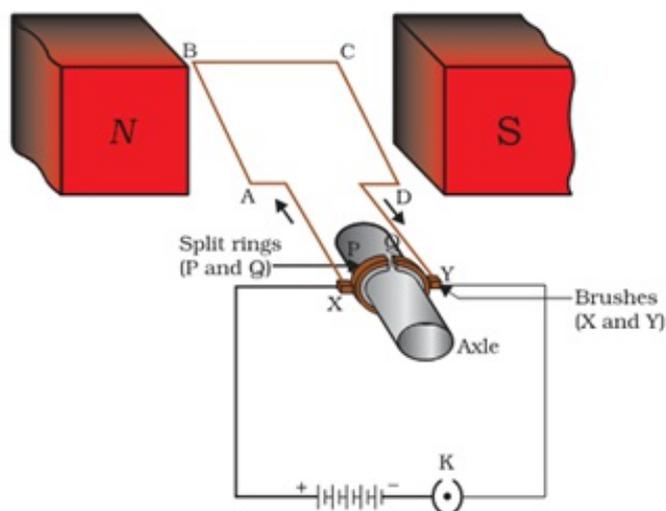
(ii) Lack of education and awareness- This is a major factor since people become prey to ignorance

(iii) Religion- For some people, family planning is against the norms set by their religion.

(iv) Control over epidemics- Various medical technologies has made it possible to fight against epidemics.

(v) Sanitary conditions- There is a lot of improvement in sanitary conditions which led to increase in population.

16. **Principle:** It is based on the principal that a current carrying conductor placed perpendicular to the magnetic field experiences a force.



Construction-

(1) Armature or coil- It consist of an insulated copper wire wound on a soft iron core.

(2) Strong field magnet- two pole pieces of a strong magnet provides a strong magnetic field.

(3) Split ring- it consist of two halves (P and Q) of a metallic ring which reverses the direction of the current in a coil.

(4) Brushes- two carbon brushes touch the commutator (split ring).

(5) Battery – a battery is connected across the carbon brushes.

Working: When current flow through coil, arm AB and CD experience magnetic force. According to Fleming's Left hand rule, arm AB of coil experiences force in downward direction and arm CD experiences force in upward direction. Both these forces are equal and opposite. Two equal and opposite forces acting at different position of armature constitute a couple. The couple rotate the coil in clockwise direction until the coil is in vertical position. At this position, the contact of commutator and brushes break. Supply of current to coil is cut off. Hence no force acts on arms of coil. But coil goes on rotating due to inertia of motion of coil until commutator again comes in contact with brushes. When commutators comes in contact with brushes after rotation, direction of current in arm AB and CD is reversed. The force acting on arm AB is in downward direction and force acting on arm CD is in upward direction. These 2 equal and opposite forces constitute a couple. this couple rotate coil again in clockwise direction. The coil of d.c. motor continues to rotate in same direction. Hence electrical energy is converted into mechanical energy.

17. (a) Carbon forms a large number of compounds called organic compounds due to the self linking property called **catenation**. Carbon can combine with other carbon atoms and form long chains. The long chain forms the backbone to which other atoms can attach in a number of ways. Tetravalent carbon is capable of bonding with four other atoms of carbon or some other mono-valent element(s). The bond formed by carbon is exceptionally strong due to its small size.

(b) Compounds which have only $-C-C-$ single bond) are **saturated compounds** whereas those compounds which have $-C=C-$ bonds (double bonds) or $-C\equiv C-$ bonds (triple bonds) are called **unsaturated compounds**.

(c) **Unsaturated compounds** are more reactive than saturated compounds. E.g. ethene ($H_2C=CH_2$) is more reactive than ethane (H_3C-CH_3).

(d) (i) CH_3-CH_2-Br is **Bromoethane**

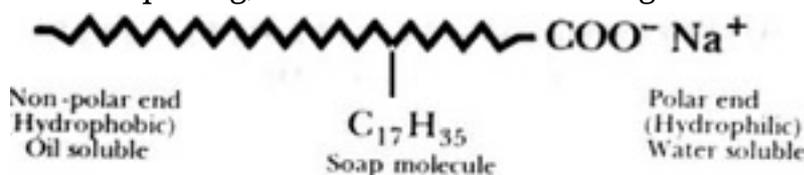
(ii) $CH_3-CH_2-CH_2-CH_2-C\equiv CH$ is **Hex-1-yne**

OR

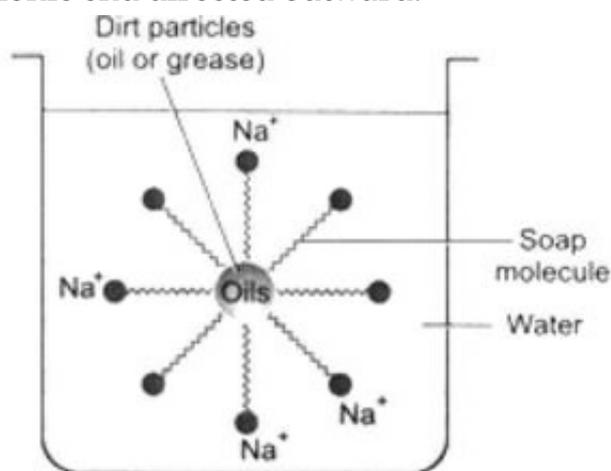
The action of soap is based on the presence of both hydrophilic and hydrophobic groups in a soap molecule. A soap molecule consists of two parts:

(i) A short ionic part comprising the carboxylate salt, -COONa^+ . This is the polar end. This is water soluble (i.e. hydrophilic or water-attracting) and, therefore, remains attached to water.

(ii) A long hydrocarbon chain which is the non-polar end. This end is hydrophobic (i.e. water-repelling) and is soluble in oil and grease.



Micelle formation: The soap molecule may be represented as a structure as shown in the figure. When soap is dissolved in water, it forms a colloidal suspension. In this colloidal suspension, the soap molecules adhere together to form micelles and remain radially suspended in water with the hydrocarbon end towards the centre and the ionic end directed outward.

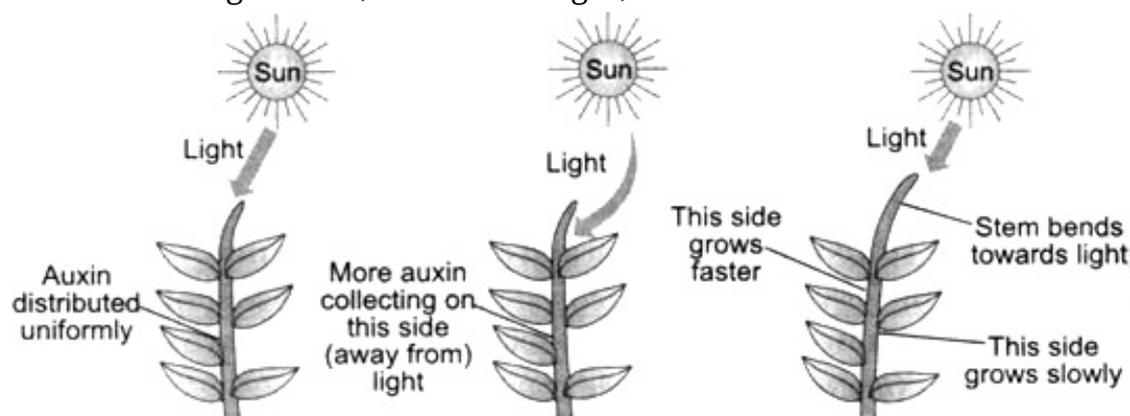


The dirt particles always adhere to the oily or greasy layer present on the skin or clothes. When a dirty cloth is dipped into a soap solution, its non-polar hydrocarbon end of micelles attach to the grease or oil present in dirt and polar end remains in water layer. The subsequent mechanical action of rubbing (agitation), dislodges the oily layer from the dirty surface shaping it into small globules. A stable emulsion of oil in water is formed. The emulsified oil or grease globules bearing the dirt can be washed away with water.

18. The directional movement of a plant part/plant in response to light is called phototropism. The shoot responds by bending towards light while roots respond by

bending away from the light. We know that the plant stem responds to light and bends towards it due to the action of auxin hormone. When sunlight comes from above, then the auxin hormone present at the tip of the stem spreads uniformly down the stem. Due to the equal presence of auxin, both the sides of the stem grow straight and with same rapidity. This is because auxin hormone moves away from the light.

Thus, more auxin hormone is present in the left side of stem as compared to the right. The left side of stem, grows faster than its right side and therefore, the stem bends towards the right side (direction of light).



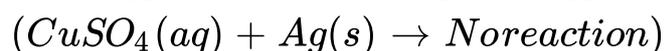
Experiment to show the effect of auxin on the growth of a plant in response to light (Phototropism)

The effect of auxin on the growth of a root is exactly opposite to that on a stem. Auxin hormone increases the rate of growth in stem but it decreases the rate of growth in a root. The side of root away from light will have all the auxin concentrated in it. Due to this, the side of root which is away from light will grow slower than the other side and make the root bends away from light.

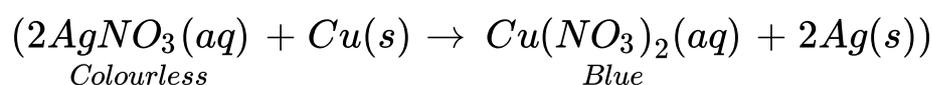
19. (a) It is incorrect as length of the day in space would be about four minutes shorter than that on the earth.
(b) It is correct because in space we cannot observe scattering of light because of absence of atmosphere.
(c) It is incorrect because twinkling of stars is due to atmospheric refraction but in space we do not have atmosphere and atmospheric particles.
20. (i) Though hydrogen is not a metal but even then it has been assigned a place in the activity series. The reason is that like metals, hydrogen also has a tendency to lose electron and forms a positive ion H^+

The metals which lose electrons less readily than hydrogen are placed below it and the metals which lose electrons more readily than hydrogen are placed above it in the reactivity series of metals.

(ii) By displacement reaction silver can be shown to be chemically less reactive than copper or copper is more reactive than silver. If a piece of silver is immersed in a solution of copper sulphate, no reaction will take place because silver is less reactive than copper and will not displace copper from the copper sulphate solution.



On the other hand, if a copper plate is placed in a solution of silver nitrate, copper will slowly displace silver from the solution and blue solution of copper nitrate is formed.



This shows that copper is more reactive than silver.

21.

Food chain	Food web
It is the sequence of eating and being eaten among the living organisms to transfer food energy.	It is a system of interconnected food chains. The network of food chain develops a relationship between various organisms.
It generally has 4-5 population of different species.	It has numerous population of different species.
It is a part of food web.	It contains many food chains.

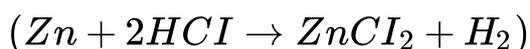
OR

There should be equitable distribution of resources because nature never discriminate any community. It equally benefits to all kinds whether they are poor or rich. It is everyone's right to consume them. Some forces which are working against equitable distribution such as lack of resources, excessive consumption and exploitation by rich.

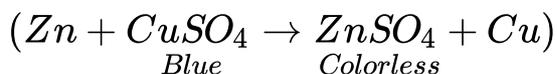
Section B

22. If dilute hydrochloric acid is used; instead of dilute sulphuric acid zinc chloride is

formed.



23. The solution will change into colorless from blue color due to following reaction.

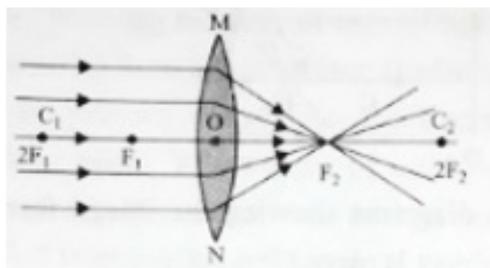


Copper sulphate is of blue color whereas Zinc sulphate is colorless.

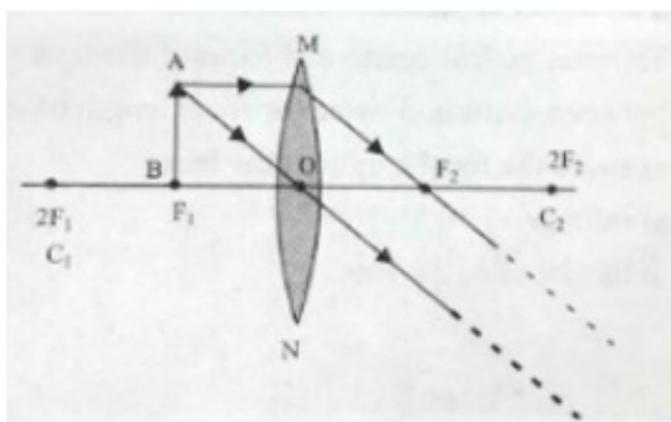
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.

25. 1. Before starting the experiment, the leaf must be distracted.
2. The leaf must be covered with black paper properly to prevent the entry of light.
3. Boiling the leaf in alcohol should be done in the water bath.

26.



OR



27. For finding power, we need to first calculate the resistance in the circuit.

$$(R = \frac{V}{I} = \frac{4.5V}{3A} = 1.5\Omega)$$

$$\text{Now, } (P = I^2R = (3A)^2 \times 1.5\Omega = 13.5W)$$

CBSE Class 10 Science
Sample Paper 03

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. What is menopause?
2. Why do the walls of trachea not collapse when there is less air in it?
3. (a) What property do all elements in the same column of the Periodic Table as boron have in common?
(b) What property do all elements in the same column of the Periodic Table as Fluorine have common?
4. Find the power of a concave lens of focal length 2m?

5. What kind of mirror -concave or convex or plain-would be best suited for use in a solar cooker? Why?
6. State the chemical property in each case on which the following uses of baking soda are based
- (i) As an antacid
 - (ii) As a constituent of baking powder.
- Give the chemical for baking soda

OR

To the three solutions listed below, a few drops of phenolphthalein and blue litmus were added separately. Specify the colour change in each case, if any:

	Name of the solution	Colour change with phenolphthalein	Colour change with blue litmus
(a)	Sodium carbonate		
(b)	Hydrochloric acid		
(c)	Sodium chloride		

7. How can three resistors of resistance 2Ω , 3Ω and 6Ω be connected to give a total resistance of (i) 4Ω , (ii) 1Ω ?
8. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
9. Atomic number is considered to be a more appropriate parameter than atomic mass for classification of elements in a periodic table. Why?
- How does metallic character of elements vary on moving from
- (i) left to right in a period?
 - (ii) from top to bottom in a group?
- Give reasons for your answers.

10. With regard to obtaining oxygen for respiration a terrestrial organism has advantages over an aquatic organism. Give reasons to support this statement.

OR

Leaves of a healthy potted plant were coated with vaseline to block the stomata. Will this plant remain healthy for long? State three reasons for your answer.

11. Evolution has exhibited a greater stability of molecular structure when compared with morphological structures. Comment on the statement and justify your opinion.
12. A study found that children with light-coloured eyes are likely to have parents with light-coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not?
13. Write the balanced chemical equations for the following reactions:
- (i) Calcium hydroxide + Carbon dioxide \rightarrow Calcium carbonate + Water
 - (ii) Zinc + Silver nitrate \rightarrow Zinc nitrate + Silver
 - (iii) Aluminum + Copper chloride \rightarrow Aluminium chloride + Copper
 - (iv) Barium chloride + Potassium sulphate \rightarrow Barium sulphate + potassium chloride
 - (v) Lead acetate + Dil. Hydrochloric acid \rightarrow Lead chloride + Acetic acid

OR

Balance the following chemical equations.

- (i) $HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + H_2O$
- (ii) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
- (iii) $BaCl_2 + H_2SO_4 \rightarrow BaSO_4 + HCl$

14. An object of size 7.0 cm is placed at 27 cm in front of a concave mirror of focal length 18 cm. At what distance from the mirror should a screen be placed, so that a sharp focused image can be obtained? Find the size and the nature of the image.
15. Define the terms unisexual and bisexual giving one example of each.
16. Draw a labelled diagram of an electric motor. Explain its principle and working. What is the function of split ring in an electric motor?

17. (a) Name the gas evolved during fermentation process.
(b) What role is played by yeast in the conversion of cane sugar ($C_{12}H_{22}O_{11}$) to ethanol?
(c) How can the following be obtained from pure ethanol? Express chemical reactions by the chemical equations.
1. Sodium ethoxide
 2. Ethyl ethanoate
 3. Ethanal
18. Draw the structure of a neuron and explain its function.
19. How does atmospheric refraction affect sunrise and sunset?
20. An ore on treatment with dilute hydrochloric acid gives a smell like that of rotten eggs. What type of ore is this? How can it be concentrated? How can the metal be obtained from the concentrated ore?
21. What are the factors to check the quality of water?

OR

Describe how ozone layer is formed.

Section B

22. What will be the action of the following substance in litmus paper?
Curd, Soap solution.
23. Zinc liberates hydrogen gas when reacted with dilute hydrochloric acid, whereas copper does not. Explain why?
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. A portion of destarched leaf of a potted plant was covered with a black strip of paper.

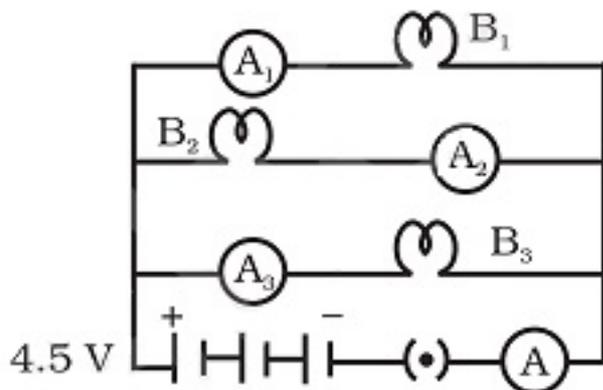
The plant was exposed to sunlight for six hours and then tested for starch. What will be the observation?

26. A pencil when dipped in water in a glass tumbler appears to be bent at the interface of air and water. Will the pencil to be bent to the same extent, if instead of water we use liquids like, kerosene or turpentine? Support your answer with reasons.

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed between optical centre and focus of the lens.

27. B_1 , B_2 and B_3 are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3A is recorded by the ammeter A.



- (i) What happens to the reading of A_1 , A_2 , A_3 and A when the bulb B_2 gets fused?

CBSE Class 10 Science
Sample Paper 03
Solution

Section A

1. The period of permanent cessation of menstruation in females, usually occurring between the age of 45 and 50.
2. The walls of trachea walls do not collapse even when there is less air in it because it is supported by rings of cartilage.
3. (a) All the elements in the same column as boron have three electrons in the valence shell. That is all the elements are trivalent.

They need to lose these 3 electrons to attain stable configuration .

(b) All the elements in the same column as fluorine has one electron in the valence shell. They need to gain one more electron to attain stable configuration , which is why all the elements, in this group are monovalent.

4. $f=2\text{cm}$

$$P = \frac{1}{f}$$

$$P = \frac{1}{2} = 0.5\text{Dioptre}$$

5. Large size concave mirrors are best suited for use in solar cooker, because they focus large amount of solar radiation on a small surface area so that temperature will rise quickly and a lot of energy can be created
6. (i) It is weakly alkaline in nature and neutralizes acid formed in the stomach.
 $\text{NaHCO}_3 + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$ (ii) It evolves in the form of bubbles when cake is made by baking. As a result, the cake becomes porous as well as fluffy.
 $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$
The chemical formula of baking soda is NaHCO_3

OR

	Name of the solution	Colour change with phenolphthalein	Colour change with blue litmus
(a)	Sodium carbonate (Na ₂ CO ₃)	Turns pink	No change
(b)	Hydrochloric acid (HCl)	No change	Turns red
(c)	Sodium chloride (NaCl)	No change	No change

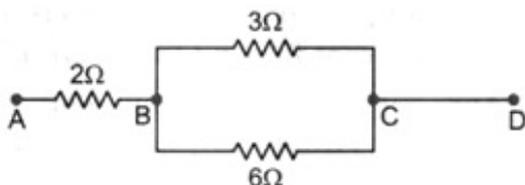
Sodium carbonate is basic in nature. Hydrochloric acid is acidic in nature. Sodium chloride is neutral and has no effect on the indicators.

7. (i) As the total resistance (equivalent resistance) is 4Ω , the 6Ω resistor cannot be in series as in series combination the equivalent resistance is greater than the largest individual resistance. So, it must be in parallel with the other resistors.

In parallel connection, the equivalent resistance (4Ω) has to be less than all the resistances.

So, the resistors of 2Ω and 3Ω cannot be in parallel at one time with 6Ω

So, the resistors have to be in a mixed combination. Let us consider the combination shown in the figure.



The equivalent resistance between B and C (which are in parallel).

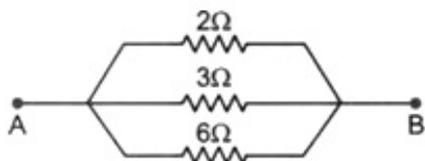
$$= \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega}$$

$$= \frac{18\Omega}{9\Omega} = 2\Omega$$

The resistance between A and D = $2\Omega + 2\Omega = 4\Omega$

So, the combination shown in the figure is true.

- (ii) Here, $R_1 = 2\Omega$, $R_2 = 3\Omega$, $R_3 = 6\Omega$, and $R = 1\Omega$



Since the equivalent resistance of the combination is of lesser value than any of the resistors of the combination, it is clear that the resistors should be connected in parallel. It can be further confirmed by using the formula

$$\begin{aligned}\frac{1}{R} &= \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \\ &= \frac{1}{2} + \frac{1}{3} + \frac{1}{6} \\ &= \frac{3+2+1}{6} = \frac{6}{6} \\ &= 1\Omega\end{aligned}$$

i.e, $R=1\Omega$

Therefore, resistors should be connected in parallel.

8. Advantages of connecting electrical devices in parallel with the battery are as follows:
- (i) The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
 - (ii) Separate on/off switches can be applied across each device.
 - (iii) Total resistance in parallel circuit decreases, hence, a great current may be drawn from the cell.
 - (iv) If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.
9. The properties of elements depend upon valence electrons in the atom which in turn depends on the total number of electrons, i.e., atomic number. Therefore, atomic number is a more appropriate parameter than atomic mass for classification of elements.
- (i) On moving from left to right in a period, the metallic character decreases. This is due to an increase in nuclear charge which tends to pull the electrons closer to the nucleus and reduces the size of the atom.
 - (ii) On moving from top to bottom in a group, metallic character increases. This is because new shells are being added as we go down the group. This increases the distance between the valence shell and the nucleus.
10. Terrestrial organisms take up oxygen from the atmosphere whereas aquatic animals obtain oxygen from water. Air contains more O_2 as compared to dissolved oxygen present in water. Since the content of O_2 in air is high, the terrestrial animals do not

have to breathe faster to get more oxygen. Also, other features like increased respiratory surface area, mechanism for moving the air in and out of respiratory surface where the oxygen is absorbed give the terrestrial animals an advantage over aquatic animals for gaseous exchange.

OR

If waxy coating is made on the surface of leaf, loss of water in the form of water vapour does not take place. Even the gaseous exchange will not take place. So, photosynthesis will either be reduced or will not take place.

The plant will not remain healthy for long because:

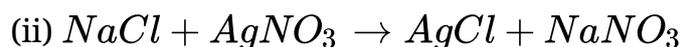
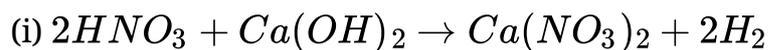
(a) Exchange of gases will not take place.

(b) Photosynthesis will either be reduced or will not take place due to lack of CO_2 .

(c) Transpiration will not take place, so there will be no mechanism for cooling in hot weather.

11. We see immense diversity in size, form, structure and morphological features in the living world. But at the molecular level these diverse types of organisms exhibit unbelievable similarity. For instance, the basic biomolecules like DNA, RNA, carbohydrates, proteins, etc., exhibit remarkable similarity in all organisms.
12. No, since two copies of traits are inherited from parents, one from mother and the other from father. Unless we know the nature of these two variants of traits we cannot tell which is dominant and which is recessive. Recessive traits appear when both the parents contribute recessive allele. From this statement we can only presume are that both parents are contributing recessive allele.
13. Balanced chemical equation for reactions are:
- (i) $\text{Ca}(\text{OH})_2 + \text{CO}_2 \rightarrow \text{CaCO}_3 + \text{H}_2\text{O}$ Already balanced equation
- (ii) $\text{Zn} + 2\text{AgNO}_3 \rightarrow \text{Zn}(\text{NO}_3)_2 + 2\text{Ag}$
- (iii) $2\text{Al} + 3\text{CuCl}_2 \rightarrow 2\text{AlCl}_3 + 3\text{Cu}$
- (iv) $\text{BaCl}_2 + \text{K}_2\text{SO}_4 \rightarrow \text{BaSO}_4 + 2\text{KCl}$
- (v) $\text{Pb}(\text{CH}_3\text{COO})_2 + 2\text{HCl} \rightarrow \text{PbCl}_2 + 2\text{CH}_3\text{COOH}$

OR



14. $u = -27$ cm, $f = -18$ cm. $h_o = 7.0$ cm

$$1/v = 1/f - 1/u$$

$$1/v = -1/18 + 1/27 = -1/54$$

$$v = -54$$
 cm

Screen must be placed at a distance of 54 cm from the mirror in front of it.

$$h_i/h_o = v/u$$

$$h_i/7 = +54/-27$$

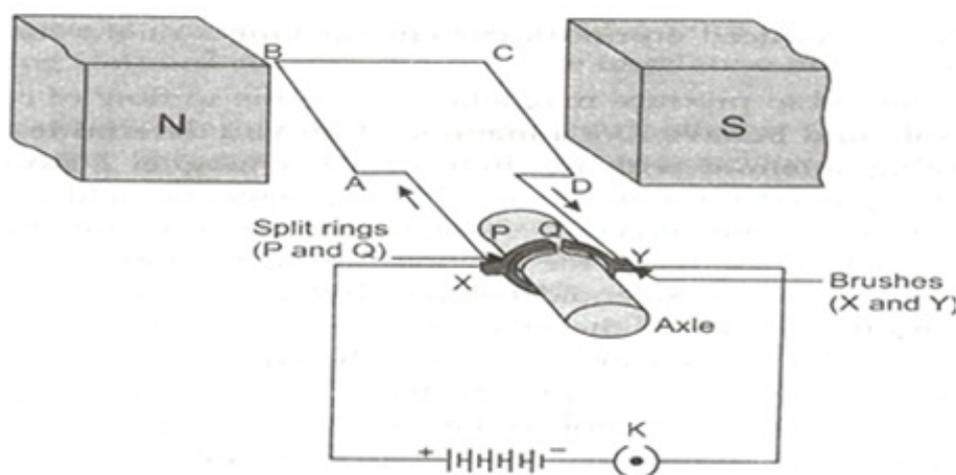
$$h_i = -2 \times 7 = -14$$
 cm.

Thus, the image is of 14 cm length and is inverted image.

15. Unisexual: In most of the animals including humans, male and female reproductive organs are in different individuals. Such animals are called unisexual.

Bisexual: In some animals like tapeworm, liver fluke, earthworm, leech, etc., the male and female reproductive organs are found in a single individual. Such organisms are called bisexual (hermaphrodite). The flower may be unisexual {e.g., papaya, watermelon) when it contains either stamens or carpels and bisexual {e.g., Hibiscus, mustard) when it contains both stamens and carpels.

16. Electric motor labelled diagram of an electric motor is as follows:



Principle: A current-carrying conductor, when placed in a magnetic field, experiences a force. If the direction of magnetic field and that of current are mutually perpendicular, then force acting on the conductor will be perpendicular to both and

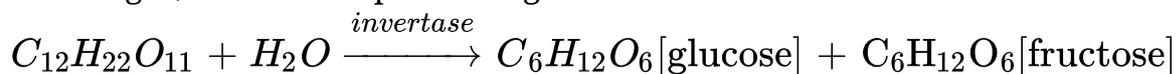
will be the given by Fleming's left-hand rule. Due to this force the conductor begins to move, if it is free to rotate.

Working: Let the current in the coil ABCD of motor enters from the source battery through the conducting brush X, flow along ABCD and finally flows back to the battery through brush Y. On applying Fleming's left-hand rule we find that force acting on arm AB due to magnetic field pushes it downwards. But the force acting on arm CD pushes it upwards. Thus, the coil and the axle rotate anticlockwise. Due to action of split rings P and Q change their contacts with brushes. Now, P makes contact with Y and Q with X. As a result, Current begins to flow in coil along DCBA. The arms are pushed in opposite direction and coil continues to rotate in same direction.

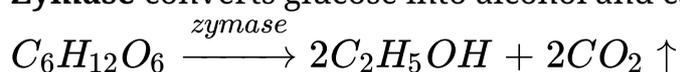
17. (a) The gas that is evolved is evolved during the fermentation process is carbon dioxide (CO₂). It is accompanied by brisk effervescence.

(b) Yeast is the source of enzymes - invertase and zymase. These enzymes are needed for fermentation of cane sugar (C₁₂H₂₂O₁₁) to ethanol.

Invertase helps in breaking sucrose (a naturally occurring carbohydrate present in cane sugar) into its components - glucose and fructose.

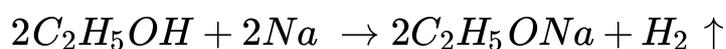


Zymase converts glucose into alcohol and carbon dioxide.

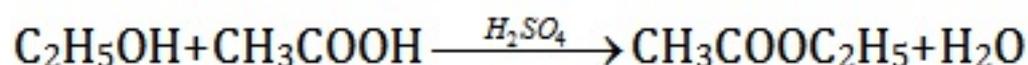


(c) The required chemical reactions for pure ethanol are as follows:-

(i) **Sodium ethoxide** (C₂H₅ONa) can be obtained from pure ethanol when it is made to react with sodium. Sodium displaces hydrogen from ethanol.



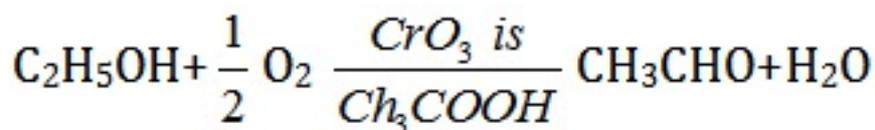
(ii) **Ethyl ethanoate** can be obtained from pure ethanol by warming ethanol with ethanoic acid in the presence of conc. sulphuric acid. This is esterification reaction.



(Ethyl ethanoate)

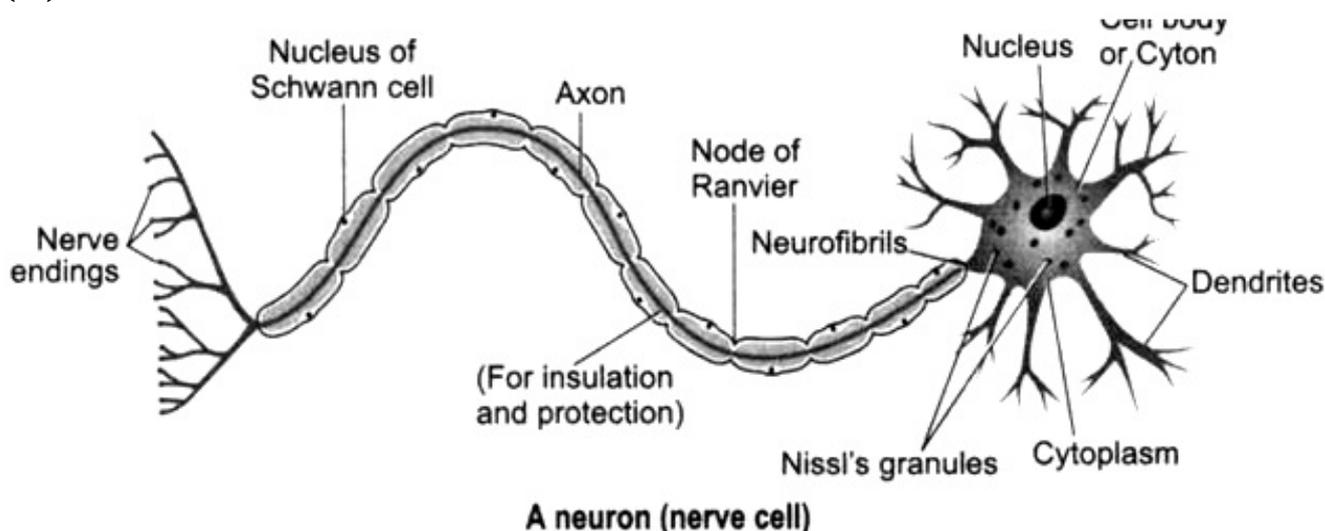
(iii) **Ethanal** can be obtained by performing the partial oxidation of pure ethanol in the absence of water. A chromium based reagent such as chromium trioxide can be

used.



18. Neuron or nerve cell is a structural and functional unit of the nervous system that is specialised to receive, conduct and transmit nerve impulses. A neuron (nerve cell) has three components:

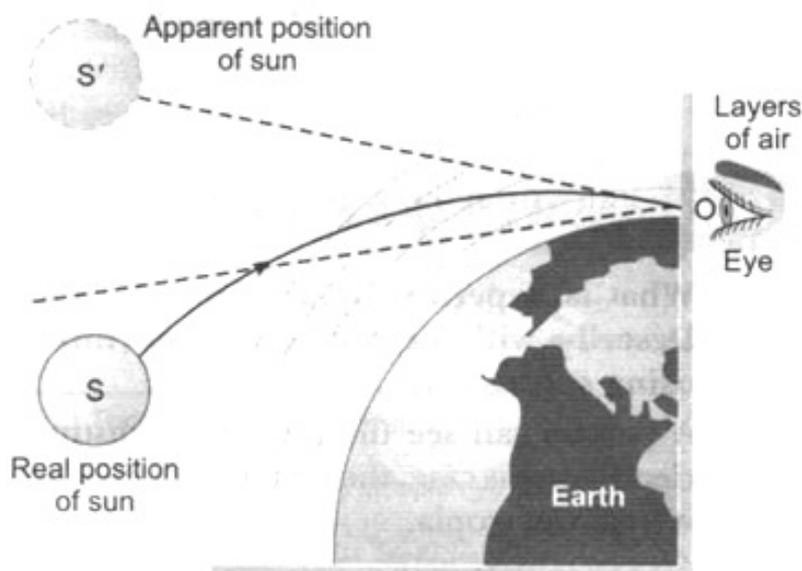
- (i) Cell body (cyton)
- (ii) Dendrites
- (iii) Axon



Functions: The information acquired at the end of the dendritic tip of a neuron sets off a chemical reaction which creates an electrical impulse. This impulse travels from the dendrite to the cyton along the axon of its end. At the end of axon, the electrical impulse sets off the release of some chemicals, which cross the synapse and start a similar electrical impulse in a dendrite of the next neuron. In this way nerve impulses travel in the body, from one neuron to another till it reaches the brain or the target organ. Thus, a nervous tissue is made up of an organised network of nerve cells or neurons which are specialised in conducting information via electrical impulse from one part of the body to another.

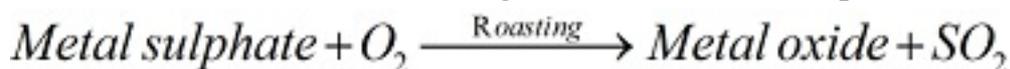
19. The layers of air nearer to earth are denser than those above it. At sunrise and sunset when the sun is below the horizon, the light rays starting from sun are falls on these layers. They pass through successively denser layers and thus get bent more and more towards the normal until they fall upon the eye of the observer O.

To the observer O these rays appear to come from S' which is above horizon. It is for this reason that the sun is visible to us a little before it rises above the horizon and so also can be seen for more time as it sets below the horizon. The difference of time is about two minutes each for early rise and late setting of the Sun.

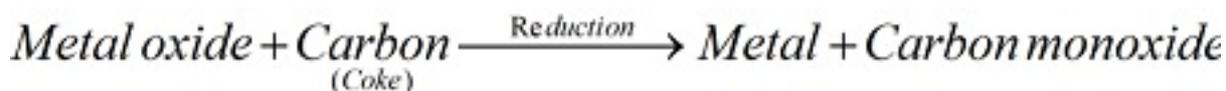


20. The gas which smells like that of rotten eggs is H_2S . Hence, the ore is a sulphide ore. It is concentrated by froth-floatation process. The metal is obtained from the concentrated ore in the following two steps:

(i) Roasting: Heating the ore strongly in the presence of air. The metal sulphide is converted into metal oxide along with evolution of sulphur dioxide gas.



(ii) Reduction with carbon: On heating the metal oxide with carbon, it is reduced to free metal.



21. To check the quality of water certain measurable factors are always followed-

1. Total coliform count- i.e., MPN of coliform bacteria/100ml of water. In human intestines, a group of bacteria called coliform are found.
2. pH of water- If water is highly acidic or basic, it is said to be polluted.
3. TDS count: Total dissolved solvents
4. BOD (Biochemical Oxygen Demand) : It is the amount of dissolved oxygen that is required by aerobic micro-organisms.

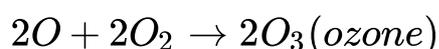
OR

Formation of the ozone layer-

(a) During the origin of life Earth, some of underwater photosynthetic micro-organisms released molecular oxygen O_2 in air as a by product of photosynthesis .

(b) This oxygen is released to stratosphere where it began to react with ultraviolet radiations from sun to form free oxygen (O).

(c) Free oxygen combines with molecular oxygen O_2 to form O_3 in presence of U.V. light.



Formation of ozone.

Section B

22.

Substance	Blue Litmus paper	Red litmus paper
Curd	Turns red	None
Soap solution	None	Turns blue

23. Zinc is more reactive than copper. Due to this, zinc readily reacts with dilute hydrochloric acid but copper does not react with hydrochloric acid.

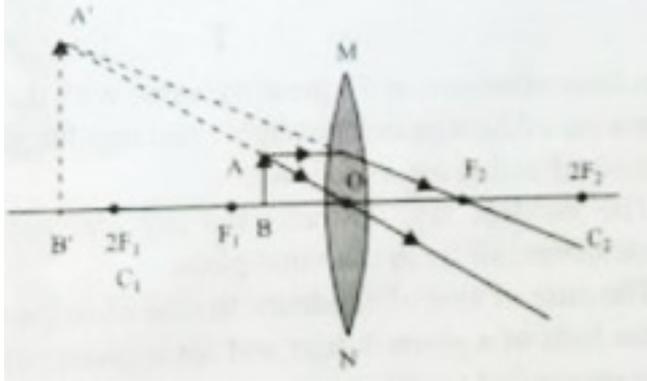
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.

25. The leaf turns blue-black except in the covered region. As this covered region did not receive light, photosynthesis did not occur. Hence no starch was formed there. The uncovered region received light and starch was formed there due to photosynthesis.

26. We know that pencil appears to be bent at the interface of air and water because of refraction of light. The degree of refraction depends on refractive index of a given liquid. Refraction indices of kerosene, water and other liquids would be different.

Hence, degree of bend would be different in case of different liquids.

OR



27. Ammeter A shows a reading of 3A. This means each of the A₁, A₂ and A₃ show 1A reading. When the bulb B₂ get fused, no current flows through this bulb. So, all the current is equally divided between remaining two bulbs. So, ammeter A₁ and A₂ will show $3/2 = 1.5$ A current each. Ammeter A₃ will show zero current.

CBSE Class 10 Science
Sample Paper-04

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. What is hymen?
2. Name the excretory organ in amoeba and earthworm.
3. How does the metallic character change along the period?
4. A concave mirror produces three times magnified (enlarged) real image of an object placed at 10 cm in front of it. Where is the image located?
5. Why is biogas a better fuel than animal dung cakes?
6. With the help of a chemical equation, explain how a soda-acid fire extinguisher helps

in putting out a fire.

OR

Bleaching powder forms a milky solution in water. Explain.

7. The length of different metallic wires, but of the same area of cross-section and made of the same material are given below:

Wire - Length

A -1 m

B -1.5 m

C -2.0 m

(i) Out of these three wires, which wire has higher resistance?

(ii) Which wire has higher electrical resistivity? Justify your answer.

8. What is electrical resistivity? In a series electrical circuit comprising of a resistor made up of a metallic wire, the ammeter reads 5 A. The reading of the ammeter decreases to half when the length of the wire is doubled. Why?
9. What do you understand by the term periodicity? Does the periodicity in properties is a function of valence electrons? Illustrate.
10. Describe double circulation in human beings. Why is it necessary?

OR

How does respiration occur in the roots of the plant?

11. What is phenotypic ratio obtained by Mendel by monohybrid cross? Answer with the help of diagram.
12. Outline a project which aims to find the dominant coat colour in dogs.
13. Write the balanced chemical equations for the following reactions:
- i. Potassium Bromide (aq) + Barium iodide (aq) \rightarrow Potassium iodide (aq) + Barium Bromide(aq)

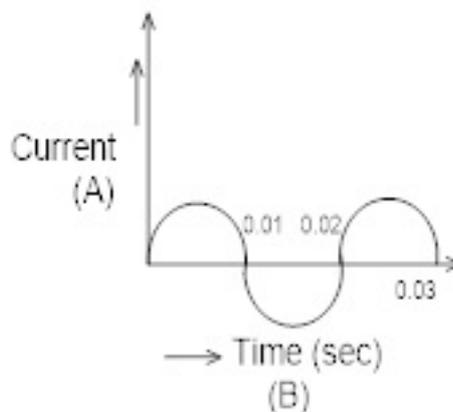
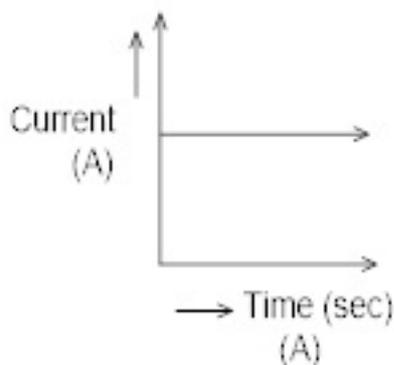
- ii. Zinc carbonate (s) \rightarrow Zinc oxide (s) + carbon dioxide (g)
- iii. Hydrogen (g) + chlorine (g) \rightarrow Hydrogen chloride (g)
- iv. Magnesium(s) + Hydrochloric acid(aq) \rightarrow Magnesium chloride(aq) + Hydrogen(g)
- v. Iron(III) oxide(s) + Carbon monoxide(g) \rightarrow Iron(s) + Carbon dioxide(g)

OR

Consider the chemical equation given below and answer the questions that follow:



- i. Name the substance which is getting oxidised.
 - ii. Name the substance which is getting reduced.
 - iii. Name the oxidising agent.
 - iv. Name the reducing agent.(v) What type of a reaction does this equation represent?
14. An object 5 cm in length is held 25 cm away from a converging lens of focal length 10 cm. Draw the ray diagram and find the position, size and the nature of the image formed.
15. Why is variation beneficial to the species but not necessarily for the individual?
16. Current- time graph from two different sources are shown in the figure.



- i. Name the type of current shown by graph (A) and (B)?
- ii. Name any one source of shown by (A) and (B)?
- iii. What is frequency of current in case (B)?
- iv. Write two differences between current shown by (A) and (B)?

17. Explain the mechanism of the cleaning action of soaps.

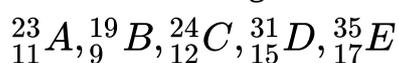
OR

How does atmospheric refraction affect sunrise and sunset?

18. Describe the central nervous system in human beings.

19. What is hypermetropia? Write two causes for development of this defect Describe with a ray diagram how this defect of vision can be corrected by using spectacles.

20. i. How do you classify elements into metals and non-metals on the basis of their electronic configuration? Choose metal and non-metal out of the following:



(ii) What type of bond will be formed if

- 'A' combines with 'B'?
- 'A' combines with 'E'?
- 'C' combines with 'E'?
- 'D' combines with 'E'?

21. What is GAP? Explain.

OR

DDT was sprayed in minute amount on food plants but was detected in high concentration in man? How did it happen? Explain.

Section B

22. What will be the action of the following substance in litmus paper?

Lemon Juice, Carbonated soft drink

23. Four test tubes were taken and marked A, B, C and D respectively. 2 mL of solution of $Al_2(SO_4)_3$ in water was filled in each of the four test tubes. Clean piece of metal zinc was placed in test tube A, clean iron nail was put in test tube B, clean copper wire was placed in test tube C and a clean aluminium wire was placed in test tube C and a clean aluminium wire was placed in test tube D. It was observed that no change occurred in

any of the test tubes. The correct inference drawn is

24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. When asked to set-up an experiment to show that "light is necessary for photosynthesis", a student ran to the school garden and set-up the experiment using a plant growing in the school garden. The experiment failed. His fellow students made the following suggestions to get success :
- Student A :** Safranin should be used instead of Iodine.
- Student B :** The leaf should not be boiled in alcohol to remove chlorophyll before testing the starch.
- Student C :** Transparent paper strip should be used instead of black paper strip.
- Student D :** The plant should be destarched before starting the experiment.

Who made the right suggestion?

26. Draw ray diagram showing the image formation by a concave lens when an object is placed at the focus of the lens.

OR

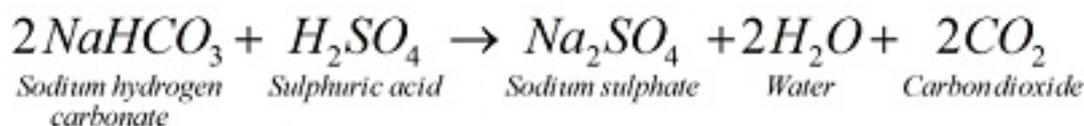
Draw ray diagram showing the image formation by a convex lens when an object is placed between focus and twice the focal length of the lens.

27. What precautions should be taken while performing this experiment?

CBSE Class 10 Science
Sample Paper 04
Solution

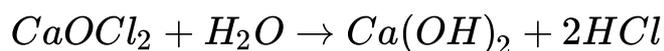
Section A

1. It is a thin fold of mucous membrane which partly closes the external vaginal opening in the unmarried girls.
2. The excretory organ in amoeba is the contractile vacuole and in earthworm are nephridia.
3. As we go from left to right in a period, the metallic character decreases, because of the addition of an electron in the same energy shell each time. So, attraction between the nucleus and the electrons in the outermost shell increases. Thus, tendency to lose an electron decreases and metallic character decreases.
4. Magnification, $m = -3$ (since image is real)
Object distance, $u = -10$ cm Image distance,
 $v = ?$
We know that magnification for the mirror.
Thus, the image is located at a distance of 30 cm in front of the mirror.
5. Biogas is a better fuel than animal dung cakes because:
 - i. Burning of animal dung cake produces smoke which causes lot of pollution whereas biogas is a smokeless fuel.
 - ii. The calorific value of animal dung cake is much lower than that of biogas.
 - iii. Animal dung cakes leave residue after burning whereas biogas leaves no residue.
6. **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.



OR

When bleaching powder gets dissolved in water, the solution turns milky due to the formation of $\text{Ca}(\text{OH})_2$



(Bleaching powder)

7. i. Since $R \propto l$ (length of the conductor)

Length of wire C is more than A and B. Therefore wire C has higher resistance.

- ii. Resistivity of all wires is same as material of all the wires is same. Electrical Resistivity of a wire depends on the nature of the material and not on the dimensions of a wire.

8. The resistivity of a given material is defined as the resistance of a conductor made of that material of unit length and unit cross-sectional area. It can be further defined as the resistance offered by a cube of that material of side 1 m, when current flows perpendicular to the opposite faces. Its S.I unit is ohm-metre $\Omega(\text{Om})$

Using, $R = \rho \frac{l}{A}$, it can be noted that $R \propto l$ and $R \propto 1/A$

So, as the length of the wire is doubled,(area of cross section becomes half,if its stretched to double its size). Hence, the resistance of the wire gets doubled.

From Ohm's Law, $V = IR$

If V remains unchanged,with resistance getting doubled,current becomes half of its original value.

9. When the elements are arranged in order of increasing atomic number elements with similar chemical properties are repeated at definite intervals. This is known as periodicity. Yes, this periodicity is due to the periodicity in the number of electrons in the outermost shell of the atoms of the elements. Elements having the same number of valence electrons are grouped together in the same group. The elements falling within each group are similar in chemical properties.

10. In mammals and birds the blood goes through the heart twice during each cardiac cycle. This is known as double circulation.

Deoxygenated blood which enters right auricle and then it enters the right ventricle from where it is pumped to lungs for oxygenation. From lungs after oxygenation it comes to left auricle and then enters left ventricle from where it is pumped to various parts of body.

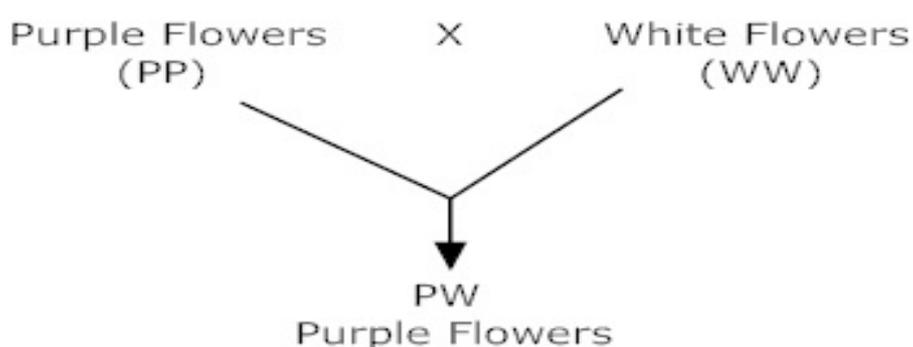
Such system of circulation does not allow mixing of oxygenated and deoxygenated blood which allows efficient supply of oxygen to the body.

OR

Air is present in between the particles of the soil. The roots take the oxygen by the process of diffusion. Oxygen first diffuses into the root hairs and reaches all other cells of the root for respiration. CO₂ produced in the cells moves out through the root hairs by the process of diffusion. For respiration, in older roots, where root hair is not present, the exchange of gases takes place through lenticels (tiny openings in the bark of the tree) by the process of diffusion.

11.

P generation -



Gametes

P

P

PP
Purple

W

PW
purple

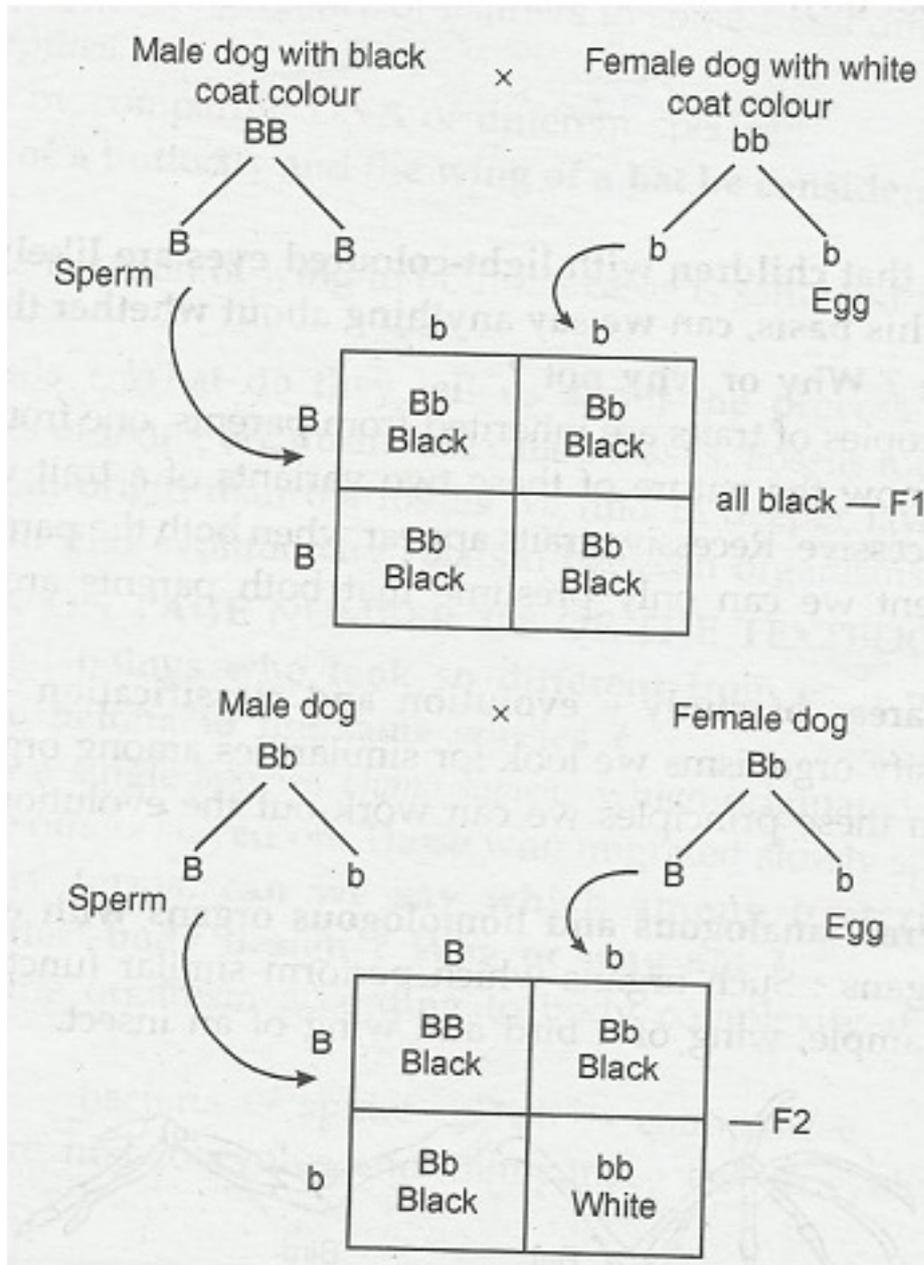
W

PW
Purple

WW
white

Phenotypic ratio = 3:1

12.

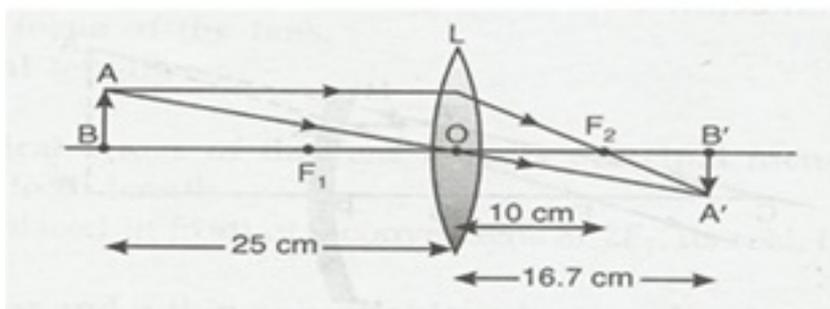


(i) Select two varieties of dogs one with white coat colour, the other with black coat colour. (ii) Crossbreed them taking male dog from one variety and bitch (female dog) from the other variety. (iii) Observe the colour of offsprings of F1 generation. (iv) Now, bring about breeding among the organisms of F1 generation. (v) Observe the coat colour of organisms (pups) of F2 generation and note the variations in coat colour. (vi) Draw conclusions on the basis of your study. One of the probable inheritance pattern may be as given below. Phenotypic ratio = 3 : 1, Black coat colour (3) : White coat colour (1)

13. (i) $2KBr(aq) + BaI_2(aq) \rightarrow 2KI(aq) + BaBr_2(aq)$
 (ii) $ZnCO_3(s) \rightarrow ZnO(s) + CO_2(g)$
 (iii) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$
 (iv) $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$
 (v) $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$
 $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$

OR

- The substance getting oxidised is H_2
 - The substance getting reduced is CuO .
 - $CuOCuO$ is the oxidising agent.
 - H_2 is the reducing agent.
 - Since oxidation and reduction are taking place simultaneously, this reaction is an example of a redox reaction.
14. $f = +10$ cm, $u = -25$ cm and $h_o = 5$ cm



$$1/f = 1/v - 1/u$$

$$1/v = 1/10 - 1/15$$

$$1/v = 3/50$$

$$v = 50/3 \text{ cm.}$$

The image is real and inverted at a distance of 16.7 cm from the lens on opposite side.

$$\text{Magnification (m)} = - h_i/h_o = - v/u$$

$$h_i/5 = 16.7/-25$$

$$h_i = -10/3 \text{ cm. image is inverted and diminished.}$$

15. Variations are useful for the survival of species in changed environment situations. If a population of reproducing organism were suited to a particular niche and if the niche is drastically altered the population could be wiped out. However, some

variations are present some species will survive. Thus, variation is useful to species but not the individual.

16. 1. Graph A represent D.C. and graph B represent A.C.

2. Source of (A) - Dry cell

Source of (B) - A.C. generator

3. For graph (B)

$$f = \frac{1}{T} = \frac{1}{0.02}$$

$$f = 50\text{Hz}$$

17.

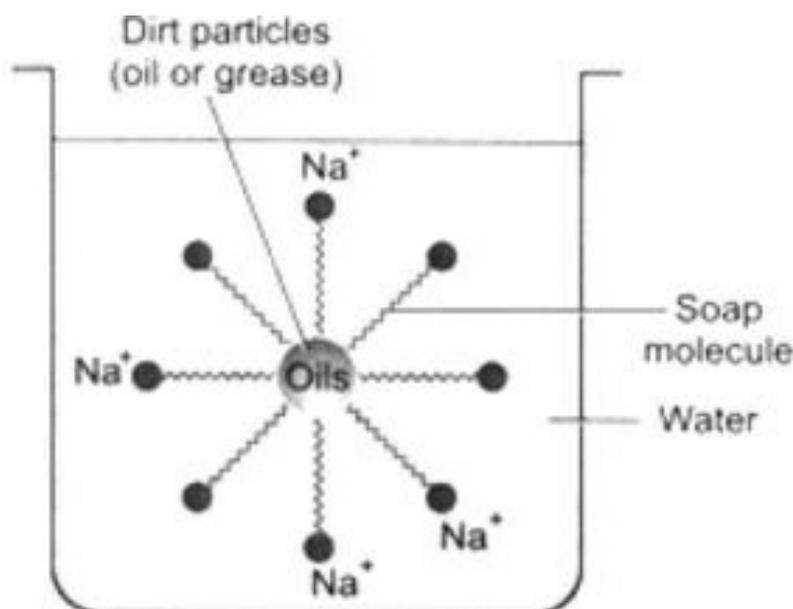
Its magnitude is constant and flows in one direction only.	Its magnitude and direction reserves periodically.
The frequency of D. C. is zero.	The frequency of A. C. is non-zero.

18. The action of soap is based on the presence of both hydrophilic and hydrophobic groups in a soap molecule. A soap molecule consists of two parts:

- A short ionic part comprising the carboxylate salt, $-\text{COONa}^+$. This is the polar end. This is water soluble (i.e. hydrophilic or water-attracting) and, therefore, remains attached to water.
- A long hydrocarbon chain which is the non-polar end. This end is hydrophobic (i.e. water-repelling) and is soluble in oil and grease.



Micelle formation: The soap molecule may be represented as a structure as shown in the figure. When soap is dissolved in water, it forms a colloidal suspension. In this colloidal suspension, the soap molecules adhere together to form micelles and remain radially suspended in water with the hydrocarbon end towards the centre and the ionic end directed outward.

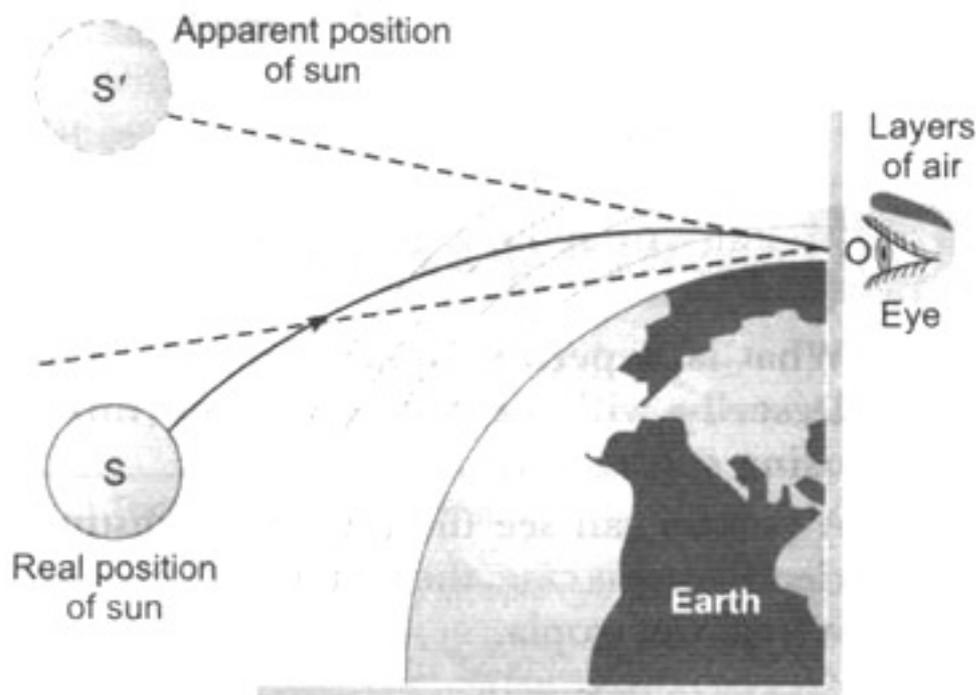


The dirt particles always adhere to the oily or greasy layer present on the skin or clothes. When a dirty cloth is dipped into a soap solution, its non-polar hydrocarbon end of micelles attach to the grease or oil present in dirt and polar end remains in water layer. The subsequent mechanical action of rubbing (agitation), dislodges the oily layer from the dirty surface shaping it into small globules. A stable emulsion of oil in water is formed. The emulsified oil or grease globules bearing the dirt can be washed away with water.

OR

The layers of air nearer to earth are denser than those above it. At sunrise and sunset when the sun is below the horizon, the light rays starting from sun are falls on these layers. They pass through successively denser layers and thus get bent more and more towards the normal until they fall upon the eye of the observer O.

To the observer O these rays appear to come from S' which is above horizon. It is for this reason that the sun is visible to us a little before it rises above the horizon and so also can be seen for more time as it sets below the horizon. The difference of time is about two minutes each for early rise and late setting of the Sun.



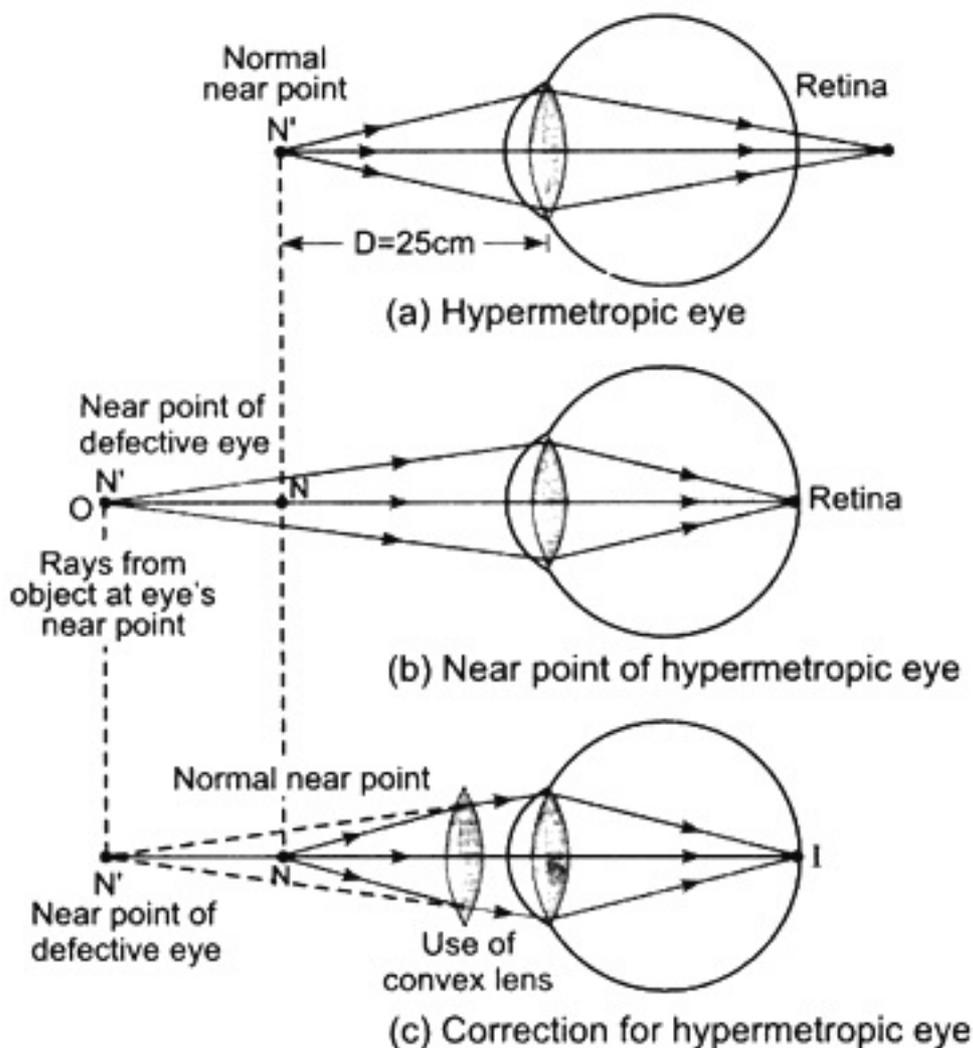
19. The central nervous system in human beings consists of brain and spinal cord.

(i) Brain: Brain is the highest coordinating centre in the body. It is covered by meninges, which is made up of three layers. It is protected by cranium. Brain is broadly divided into three parts, forebrain, midbrain and hindbrain

- a. **Forebrain:** The forebrain includes cerebrum and olfactory lobes. Cerebrum is the largest part of the brain. It consists of two cerebral hemispheres. Sensory and motor receptors are present in the brain. There are various regions for reception of vision (occipital lobe), reception of sound (temporal lobe), touch, smell, temperature (parietal lobe) and muscular activities (frontal lobe). Olfactory lobes are one in pair and receives olfactory nerves.
- b. **Midbrain:** It is the small portion of the brain that connects cerebrum with the other parts of the brain and spinal cord.
- c. **Hindbrain:** It consists of cerebellum, pons and medulla oblongata. Cerebellum is responsible for coordination and adjustment of movement and posture. Pons regulate respiration. Medulla oblongata regulates swallowing, coughing, sneezing and vomiting.

(ii) Spinal cord: Medulla oblongata extends downwards, enclosed in vertebral column to form a cylindrical structure known as spinal cord. It is also covered by meninges. It is the reflex centre of the body.

20. Hypermetropia refers to the condition of eyesight defect, when a person can see distant objects distinctly but cannot see nearby objects so clearly. This is also termed as long sightedness, it occurs when light from near objects is not quite brought to focus in time to hit the retina. The point of focus would in fact be behind the retina.



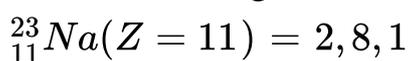
Causes of hypermetropia: This defect arises because of either,

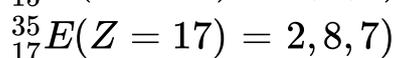
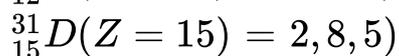
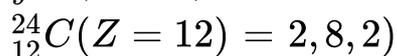
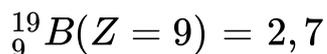
- i. the focal length of the eye lens is too long, or
- ii. the eyeball becomes too short, so that light rays from the nearby object, say at point N, cannot be brought to focus on the retina to give a distinct image.

Hypermetropia can be corrected by using convex lens of suitable focal length in spectacles.

21. i. Elements which contain 1 to 3 electrons in their outermost shell are metals. Elements containing 4 to 7 electrons in their valence shell are non-metals.

Electronic configurations:

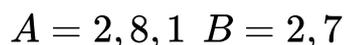




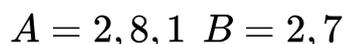
Hence A and C are metals whereas, B, D and E are non-metals.

ii. Type of bonds

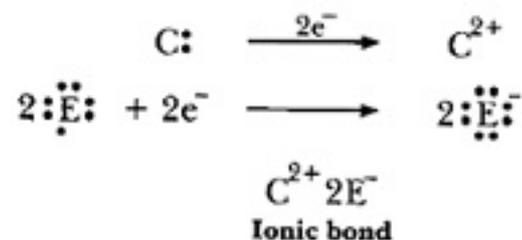
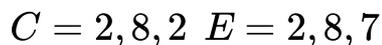
a. 'A' is metal and 'B' is non-metal, so the bond formed will be ionic.



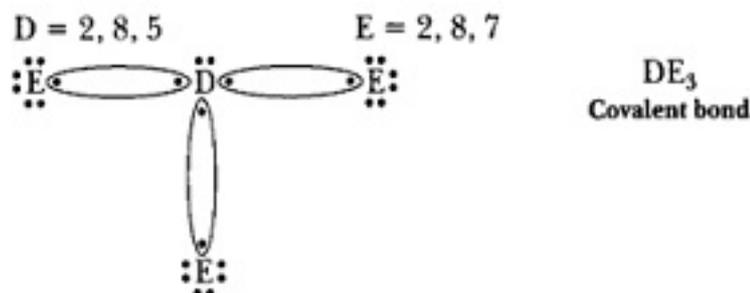
b. 'A' is metal and 'E' is non-metal, so the bond formed is ionic.



c. 'C' is metal and 'E' is non-metal, so the bond formed is ionic.



d. 'D' is a non-metal and 'E' is also a non-metal, so the bond formed will be covalent.



22. GAP meaning Ganga Action Plan which is came in 1986. The GAP covers 25 towns located along its basin, 6 are in U.P., 4 in Bihar and 15 are in West Bengal. Ganga river

has become so highly , polluted that its water is fast losing the reputation of remaining undeterioted for hundreds of years.

Ganga action plan has been divided into two phases i.e. phase I and phase II. The amount sanctioned for phase I was 462.04 crore and for phase II 1328.32 crore. On completion of GAP-I two important parameters of water pollution i.e. BOD (Biological Oxygen Demand) and DO (Dissolved Oxygen) have shown definite improvement.

OR

This occurs due to biological magnification. When pesticides like DDT are used to protect crops from diseases and pests sprayed on the plants, these non-biodegradable substances enter the soil. From soil these substances are absorbed by plants along with water and minerals. The food plants when consumed by organisms, they get accumulated at different trophic levels. As the human beings occupy the top position in any food chain, maximum concentration of such harmful chemicals get accumulated in the bodies of man.

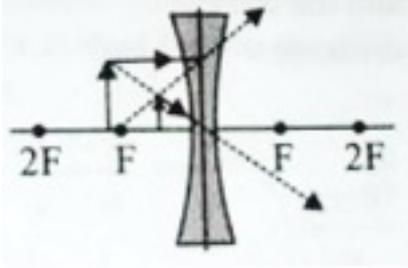
Section B

22.

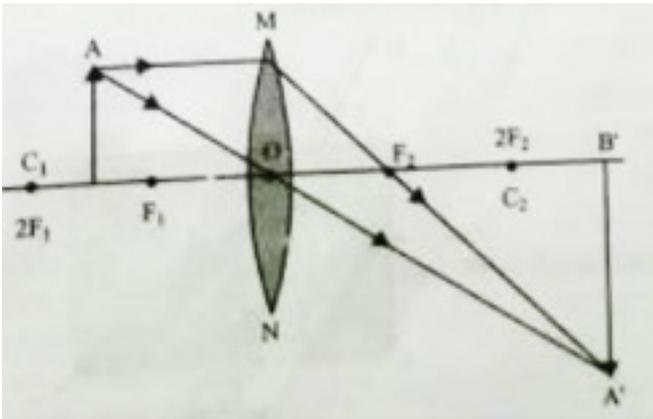
Substance	Blue Litmus paper	Red litmus paper
Lemon Juice	Turns red	None
Carbonated soft drink	None	Turns blue

23. No reaction takes place because Zn, Fe, Cu are less reactive than aluminium therefore they cannot displace aluminium from $(Al_2(SO_4)_3)$ solution.
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25. The right suggestion was made by Student D. Destarching the leaf by keeping the plant in darkness before starting the experiment is essential.

26.



OR



27. Following precautions should be taken:

1. The ends of connecting wire should be neat and clean.
2. Never allow the current to flow in the resistance of wire for a long time.
3. Range of voltmeter should be greater than the applied voltage.
4. When not in use, supply of current should be switched off.
5. A low resistance rheostat must be used.

CBSE Class 10 Science
Sample Paper-05

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. Name the structure through which pollen tubes enters the ovule.
2. The walls of trachea are supported by cartilaginous rings. Why?
3. Why does the size of the atom increase down the group?
4. Light enters from air into diamond which has a refractive index of 2.42. Calculate the speed of light in diamond. The speed of light in air is 3.0×10^8 m/s.
5. Compare and contrast bio- mass and hydro-electricity as source of energy. The production cost of hydroelectricity is cheaper than the electricity produced in a

thermal power station. Explain why?

6. Write equations for the following reactions
 - i. Dilute sulphuric acid reacts with zinc granules
 - ii. Dilute hydrochloric acid reacts with magnesium ribbon.
 - iii. Dilute sulphuric acid reacts with aluminum powder.
 - iv. Dilute hydrochloric acid reacts with iron fillings

OR

- a. An aqueous solution has a PH value of 7.0. Is this solution acidic, basic or neutral?
 - b. If H^+ concentration of a solution is $1 \times 10^{-2} \text{ mol L}^{-1}$ what will be its PH value?
 - c. Which has higher PH value: 1 - M HCl or 1 - M NaOH
7. A potential difference of 220 V is applied across a resistance of 440Ω in an electric ion.
 - (i) Find the current.
 - (ii) Heat energy produced is 30s.
 8. what is meant by electric power ? Give its units. How is it related to V and I ?
 9. Two elements X and Y belong to Group 1 and Group 2 respectively in the same period. Compare them with respect to:
 - (a) The number of valence electrons
 - (b) Valency
 - (c) metallic character
 - (d) Size of the atoms
 - (e) Formulae of their oxides and chlorides.
 10. What are differences between aerobic and anaerobic respiration? Name some organisms that use anaerobic mode of respiration.

OR

Differentiate inhalation and exhalation.

11. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?
12. Give the basic features of the mechanism of inheritance.
13. The reaction is given by
$$\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$$
 - (i) Write the ionic equation for the reaction.
 - (ii) Express the ionic equation in form of two half reactions.
 - (iii) Explain why this is a redox reaction?

OR

A magnesium ribbon is burnt in oxygen to give a white compound X accompanied by emission of light. If the burning ribbon is now placed in an atmosphere of nitrogen, it continues to burn and forms a compound Y.

- (i) Write the chemical formulae of X and Y.
 - (ii) Write the balanced chemical equation when X is dissolved in water.
14. State the mirror formula for determining the focal length of spherical mirrors write the meanings of the symbols used An object is placed at a distance of 25 cm. from a concave mirror of focal length 15 cm. Calculate the distance of the image from the mirror.
15. What changes occur in ovaries during menstrual cycle?
16. Draw an appropriate schematic diagram showing common domestic circuits and discuss the importance of fuse. Why is it that a burnt out fuse should be replaced by another fuse of identical rating?
17. Two carbon compounds A and B have the molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition reaction? Justify

your answer.

18. Compare nervous and hormonal mechanism for control.
19. (a) What is myopia? State the two causes of myopia. With the help of labelled ray diagrams show
 - (i) the eye defect myopia
 - (ii) correction of myopia using a lens.(b) Why is the normal eye unable to focus on an object placed within 10 cm from the eye?
20. Give reasons:
 - (a) Platinum, gold and silver are used to make jewellery.
 - (b) Sodium, potassium and lithium are stored under oil.
 - (c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
 - (d) Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
 - (e) Lemon or tamarind juice are effective in cleaning tarnished copper vessels.
21. What are the effects of deforestation?

OR

Why are some substances biodegradable and some non-biodegradable?

Section B

22. What will be the action of the following substance in litmus paper?
Dry HCl gas, Moistened NH_3 gas
23. A silver article generally turns black when kept in the open for a few days. The article when rubbed with toothpaste again starts shining. Why do silver articles turn black when kept in the open for a few days? Name the phenomenon involved.
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes

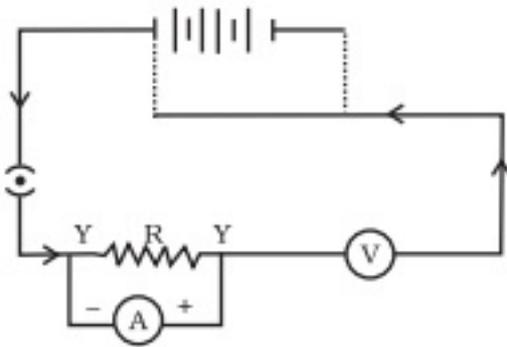
in the zygote?

25. If a plant is releasing carbon dioxide and taking in oxygen during the day, does it mean that there is no photosynthesis occurring? Justify your Answer.
26. Draw ray diagram showing the image formation by a concave lens when an object is placed beyond twice the focal length of the lens.

OR

Draw ray diagram showing the image formation by a concave mirror when an object is placed at infinity.

27. A Child has drawn the electric circuit to study Ohm's law as shown in Figure.



CBSE Class 10 Science
Sample Paper 05
Solution

Section A

1. Stigma
2. The trachea is supported by cartilaginous rings which prevent the collapsing of the wind pipe even when there is not much air inside it.
3. In moving down a group, the charge on the nucleus increases with increase in atomic number, but at the same time, there is an increase in the energy levels. The number of electrons in the outermost shell, however, remains the same. Since the effect of additional energy levels outweighs the effect of increase nuclear charge and thus the distance of the outermost electron from the nucleus increases on going down the group.
4. $n = 2.42$
 $v = ?$
 $c = 3 \times 10^8 \text{ m/s}$
 $n = \frac{c}{v} \Rightarrow v = \frac{c}{n}$
 $v = \frac{3 \times 10^8}{2.42}$
 $v = 1.24 \times 10^8 \text{ m/s}$

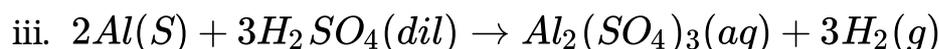
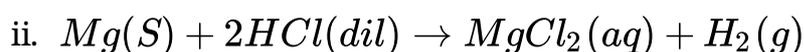
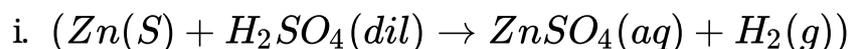
5.

	Biomass		Hydroelectricity
(i)	Energy supplied by the burning of biomass causes pollution.	(i)	It does not cause any pollution.
(ii)	Energy can be obtained by burning it directly or by burning a gohar gas plant.	(ii)	Hydroelectricity can be obtained by constructing dams.

In a thermal power station coal is burnt to produce electricity where as

hydroelectricity is produced by allowing the water to fall on turbines. Water in rivers is available free of cost but the cost of extracting and transporting coal is very high.

6.



OR

a. The solution is neutral in nature.

b. $[H^+] = (1 \times 10^{-2} molL^{-1}) 1 \times 10^{-2} molL^{-1}$

$$= 10^{-2} M$$

$$PH = \log \left[\frac{1}{[H^+]} \right]$$

$$= -\log [H^+]$$

$$= -\log [10^{-2}]$$

$$= -(-2)\log 10 = 2$$

c. 1 M NaOH solution (basic) higher PH. Value

1 M HCl solution (acidic) lower PH. Value

7. Here $V = 220$ volts; $R = 440 \Omega$

$$\text{Now } I = \frac{V}{R} = \frac{220}{440} = 0.5 A$$

$$\text{Heat energy produced in 30s.} = \frac{V^2}{R} t = \frac{(220)^2 \times 30}{440} = 3.300 J$$

8. Power is the rate of doing work. The electric power of an appliance is its rate of consumption of electric energy.

The power of an electric appliance is 10 (watt) if it consumes 10 (joule) of energy in 1

second.

If I ampere of the current flows for t second through a coil whose ends are maintained at a potential difference of V volt, then the energy consumed or the work done.

$$O = VIt \text{ joule}$$

$$\text{Power} \frac{W}{t} = \frac{VIt \text{ joule}}{t \text{ second}}$$

$$\text{or } P = V \times I \text{ joule/second} = VI \text{ watt}$$

$$\therefore P(\text{watt}) = V(\text{volt}) \times I (\text{ampere}) \text{ or watt} = \text{volt} \times \text{ampere}$$

Again we now $V = IR$

$$\therefore P = VI = (IR)I = I^2R \text{ or } P = I^2R$$

Also, $I = V/R$, therefore

$$P = I^2R = \left(\frac{V}{R}\right)^2 R \text{ or } P = \frac{V^2}{R}$$

Bigger unit of power usually kO (kilowatt)

$$1\text{kO} = 1,000 \text{ O}$$

$$P (\text{in kW}) = \frac{\text{watt}}{1,000} = \frac{V(\text{volt}) \times I(\text{ampere})}{1,000}$$

9.

- The valence electrons present in element X (group 1) and element Y (group 2) are 1 and 2 respectively.
- The valency of the element X is one while that of the element Y is two.
- Metallic character decreases along a period. This means that element X is more metallic as compared to element Y.

d. Atomic size decreases along a period. As a result, the element Y has a smaller size than the element X.

e. For element X Oxide (X_2O), chloride (XCl) E.g. Na_2O (oxide).NaCl.(chloride)

For element Y Oxide (Y O.CaO)chloride (YCl_2 .CaCl₂)(YCl_2)

10. Difference between aerobic and anaerobic respiration:

Aerobic respiration	Anaerobic respiration
(i) Takes place in presence of oxygen.	(i) Takes place in absence of oxygen.
(ii) Complete oxidation of glucose occurs.	(ii) Incomplete oxidation of glucose occurs.
(iii) More energy is produced.	(iii) Less energy is produced.

Anaerobic respiration takes place in yeast, some bacteria and some internal parasites like tapeworm. Anaerobic respiration also takes place in our muscles during vigorous exercise to meet the energy demands of the body.

OR

Inhalation	Exhalation
It is taking in of air from the atmosphere	It is expelling out of air from the lungs.
Diaphragm contract & flattens.	Diaphragm relaxes and becomes dome shaped.
Ribs movement is forward & outward.	Ribs movement is downward & inward
Volume of thoracic cavity increases	Volume of thoracic cavity decreases
Air pressure in thoracic cavity decreases	Air pressure in thoracic cavity increases

11. In sexual reproduction, two individuals having different variations combine their DNA to give rise to a new individual. Therefore, sexual reproduction allows more

variations, whereas, in asexual reproduction, chance variations can only occur when the copying of DNA is not accurate. Additionally, asexual reproduction allows very less variations because if there are more variations, then the resultant DNA will not be able to survive inside the inherited cellular apparatus. However, in sexual reproduction, more variations are allowed and the resultant DNA is also able to survive, thus making the variations viable.

Variation and Evolution: Variants help the species to survive in all the conditions. Environmental conditions such as heat, light, pests, and food availability can change suddenly at only one place. At that time, only those variants resistant to these conditions would be able to survive. This will slowly lead to the evolution of a better-adapted species. Thus, variation helps in the evolution of sexually reproducing organisms.

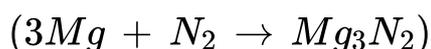
12. Basic features of mechanism of inheritance-

- a. Each character is controlled by a pair of factors. The factors may be similar or dissimilar.
- b. When two dissimilar factors of a character are present in an organism, only one expresses itself while other remains unexpressed.
- c. Two factors of a character are separated at the time of gamete formation and get only one factor for that character.
- d. Inheritance of two or more pairs of contrasting traits in such a way that one pair of contrasting traits is independent of the other pairs of contrasting traits.

13.

- i. $(Zn + 2H^+ \rightarrow Zn^{2+} + H_2)$
- ii. The half ionic equations are-
 $(Zn \rightarrow Zn^{2+} + 2e^-)(2H^+ + 2e^- \rightarrow H_2)$
- iii. The first half represents oxidation as there is loss of electrons and second half represents reduction as there is gain of electrons.

OR



14. $(\frac{1}{f} = \frac{1}{u} + \frac{1}{v})$

Where f is the focal length of the mirror

U is the object distance

V is the Image distance

U=-25 cm

F=-15 cm

V=?

$$(\frac{1}{f} = \frac{1}{v} + \frac{1}{u})$$

$$(\frac{1}{-15} = \frac{1}{v} + \frac{1}{-25})$$

$$(\frac{1}{v} = \frac{-1}{15} + \frac{1}{25})$$

$$(\frac{1}{v} = \frac{-1}{15} + \frac{1}{25})$$

$$(\frac{1}{v} = \frac{-5+3}{75})$$

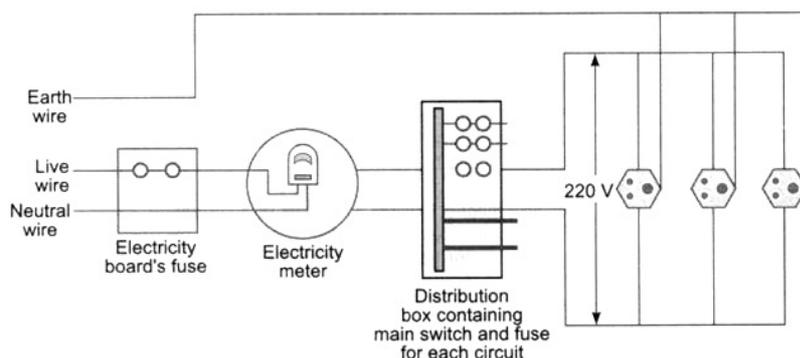
$$(\frac{1}{v} = \frac{-2}{75})$$

$$(v = \frac{-75}{2} = -37.5cm)$$

15. Change occurs in ovaries during menstruation

- 1 - 4 days - Corpus luteum degenerates. The ovary starts preparing for the maturation of a new follicle.
- 5 - 13 days - Ovarian follicle develops to optimum. Estrogen secreted by ovaries causes thickening of uterine wall.
- 14 day - Egg gets released from the ovary. It enters the fallopian tube, known as ovulation.
- 15 to 28 days - After releasing the egg, the follicle part produces corpus luteum which produces progesterone. If pregnancy has not occurred, corpus luteum degenerates corpus luteum. This restarts menstrual cycle once again.

16.



A fuse in a circuit prevents damage to the appliances and the circuit due to overloading. Otherwise, the appliances or the circuit may be damaged.

When current in the circuit exceeds the value of fuse rating, the fuse wire burns due to overloading. This causes a gap in the circuit and the current stops flowing in the circuit.

This is done due to the reason so that the circuit or the appliances to be connected in the circuit continue functioning without any damage in future.

17. The formula of compound A (C_3H_8) is of the form C_nH_{2n+2} , therefore it is a saturated hydrocarbon (propane). Saturated hydrocarbons undergo substitution reactions.

The formula of compound B (C_3H_6) is of the form C_nH_{2n} , therefore it is an unsaturated hydrocarbon with a double carbon-to-carbon bond. Addition reactions are a characteristic property of unsaturated hydrocarbons.

Thus, **compound B** (C_3H_6) - propene- will show an addition reaction.



18.

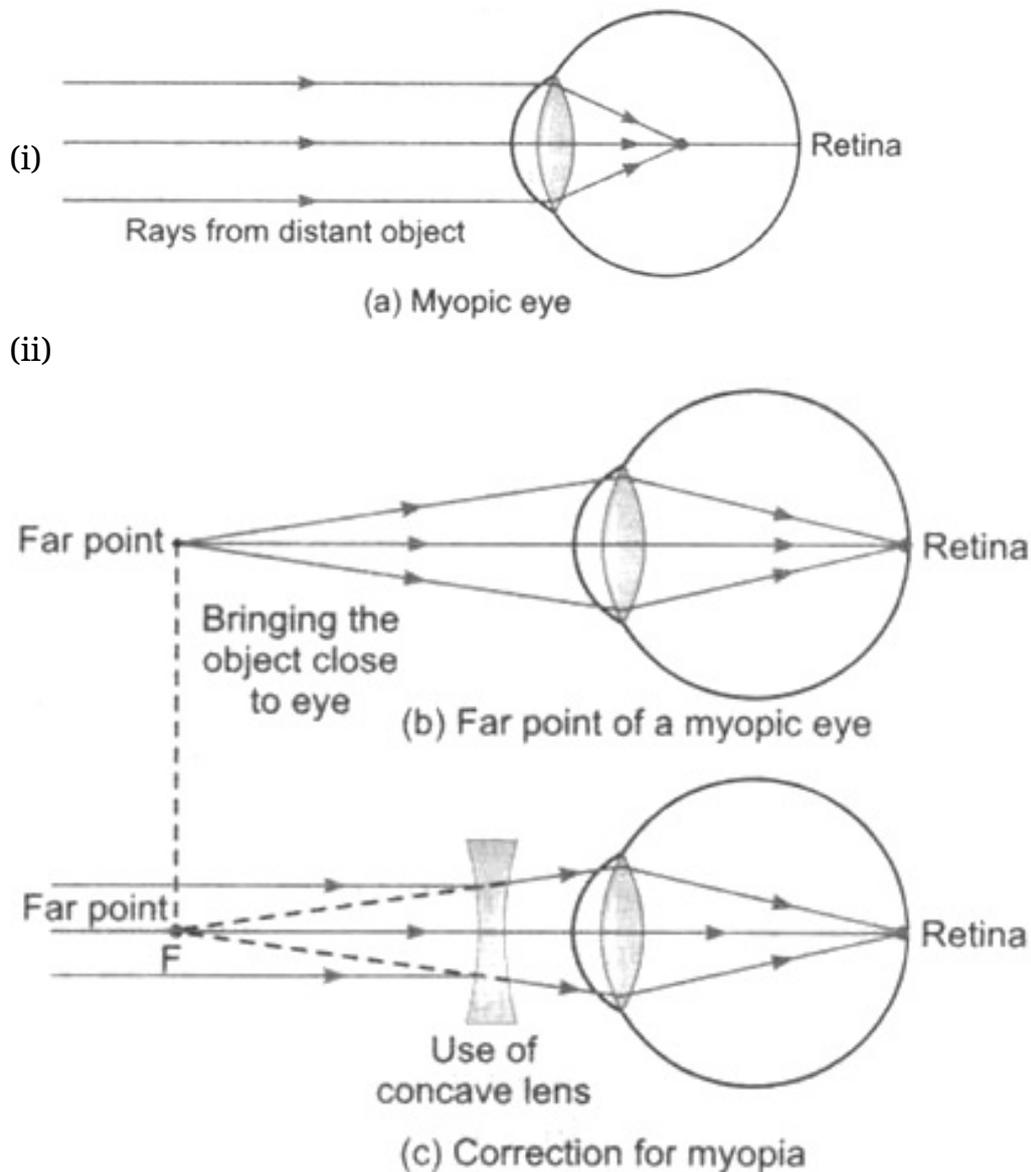
Nervous System	Hormonal System
Made of neuron	Made of Hormone
Messages transmitted in the form of electrical impulses	Message transmitted in the form of chemicals called hormones.
Messages transmitted along nerve fibres.	Messages transmitted through blood stream.
Messages travel very quickly.	Messages travel very slowly.

Effect of message usually lasts for a very short while	Effect of message usually lasts longer
Sense organs are receptors as nerve cells located in them receive information.	Glands are effectors which secrete hormones when the brain commands.

19. (a) Myopia is the defect of the eye vision due to which a person can see the near by objects clearly but cannot see the far objects so distinctly.

Causes of myopia: Myopia is caused due to:

- (i) the elongation of the eyeball.
- (ii) decrease in the focal length of the eye lens.



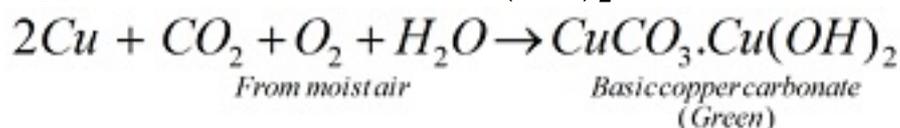
Myopia can be corrected by using a **concave lens** of suitable focal length in the

spectacles of such a person.

(b) The ability of the eye lens to adjust its focal length is called power of accommodation. However, the focal length of the eye lens cannot be decreased below a certain limit. The maximum accommodation of a normal eye is reached when the object is at a distance of 25 cm from the eyes. Thus, the normal eye is unable to focus an object placed within 10 cm from the eye because the nearest distance of distinct vision for a normal eye is 25cm.

20.

- a. Platinum, gold and silver are used to make jewellery because of their bright shiny surface and high resistance to corrosion. Also they have high malleability and ductility.
- b. Sodium, potassium and lithium are stored under oil to prevent their reaction with oxygen, moisture and carbon dioxide of air so as to protect them.
- c. Aluminium metal forms a thin layer of aluminium oxide all over its surface under the action of moist air. This layer prevents the metal underneath from further corrosion. It is cheap, easily available, malleable and ductile. Therefore, it is used to make utensils for cooking
- d. It is easier to obtain a metal from its oxides as compared to its sulphides and carbonates. So, prior to reduction, metal carbonate and sulphides must be converted into metal oxides. A carbonate ore is converted into oxide by calcination whereas a sulphide ore is converted into oxide by roasting.
- e. When copper vessels are exposed to moist air, they form a green coating of basic copper carbonate [$CuCO_3 \cdot Cu(OH)_2$].



The sour substances such as lemon or tamarind juice contain acids. Lemon juice contains citric acid and tamarind contains tartaric acid. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

21. Effects of deforestation-

- a. Large scale deforestation has badly affected the weather of our country. There is excessive heating during summers and excessive cooling during winters. The rainfall has also reduced and there are more dust-storms.
- b. Threatening of indigenous people whose culture and physical survival depends upon the forests.
- c. Deforestation leads to the scarcity of timber wood, fuel wood and the wood used in industries.
- d. Deforestation is important cause for soil erosion, droughts, floods, landslides and decrease in soil fertility.

OR

The substances that are natural or made from natural materials that can be degraded or decomposed by enzymes of decomposer organisms like bacteria & fungi into soil are called Biodegradable substances. e.g.. Fruits & Vegetable peels, Paper etc. These substances do not persist in the environment for long as the enzymes of the decomposer organisms convert them into simple substances & make them available to the plants. The substances that can not be decomposed by decomposer organisms & persist in the environment for long period are called Non Biodegradable substances. e.g.. Plastics, Pesticides etc.

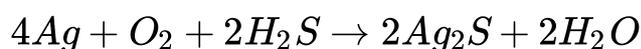
Section B

22.

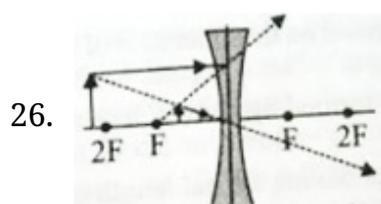
Substance	Blue Litmus paper	Red litmus paper
Dry HCl gas	None	None
Moistened NH ₃ gas	None	Turns blue

23. When silver is kept in open for a few days, it reacts with atmosphere oxygen to form oxide. In due course of time, this react with oxygen and hydrogen sulphide (in the

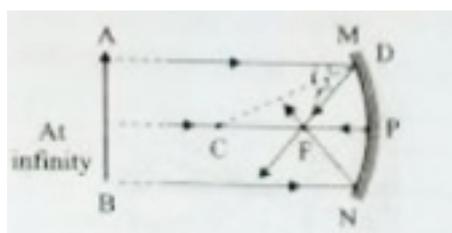
atmosphere) to form silver sulphide; which appears as black layer. This phenomenon is called tarnishing of silver.



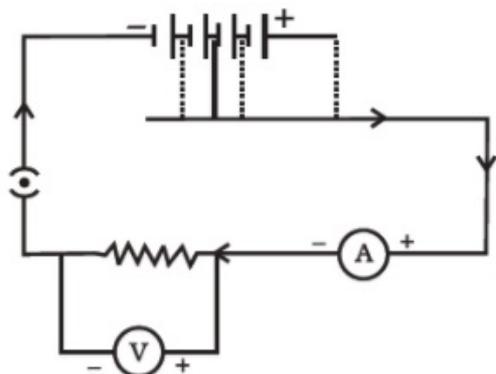
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25. If plant is releasing carbon dioxide and taking in oxygen during the day, it means that respiration is happening in plant. But it does not mean that photosynthesis is not happening. Carbon dioxide released after respiration comes out of stomata. For photosynthesis, the plant takes in carbon dioxide from atmosphere. In other words, plant does not depend on respiration for carbon dioxide for photosynthesis.



OR



27. **Correct diagram is as follows:**



CBSE Class 10 Science
Sample Paper 06

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. Name the type of reproduction involved in the following-
 - (i) A slice of bread has greenish - yellow patches.
 - (ii) Potato in the store room starts sprouting
2. Give one point of similarity among cuscuta, ticks and leeches.
3. Name other elements which belong to the same family as
 - (i) Calcium (ii) Carbon.
4. In what way is the word AMBULANCE printed in front of the hospital vans? Why is it printed this way?

- Name two activities in our daily life in which solar energy is used?
- How would you distinguish between baking powder and washing soda by heating?

OR

A few drops of phenolphthalein indicator were added to an unknown solution A. It acquired a pink colour. Now another unknown solution B was added to it drop by drop and the solution becomes colourless. Predict the nature of A & B.

- An electric kettle rated at 220 V, 2.2 kW works for 3h. Calculate the energy consumed and the current drawn.
- The values of the current I flowing in a given resistor for corresponding values of potential difference V across the resistor are given below:

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of that resistor.

- Name the elements present in the third period and classify them into metals and non-metals.
 - On which side of the table do you find the metals?
 - On which side of the table do you find the non-metals?
- Compare the functioning of alveoli in the lungs and nephron in the kidneys with respect to their structure and function.

OR

Differentiate between aerobic and anaerobic respiration.

- Give a suitable explanation for "geographical isolation of individual of a species lead to formation of a new species?"
- Name two homologous structures in vertebrates. Why are they so called? How do

such organs help in understanding an evolutionary relationship?

13. Compound 'A' when dissolved in water gives compound 'B' and liberates heat. Compound 'A' is used in whitewashing. Compound 'B' reacts with CO_2 to form a white precipitate of compound 'C'. Identify compounds 'A', 'B' and 'C' Also write the equations involved.

OR

In the reaction $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$

- (a) Name the substance oxidised.
(b) Name the oxidising agent.
(c) Name the reducing agent and the substance reduced.
14. Three mirrors, one plane, one concave and one convex are lying on the table. How can a person identify them without touching them or using any other apparatus or device?
15. Illustrate the "Spore formation in Rhizopus" with the help of suitable diagrams.
16. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes?
17. Explain the mechanism of the cleaning action of soaps.
18. Draw the structure of a neuron and explain its function.
19. A 14 year old student is not able to see clearly the questions written on the black board placed at a distance of 5 m from him.
(a) Name the defect of vision he is suffering from?
(b) Draw the diagram to show this defect?
(c) Name the type of lens used to correct this defect?
(d) Name two possible causes of this defect.
(e) Draw the diagram to show how this defect can be corrected.
20. (i) Name the metal which does not stick to glass?
(ii) Name the non-metal which is a good conductor of electricity?

- (iii) Name the metal which is commonly used in thermit welding?
- (iv) What gets deposited at the cathode, a pure or impure metal?
- (v) What is the nature of Zinc oxide?

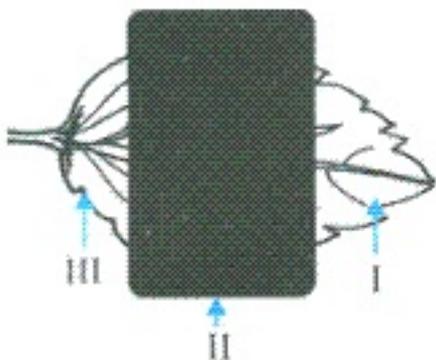
21. What do you mean by natural resources? List its two main categories.

OR

Explain the concept of food chain.

Section B

22. A Student prepared solution of (i) an acid and (ii) a base in two separate beakers. She forgot to label the solutions and litmus paper is not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two?
23. Solutions of ferrous sulphate, zinc sulphate, copper sulphate and aluminium sulphate were separately taken in four test tubes and some iron nails were placed in each of the solutions. After few minutes, What will you observe?
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. Given below is a sketch of a leaf partially covered with black paper and which is to be used in the experiment to show that light is compulsory for the process of photosynthesis. At the end of the experiment, which one of the leaf parts labeled I, II and III will become blue black when dipped in iodine solution?

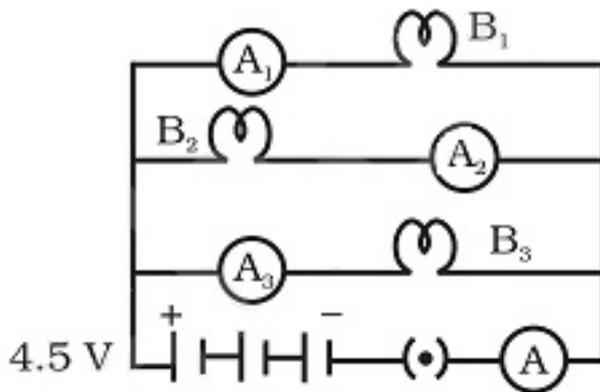


26. Draw ray diagram showing the image formation by a convex lens when an object is placed at twice the focal length of the lens.

OR

Draw ray diagram showing the image formation by a concave mirror when an object placed at centre of curvature of the mirror.

27. B_1 , B_2 and B_3 are three identical bulbs connected as shown in figure. When all the three bulbs glow, a current of 3A is recorded by the ammeter A.



- (i) What happens to the glow of the other two bulbs when the bulb B_1 gets fused?

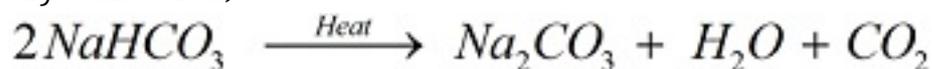
CBSE Class 10 Science
Sample Paper 06
Solution

Section A

1. a) Spore formation
b) Vegetative propagation
2. Cuscuta, ticks and leeches are all parasites and obtain their nutrition from the host.
3. (i) Magnesium, Strontium.
(ii) Silicon, Germanium.
4. The word AMBULANCE on the hospital vans is written in the form of its mirror image because any vehicle which is ahead of ambulance van can see the laterally inverted alphabets correctly from his rear-view mirror and make way for it to pass through and enable it to reach the hospital quickly.
5. The following are the two activities in our daily life in which solar energy is used...
(i) For cooking food using solar cookers.
(ii) For drying clothes and food grains.
6. The chemical formula of baking powder is sodium hydrogen carbonate ($NaHCO_3$)

The chemical formula of washing soda is sodium carbonate decahydrate ($Na_2CO_3 \cdot 10H_2O$)

Sodium hydrogen carbonate on heating gives CO_2 gas which will turn lime water milky. No such gas is obtained by heating sodium carbonate (It loses water of crystallisation).



OR

All substances that are basic in nature turn phenolphthalein indicator pink. Thus, solution 'A' is **basic** in nature as it turns phenolphthalein pink.

Solution 'B' is an **acid** as it has made the solution colourless by neutralizing its basic nature. As soon as the solution becomes acidic while adding solution 'B' drop by drop, the colour of phenolphthalein changes from pink to colourless.

7. Energy consumed (in kWh) = power (in kW) time (h)

$$= 2.2 \text{ kW} \times 3 \text{ h} = 6.6 \text{ kWh}$$

$$\text{Power} = 2.2 \text{ kW} = 2.2 \times 1,000 \text{ W} = 2,200 \text{ W}$$

$$\text{But Power} = \text{Voltage} \times \text{Current}, 2,200 = 220 I$$

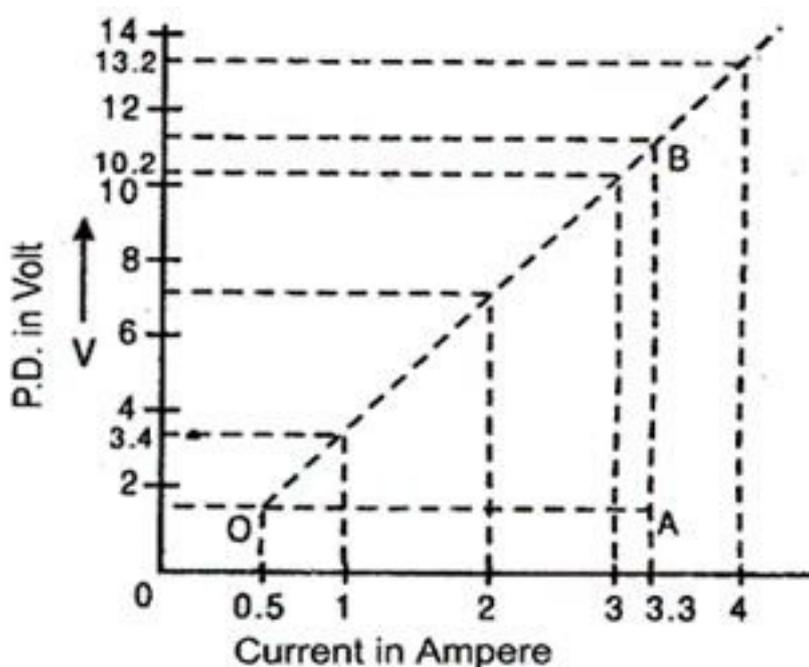
$$I = \frac{2,200}{220} = 10 \text{ A}$$

8. Graph between I and V is as shown in figure. Since graph is almost a straight line, the slope of line between any two points give the resistance. Slope of say OB is:

$$R = \frac{AB}{OA} = \frac{BC - AC}{DA - OD}$$

$$R = \frac{12 - 1.6}{3.3 - 0.5} = \frac{10.4}{2.8} = \frac{104}{28}$$

$$R = 3.7 \Omega$$



9. (a) The elements are

Na Mg Al Si P S Cl Ar

Na, Mg, Al are metals, Si is a metalloid, P, S, Cl and Ar are non-metals

(b) The metals are placed mostly on the left side of the table.

(c) The non-metals are placed on the right side of the table.

10. Comparison between alveoli and nephron:

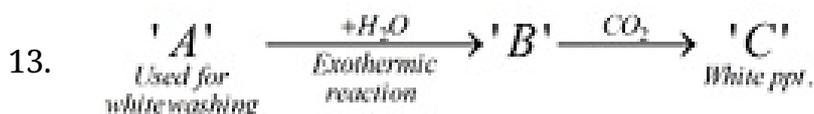
Alveoli	Nephrons
Structure	Structure
(i) Alveoli are tiny balloon-like structures present inside the lungs.	(i) Nephrons are tubular structures present inside the kidneys.
(ii) The walls of the alveoli are one cell thick and it contains an extensive network of blood capillaries.	(ii) Nephrons are made of glomerulus, Bowman's capsule, and a long renal tubule.
Function	Function
(i) The exchange of O_2 and CO_2 takes place between the blood capillaries that surround the alveoli and the gases present in the alveoli.	(i) The blood enters the kidneys through the renal artery. The blood is filtered and the nitrogenous waste in the form of urine is collected by collecting duct.
(ii) Alveoli are the site of gaseous exchange.	(ii) Nephrons are the basic filtration unit of the kidney.

OR

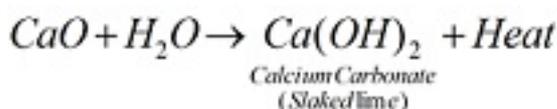
Aerobic Respiration	Anaerobic Respiration
a) It occurs in the presence of oxygen	a) It occurs in the absence of oxygen
b) It occurs in cytoplasm and in the mitochondria	b) It occurs in cytoplasm

c) Complete breakdown of glucose occurs	c) Incomplete breakdown of glucose occurs
d) End products are CO ₂ and H ₂ O	d) End products are CO ₂ and ethyl alcohol or lactic acid
e) Amount of energy produced is more.	e) Amount of energy produced is less.

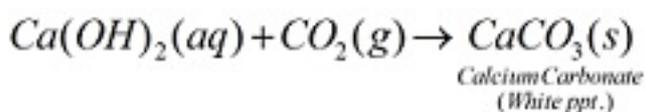
11. Reproduction barrier such as river (geographical isolation) between the sub population leading to:
Geographical isolation of individuals of a species has the potential to lead to formation of a new species. Turtles of the Galapagos Islands show a good example of speciation due to geographical isolation. Turtles on different islands were geographically isolated. Individuals from one island could not meet with those from another island. So, genetic flow between different groups of turtle could not take place. Over several generations, the degree and types of variations were markedly different in different groups. This led to formation of new species. Turtles on different islands represent altogether different species.
12. Two homologous structures in vertebrates are:
(i) limbs of birds and reptiles
(ii) limbs of reptiles and amphibians.
These are called so because the organs have similar structure to perform different functions in various vertebrates.
The homologous characteristics indicate common ancestry.



Quicklime (CaO) is used for white washing. So 'A' is CaO.



'B' is Ca(OH)₂



'C' is $CaCO_3$.

OR

- HCl has been oxidized to Cl_2 as removal of hydrogen is known as oxidation.
- MnO_2 is the oxidising agent as it removes hydrogen for oxidation reaction.
- HCl is the reducing agent as it gives hydrogen for reduction and MnO_2 has been reduced to $MnCl_2$ as removal of oxygen is called reduction.

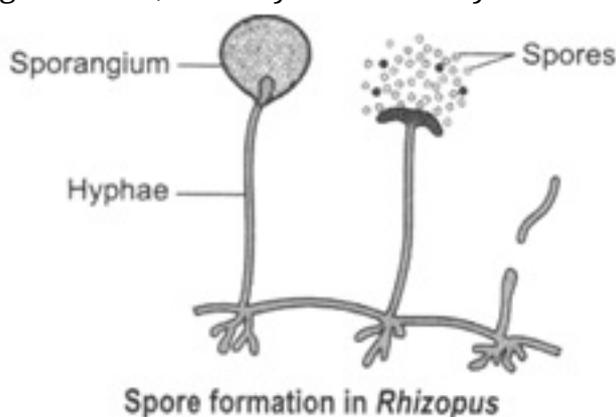
14. One can gradually move an object straight towards each of the mirror and observe the image.

Observation 1: If the image size is same as the object then it is a plane mirror.

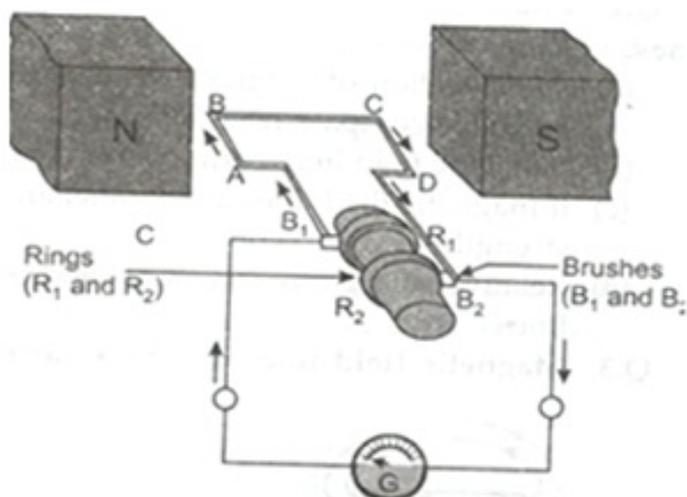
Observation 2: If the size of the image is increasing then it is a concave mirror. In case of concave mirror virtual, erect and magnified image is formed when an object is close to the mirror.

Observation 3: If the image size is diminishing then it is a convex mirror. As in a convex mirror virtual erect and diminished image is formed always.

15. **Spore formation in Rhizopus:** This is an asexual method of reproduction in bacteria and fungi. Spores are unicellular bodies formed by cell division in a parent organism. After detaching from the parent, and if conditions are suitable, they germinate, directly or indirectly into a new individual.



16. Electric generator labelled diagram is as follows:



Principle: An electric generator works on the principle of electromagnetic induction.

Working: Let in the beginning brushes B₁ and B₂ are kept pressed separately on rings R₁ and R₂ respectively. Let the axle attached to the rings is rotated such that arm AB of the coil moves up and arm CD moves down in the magnetic field. Due to rotation of arms AB and CD induced current are set up in them. As per Fleming's right hand rule, induced current in these arms along the directions AB and CD respectively and current flows into B₁ and B₂.

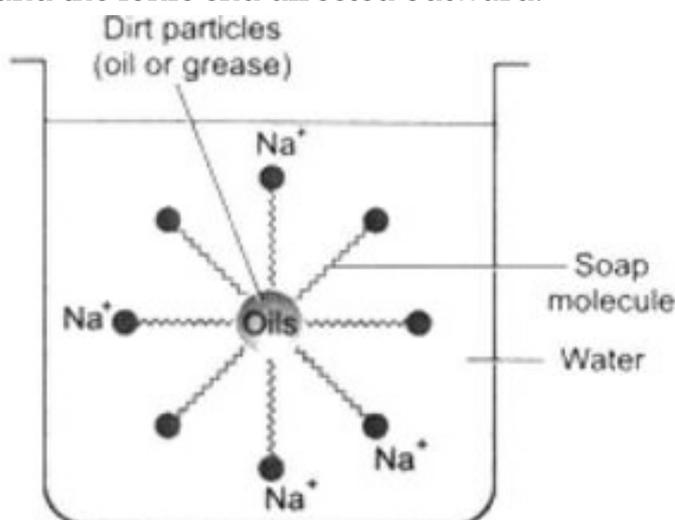
After half rotation, arm AB moves downward and arms CD upward to change the direction opposite to first case. Thus, after every half rotation current changes its direction and an alternate current is obtained in the generator.

Brushes are kept pressed on the two slip rings separately. Outer ends of the brushes are connected to the galvanometer. Thus, brushes help in transferring current from the coil ABCD to external circuit.

17. The action of soap is based on the presence of both hydrophilic and hydrophobic groups in a soap molecule. A soap molecule consists of two parts:
- A short ionic part comprising the carboxylate salt, -COONa^+ . This is the polar end. This is water soluble (i.e. hydrophilic or water-attracting) and, therefore, remains attached to water.
 - A long hydrocarbon chain which is the non-polar end. This end is hydrophobic (i.e. water-repelling) and is soluble in oil and grease.

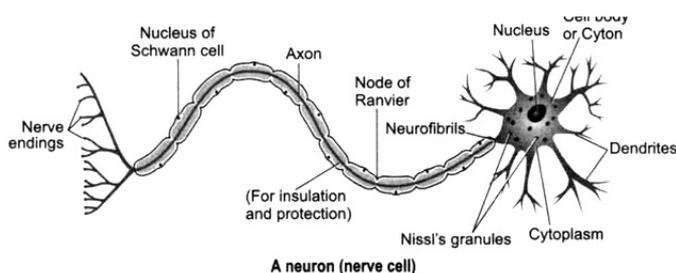


Micelle formation: The soap molecule may be represented as a structure as shown in the figure. When soap is dissolved in water, it forms a colloidal suspension. In this colloidal suspension, the soap molecules adhere together to form micelles and remain radially suspended in water with the hydrocarbon end towards the centre and the ionic end directed outward.



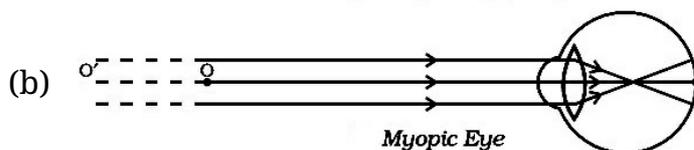
The dirt particles always adhere to the oily or greasy layer present on the skin or clothes. When a dirty cloth is dipped into a soap solution, its non-polar hydrocarbon end of micelles attach to the grease or oil present in dirt and polar end remains in water layer. The subsequent mechanical action of rubbing (agitation), dislodges the oily layer from the dirty surface shaping it into small globules. A stable emulsion of oil in water is formed. The emulsified oil or grease globules bearing the dirt can be washed away with water.

18. Neuron or nerve cell is a structural and functional unit of the nervous system that is specialised to receive, conduct and transmit nerve impulses. A neuron (nerve cell) has three components:
- (i) Cell body (cyton)
 - (ii) Dendrites
 - (iii) Axon



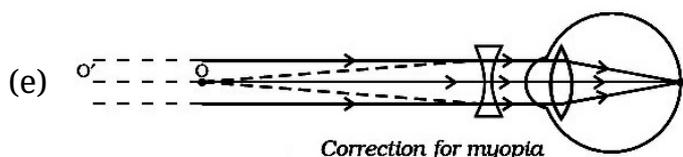
Functions: The information acquired at the end of the dendritic tip of a neuron sets off a chemical reaction which creates an electrical impulse. This impulse travels from the dendrite to the cyton along the axon of its end. At the end of axon, the electrical impulse sets off the release of some chemicals, which cross the synapse and start a similar electrical impulse in a dendrite of the next neuron. In this way nerve impulses travel in the body, from one neuron to another till it reaches the brain or the target organ. Thus, a nervous tissue is made up of an organised network of nerve cells or neurons which are specialised in conducting information via electrical impulse from one part of the body to another.

19. (a) The student is suffering from myopia.



(c) Concave lens

- (d) (i) Decrease in the focal length of the eye lens
(ii) Eye ball gets elongated.



20. (i) Mercury
(ii) Graphite
(iii) Aluminum
(iv) A pure metal is always deposited at the cathode
(v) Zinc oxide (ZnO) is an amphoteric oxide.

21. Natural resources are components of biosphere and include energy, air, land, water, minerals, plants, animals and micro-organisms.

The natural resources are categorised into two main groups i.e. renewable and non-

renewable.

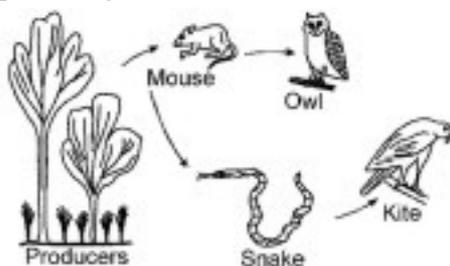
Classification of natural resources

Depending on the availability and abundance, the natural resources are classified into following kinds.

- 1) Inexhaustible resources. These resources are not likely to be exhausted by man's consumption and other uses.
- 2) Exhaustible resources. These are the resources which are likely to be exhausted by man's consumption.

OR

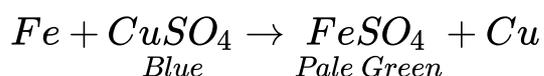
Food chain. A food chain consists of a connected group of producers, consumers and decomposers. It starts with energy from the sun and nutrients from the soil. They pass through a plant and one or several consumers to final consumer that is not fed upon by other. Even then one may have parasites, and in time it will certainly die. The food relation in simplest form grass-deer-tiger-micro-organisms representing a producer, primary consumer, a secondary consumer and decomposer is called a food chain. A common example of food chain is that involving the plants and grazing antelopes. The plants are producers and the antelope being herbivorous are primary consumers. The antelopes in turn are consumed as food by carnivorous animals, such as lion and cheetah. They constitute a group called secondary consumer. They eat upto their fill but do not completely consume the antelopes. The tertiary consumers, the scavenging vultures, then feed on the remains. After they finish, the bones may be crushed by jackals and hyenas. Still there is sufficient nutrient to attract a large number of insects. Finally whatever is left may be decomposed by bacteria and fungi, thus return the simple components to soil. The last group constitute the decomposers. Green plants are the producers, mouse is the primary consumer and kite is tertiary consumer. Thus a food chain is set up.



Section B

22. The student can use other indicator; like phenolphthalein or methyl orange to check the acidity or alkalinity of particular solution. The student can also use turmeric powder to check the solutions. It is mentioned that litmus paper is not available. So, we can assume that the laboratory may have other indicators.

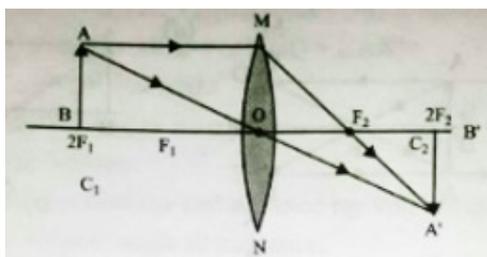
23. We will observe that only copper sulphate solution changed.
Iron (Fe) is more reactive than Copper (Cu) therefore, it will displace copper from copper sulphate solution.



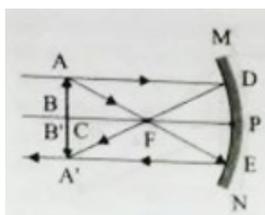
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.

25. The leaf turns blue-black except in the covered region. As this covered region did not receive light, photosynthesis did not occur. Hence no starch was formed there. The uncovered region received light and starch was formed there due to photosynthesis. So the region I and III will be turned in blue black colour.

26.



OR



27. (i) In parallel circuit, potential difference does not get divided. Hence, glow of other bulbs will not be affected when bulb B_1 get fused.

CBSE Class 10 Science
Sample Paper 07

General Instructions:

1. The question paper comprises two sections. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in 2 questions of 3 marks each and 1 question of 5 marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. What is the function of pollen grains in flowers?
2. Why is diffusion insufficient to meet the oxygen requirements of multicellular organisms like humans?
3. Did Dobereiner's triads also exist in the columns of Newland's Octaves? Compare and find out?
4. Explain the term lateral inversion.
5. Why are many thermal power plants set up near coal or oil fields?
6. Under what soil condition do you think a farmer would treat the soil of his field with

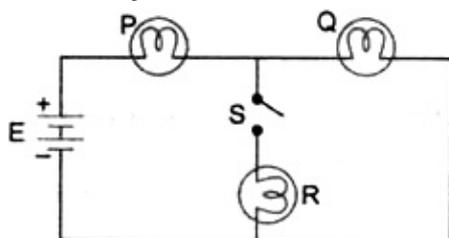
quicklime (calcium oxide) or slaked lime (calcium hydroxide) or chalk (calcium carbonate).

OR

What is 'baking powder'? How does it make the cake soft and spongy?

7. A metallic wire of resistance R is cut into ten parts of equal length. Two pieces each are joined in series and then five such combinations are joined in parallel. What will be the effective resistance of the combination?

8. A battery E is connected to three identical lamps P , Q and R as shown in figure:



Initially the switch S is kept open and the lamp P and Q are observed to glow with same brightness. Then switch S is closed. How will the brightness of the glow of bulbs P and Q will change? Justify your answer.

9. Write two major shortcomings of Mendeleev's periodic table? How have these been removed in the modern periodic table?

10. State differences between artery, vein and capillary.

OR

What is meant by clotting of blood? Write a flow chart showing major events taking place in clotting of blood?

11. State the evolutionary force which leads to origin of a new species.

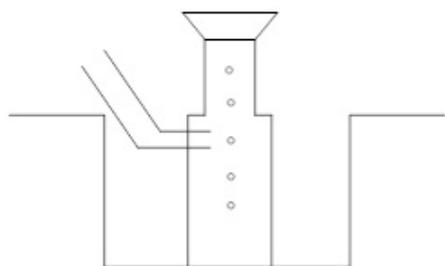
12. How is the sex of the child determined in human beings?

13. With the help of an activity show that iron metal is more reactive than copper metal.

OR

A metal is heated with dil H_2SO_4 . The gas evolved is collected by the method shown in

the figure. Answer the following questions based on it:



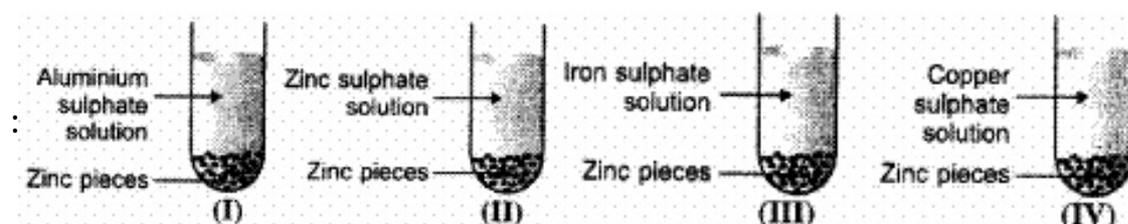
- (a) Name the gas evolved .
 - (b) Name the method used for the collection of gas.
 - (c) Is the gas soluble or insoluble in water?
 - (d) Is the gas lighter or heavier than air?
14. An object is placed at a distance of 10 cm from a convex mirror of focal length 15 cm. Find the position and nature of image.
 15. Why is DNA copying an essential part of the process of reproduction?
 16. (a) Distinguish between A.C and D.C? (b) Which source produces alternating current?
 17. Explain the mechanism of the cleaning action of soaps.
 18. Give the various functions performed by the plant hormones.
 19. A 14 year old student is not able to see clearly the questions written of the black board placed at a distance of 5 m from him.
 - (a) Name the defect of vision he is suffering from?
 - (b) Draw the diagram to show this defect?
 - (c) Name the type of lens used to correct this defect?
 - (d) Name two possible cause of this defect.
 - (e) Draw the diagram to show how this defect can be corrected.
 20.
 - (i) Name the metal which does not stick to glass?
 - (ii) Name the non-metal which is a good conductor of electricity?
 - (iii) Name the metal which is commonly used in thermit welding?
 - (iv) What gets deposited at the cathode, a pure or impure metal?
 - (v) What is the nature of Zinc oxide?
 21. Why use of coal and petroleum should be restricted?

OR

Write a note on pyramid of energy.

Section B

22. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. identify A, B and C.
23. Zinc pieces were placed in each of the four test tubes containing different salt solutions as shown below



A colour change would be observed in solutions:

24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. Which are material required for setting up an experiment to show that light is necessary for photosynthesis ?
26. Draw ray diagram showing the image formation by a concave mirror when an object placed a little beyond centre of curvature of the mirror.

OR

Draw a ray diagram showing the path of rays of light when it enters with oblique incidence (i) from air into water, (ii) from water into air.

27. How does potential difference (V) across a resistor depend on current passing through it? What is nature of I-V graph obtained?

CBSE Class 10 Science

Sample Paper 07

Solution

Section A

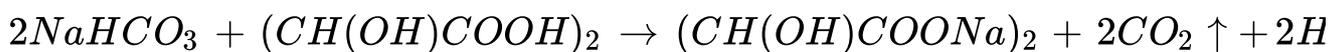
1. Pollen grains are the male gametes which fertilise the egg cell present in the ovule.
2. Since all the cells in multicellular organisms are not in direct contact with environment, simple diffusion does not meet the requirement of all the body cells.
3. Yes, following triads can be identified: Li, Na, K, Be, Mg, Ca
The atomic mass of middle atom in the above triads is approximately equal to the average mass of elements on the left and right hand side.
4. If an object is placed in front of a plane mirror, then the right side of the object appears to be the left side of the image, and the left side of the object appears to be the right side of its image. This change of sides of an object and its mirror image is called lateral inversion.
5. Thermal Power plant is a power plant where steam is used to drive a steam turbine and the heat required for the process is obtained from coal and oil. The thermal power plants are usually set up near coal or oil fields so that the fuel can be easily obtained and the problem of air pollution while transporting the fuel may be minimized.
6. Most of the plants grow best when the pH of the soil is close to 7. If the soil is too acidic or too basic, the plants do not grow properly or do not grow at all. Quicklime (calcium oxide), slaked lime (calcium hydroxide) and chalk (calcium carbonate) are alkaline substances. These would be added to the soil by a farmer when the soil of his field is highly acidic and "liming of the soil" is required.

OR

Baking powder is a mixture of baking soda $NaHCO_3$ and an edible acid like tartaric acid $(CH(OH)COOH)_2$. Tartaric acid is also known as dihydroxy

butanedioic acid.

Baking powder on heating produces carbon dioxide gas which causes bread or cake to rise making it soft and spongy.



7. The resistance of a conductor is directly proportional to the length of the conductor

$$R \propto l$$

The resistance of the metallic wire, when it is cut into ten parts of equal length, $\frac{R}{10}$

$$r = \left(\frac{R}{10}\right)$$

Two such pieces when joined in series, the equivalent resistance of these two parts

$$= r + r = 2r = \frac{2R}{10}$$

$$\text{Equivalent resistance of two parts} = 2 \times \frac{2R}{10} = \frac{R}{5}$$

5 such parts are connected in parallel.

$$\text{the total resistance } R', = \frac{25}{R}$$

$$\text{Hence, } R' = \left(\frac{R}{25}\right)$$

8. The brightness of the glow of bulb P will increase and brightness of the glow of bulb Q will decrease. This is because on closing S, bulbs Q and R will be in parallel and the combination will be in series with bulb P. Hence the total resistance of the circuit will decrease and the current flowing in the circuit will increase. Therefore, the glow of bulb P will increase.

Also, since bulbs Q and R will be in parallel in this case, the current gets divided and lesser current flows through Q and hence the glow of bulb Q will decrease.

9. The two major short comings of Mendeleev's periodic table were

(i) It could not justify the position of hydrogen in the periodic table whether in group 1 or group 8

(ii) It could not assign proper position to the different isotopes of the same element.

The main reason for these short comings was the basis of the Mendeleev's periodic table. It regarded atomic masses of the elements as the basis of classification. The modern periodic table regards atomic numbers of the elements as the basis of classifying the elements. It removed both the short comings from the table.

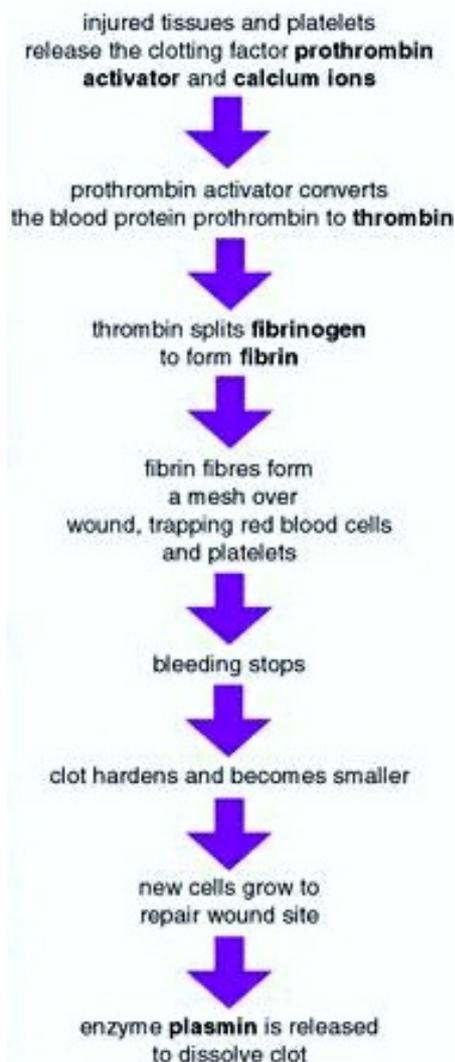
10.

Artery	Vein	Capillary
---------------	-------------	------------------

<ol style="list-style-type: none">1. Thick-walled.2. Carries oxygenated blood from the heart to other parts of the body.3. Situated deeper under the skin.	<ol style="list-style-type: none">1. Thin-walled.2. Carries deoxygenated blood from different organs to the heart.3. Situated just under the skin.	<ol style="list-style-type: none">1. Thin-walled.2. Capillaries are involved in the exchange of food material, respiratory gases, and body wastes.3. Occur at the terminals of artery and vein.
--	--	---

OR

A blood clot is formed when blood cells and fibrin strands clump together. A clot that blocks blood flow is called a thrombus.



11. Various elemental forces of evolution are-

(a) Mutation

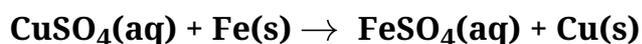
- (b) Recombination (Crossing over during meiosis, Random assortment of gene at the time of gamete formation).
- (c) Natural selection or survival of the fittest.
- (d) Genetic drift and geographical isolation.

12. In human beings, the females have two X chromosomes and the males have one X and one Y chromosome. Therefore, the females are XX and the males are XY. The gametes, as we know, receive half of the chromosomes. The male gametes have 22 autosomes and either X or Y sex chromosome. Type of male gametes: 22+X OR 22+ Y. However, since the females have XX sex chromosomes, their gametes can only have X sex chromosome.

Sex determination in humans : Thus, the mother provides only X chromosomes. The sex of the baby is determined by the type of male gamete (X or Y) that fuses with the X chromosome of the female.

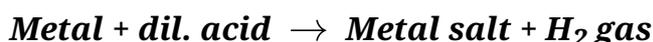
13. (A) Take three iron nails and clean them by rubbing with sand paper.
(B) Take about 10 mL copper sulphate solution in each test tube marked as T₁ and T₂ .
(C) Tie two iron nails with a thread and immerse them carefully in copper sulphate solution in test tube T₂. Keep one iron nail separately for comparison.
(D) After a few minutes, take out the iron nail from the copper sulphate solution. Compare the intensity of the blue colour of copper sulphate solutions in test tubes (T₁) and (T₂) and the colour of the iron nails.

From the above activity, you will observe that iron nails become brownish in colour and blue colour of copper sulphate solution fades away.



Thus, this activity shows that iron metal is more reactive than copper.

OR



- (a) H₂ gas is evolved.
- (b) Using downward displacement method, hydrogen gas is collected over water.
- (c) Since the gas is collected over water so it is insoluble.
- (d) The gas evolved is lighter than air.

14. $f = +15 \text{ cm}$, $u = -10 \text{ cm}$.

$$1/f = 1/v + 1/u$$

$$1/v = 1/15 + 1/10$$

$$1/v = 5/30$$

$$v = +6 \text{ cm}$$

$$\text{Magnification} = -v/u = 0.6$$

The image is formed 6 cm behind the mirror, it is a virtual and erect image and diminished.

15. The process of reproduction results in the production of offsprings which are exactly similar to the parents. DNA copying is accompanied by cell division that gives rise to two cells. The exact blue print of body design is inherited in the offsprings due to DNA replication in parent cell. Therefore, DNA copying is an essential part of the process of reproduction.

16. **(a) Difference between direct current(d.c) and alternating current are as follows:**

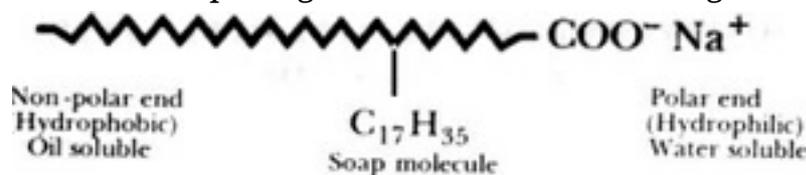
Direct current	Alternating current
i) The magnitude of current is constant and flows in one direction only.	i) The magnitude and direction of current reverses periodically.
ii) The frequency of direct current is zero.	ii) The frequency of alternating current is non-zero.
iii) Direct current is used for low voltage applications such as charging batteries automotive applications, aircraft applications.	iii) It is used to run electrical appliances like bulb, heater, iron etc.

(b) Sources of alternating current are AC generators, power plants, etc.

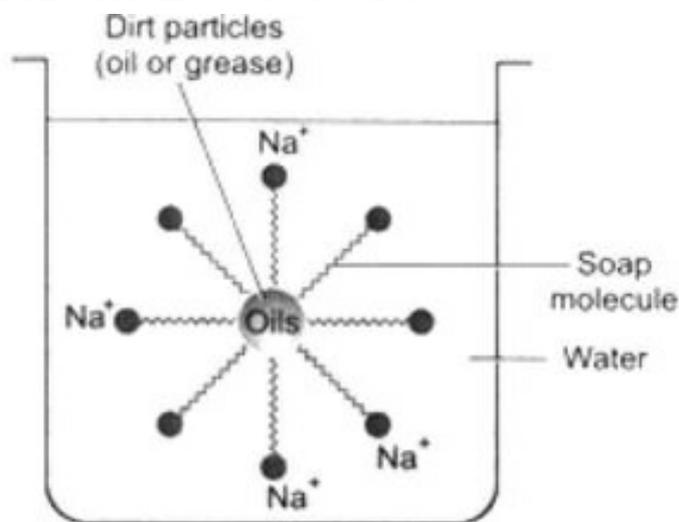
17. The action of soap is based on the presence of both hydrophilic and hydrophobic groups in a soap molecule. A soap molecule consists of two parts:

(i) A short ionic part comprising the carboxylate salt, $-\text{COONa}^+$. This is the polar end. This is water soluble (i.e. hydrophilic or water-attracting) and, therefore, remains attached to water.

(ii) A long hydrocarbon chain which is the non-polar end. This end is hydrophobic (i.e. water-repelling) and is soluble in oil and grease.



Micelle formation: The soap molecule may be represented as a structure as shown in the figure. When soap is dissolved in water, it forms a colloidal suspension. In this colloidal suspension, the soap molecules adhere together to form micelles and remain radially suspended in water with the hydrocarbon end towards the centre and the ionic end directed outward.



The dirt particles always adhere to the oily or greasy layer present on the skin or clothes. When a dirty cloth is dipped into a soap solution, its non-polar hydrocarbon end of micelles attach to the grease or oil present in dirt and polar end remains in water layer. The subsequent mechanical action of rubbing (agitation), dislodges the oily layer from the dirty surface shaping it into small globules. A stable emulsion of oil in water is formed. The emulsified oil or grease globules bearing the dirt can be washed away with water.

18. The various functions performed by the plant hormones are as follows-

- (i) Auxins promote cell enlargement and cell differentiation. They also promote growth.
- (ii) Gibberellins promote cell enlargement and cell differentiation in the presence of auxin. It also help in breaking the dormancy in seeds and buds. It promote the growth

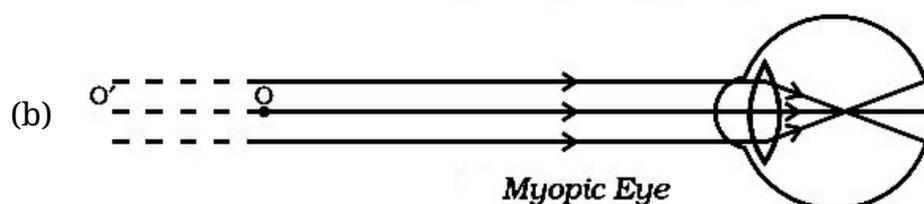
in fruits.

(iii) Cytokinins promote cell division and help in breaking the dormancy of seeds and buds. It delay the ageing in leaves. It promotes the opening of stomata and also fruit growth.

(iv) Absciscic acid promotes the dormancy in seeds and buds. It promotes the closing of stomata and falling of leaves. Inhibits growth, reverses the growth promoting effects of auxins and gibberellins. Its effects include wilting of leaves.

(v) Ethylene promotes the falling of leaves, ripening of fruits and helps in breaking bud dormancy only induce flowering.

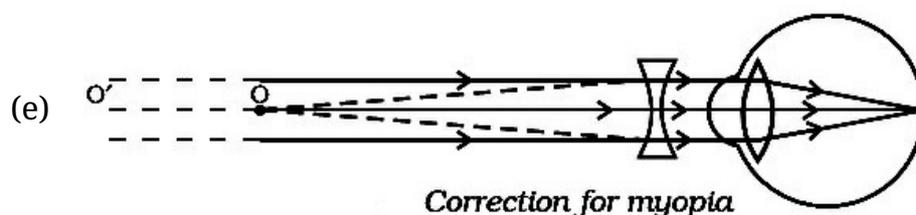
19. (a) The student is suffering from myopia.



(c) Concave lens

(d) (i) Decrease in the focal length of the eye lens

(ii) Eye ball gets elongated.



20. (i) Mercury

(ii) Graphite

(iii) Aluminum

(iv) A pure metal is always deposited at the cathode

(v) Zinc oxide ZnO is an amphoteric oxide.

21. Since coal and petroleum have been formed from biomass, in addition to carbon, these contain hydrogen nitrogen and sulphur. When these are burnt, the products formed are carbon dioxide, water, oxides of nitrogen and oxides of sulphur. When combustion takes place in insufficient air (oxygen), then carbon monoxide is formed instead of carbon dioxide. Of these products, the oxides of sulphur and nitrogen and

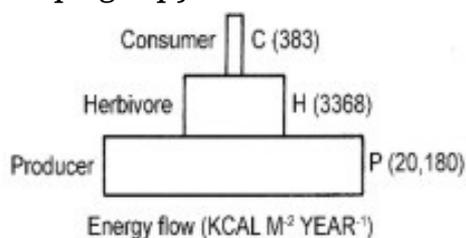
carbon monoxide are poisonous at high concentration and carbon dioxide is a greenhouse gas.

Another way of looking at coal and petroleum is that they are huge reservoirs of carbon and if all of this carbon is converted to carbon dioxide, then the amount of carbon dioxide in the atmosphere is going to increase leading to intense global warming. Thus, we need to use these resources judiciously.

OR

The primary producers of an ecosystem trap the radiant energy of the sun and convert it into potential chemical energy. This trapped energy flows in the food chain from the producers to the top consumers or top carnivore, decreasing at the successive trophic levels.

If the relationship of the total quantity of energy unutilized in unit area over a particular period of time by different trophic levels is diagrammatically represented, an upright pyramid is formed.



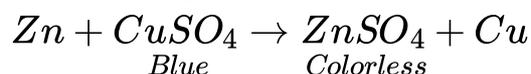
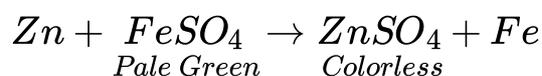
Section B

22. Salt A is sodium hydrogen carbonate (baking soda). When it is heated, it turns into sodium carbonate; which is salt B. In this reaction, carbon dioxide gas is also produced; which is the gas C.

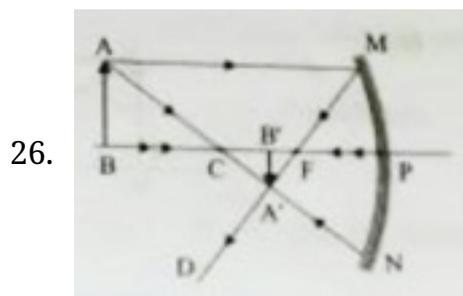


Sodium hydrogen carbonate is used in bakery products. Sodium carbonate is used for removing hardness of water.

23. The colour change will take place in III and IV as zinc is more reactive than iron as well as copper.

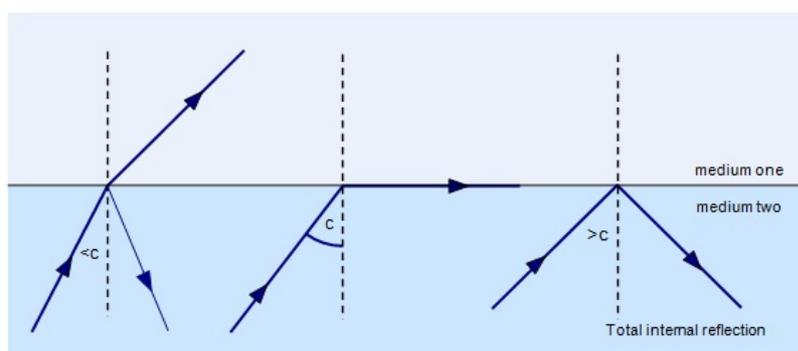


24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25. A healthy potted plant, a petri dish, a beaker containing water, forceps, a water bath, a piece of wire gauze, a tripod, a burner, a box of matches, alcohol a strip of black paper, iodine solution and clips.



OR

The following figure shows a ray of light incident obliquely. Every medium has a critical angle. When angle of incidence is more than critical angle, the ray of light comes back in the same medium. This phenomenon is called total internal reflection.



27. If temperature and other physical conditions such as pressure, mechanical strain, etc. Remain the same, the current (I) flowing through a conductor is directly proportional to be potential difference (V) across the conductor, i.e.,

$$(I \propto V \text{ or } V = IR)$$

Where R is a constant called resistance.

If a graph is plotted between the current (I) flowing through the condutor and the applied potential difference (V) between its ends, it will be straight line.

CBSE Class 10 Science
Sample Paper 08

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. Define parthenogenesis.
2. What is the mode of nutrition in fungi and plasmodium?
3. State Periodic Law on which the Modern Periodic Table is based.
4. A ray of light traveling in air enters obliquely into water. Does the light ray bend towards or away from the normal? Why?
5. What is geothermal energy? Write its advantages?
6. Explain why-

- (i) Anhydrous calcium chloride is used in desiccators
- (ii) If bottle full of concentrated H_2SO_4 is left open in the atmosphere by accident, the acid starts flowing out of the bottle of its own.

OR

How is plaster of Paris chemically different from gypsum? How may these be inter converted? Write one use of plaster of Paris?

7. The values of the current I flowing in a given resistor for corresponding values of potential difference V across the resistor are given below:

I (amperes)	0.5	1.0	2.0	3.0	4.0
V (volts)	1.6	3.4	6.7	10.2	13.2

Plot a graph between V and I and calculate the resistance of that resistor.

- 8. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
- 9. Compare and contrast the arrangement of elements in Mendeleev's Periodic Table and the Modern Periodic Table.
- 10. With the help of diagram, show pulmonary circulation in man.

OR

Explain the role of haemoglobin in respiration.

- 11. Write similarities between Mendalian's factors and gene.
- 12. What is the difference between chemical evolution and organic evolution?
- 13. Why is respiration considered as an exothermic reaction? Explain.

OR

Give the characteristic tests for CO_2

- 14. A convex mirror used for rear-view on an automobile has a radius of curvature of

3.00 m. If a bus is located at 5.00 m from this mirror, find the position, nature and size of the image.

15. What could be the reasons for adopting contraceptive methods?
16. Explain the principle, construction and working of an electric motor with a help of labelled diagram?
17. Discuss the important characteristics of covalent compounds.

OR

Discuss the formation of covalent bonds in molecules of (i) Ammonia (ii) Ethylene (iii) Carbon dioxide.

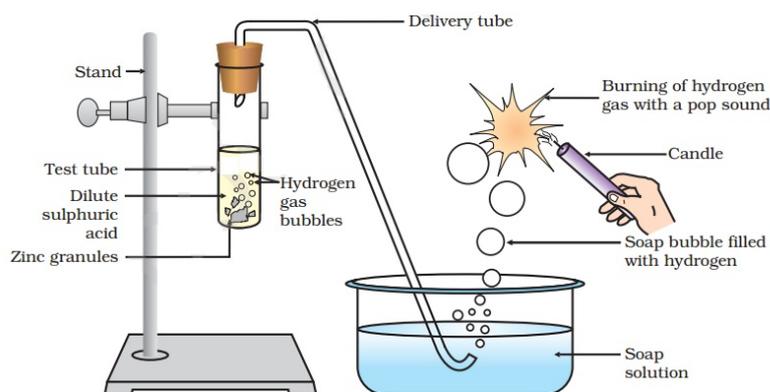
18. What are hormones? State their role in the working of the human body. Or Define 'Hormone'. What are the general functions of 'hormones'?
19. What is hypermetropia? Write two causes for development of this defect Describe with a ray diagram how this defect of vision can be corrected by using spectacles.
20. (i) Hydrogen is not a metal but it has been assigned a place in the reactivity series of metals. Explain.
(ii) How would you show that silver is chemically less reactive than copper?
21. What are causes of pollution of Ganga?

OR

Explain the meaning of food web and illustrate with a ray diagram.

Section B

22. In the following schematic diagram for the preparation of hydrogen gas as shown in fig, what would happen if following changes are made?



In place of zinc granules, same amount of zinc dust is taken into the test tube.

23. Why do we store silver chloride in dark coloured bottles?
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. What precaution should be taken while preparing a good temporary mount of leaf peel to observe stomata?
26. Sudha finds out that the sharp image of window pane of her science laboratory is formed at a distance of 15 cm from the lens. She now tries to focus the building visible of her outside the window instead of the window pane without disturbing the lens. In which direction will she move the screen to obtain a sharp image of the building? What is the approximate focal length of this lens?

OR

Draw ray diagram showing the image formation by a concave mirror when an object is placed between focus and centre of curvature of the mirror.

27. Draw a circuit diagram of an electric circuit containing two resistors, an ammeter, a resistor of 2Ω in series with a combination of two resistors (4 each) in parallel and a voltmeter across the parallel combination. Will the potential difference across the 2Ω resistor be the same as that across the parallel combination of 4Ω resistors? Give reason.

CBSE Class 10 Science
Sample Paper 08
Solution

Section A

1. Parthenogenesis is a form of asexual reproduction wherein the offspring develops from the egg or female gamete without the prior fertilization from the male gamete.
2. Fungi is saprophyte which feeds on dead and decaying matter while plasmodium is a parasite which obtains its nutrition from a living host.
3. Modern Periodic Law is based on atomic number and can be stated as

“properties of the elements are periodic function of their atomic number.”

That is, in the Modern Periodic Table, the elements are arranged in the order of their increasing atomic numbers.

4. The light bends towards the normal on entry into water. It is due to the fact that as compared to air, the water is optically denser medium.
5. The heat energy obtained from hot rocks present in earth's crust is called geo thermal energy.

The advantages of geo thermal energy are-

- (i) Eco friendly.
 - (ii) Cost of converting geo-thermal energy into electricity is less.
6. (a) Anhydrous calcium chloride is highly hygroscopic in nature it readily absorbs moisture and is therefore used as drying agent.
 - (b) Concentrated sulphuric acid is highly hygroscopic it absorbs moisture from air and gets diluted. Since the volume increases, the acid starts flowing out of the bottle.

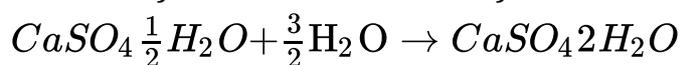
OR

Plaster of Paris is different from Gypsum as it is prepared from heating gypsum.

Plaster of Paris is a major constituent of surgical bandages used for setting fractured

bones. Before applying on fractured bone, it is made wet with water and as a result of hydration it changes into gypsum which keeps the bones in position.

These may be inter-converted by the reaction.



The use of plaster of Paris are-

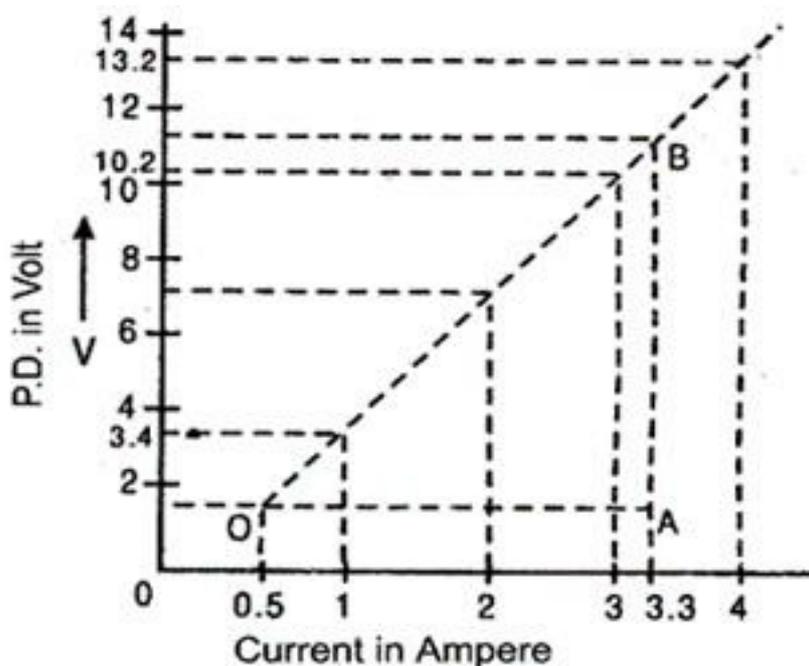
- (i) It is used for making moulds or casts for toys pottery, ceramics etc.
- (ii) In surgical bandages for setting fractured bones.

7. Graph between I and V is as shown in figure. Since graph is almost a straight line, the slope of line between any two points give the resistance. Slope of sayOB is:

$$R = \frac{AB}{OA} = \frac{BC - AC}{DA - OD}$$

$$R = \frac{12 - 1.6}{3.3 - 0.5} = \frac{10.4}{2.8} = \frac{104}{28}$$

$$R = 3.7 \Omega$$



8. Advantages of connecting electrical devices in parallel with the battery are as follows:

- (i) The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
- (ii) Separate on/off switches can be applied across each device.
- (iii) Total resistance in parallel circuit decreases, hence, a great current may be drawn

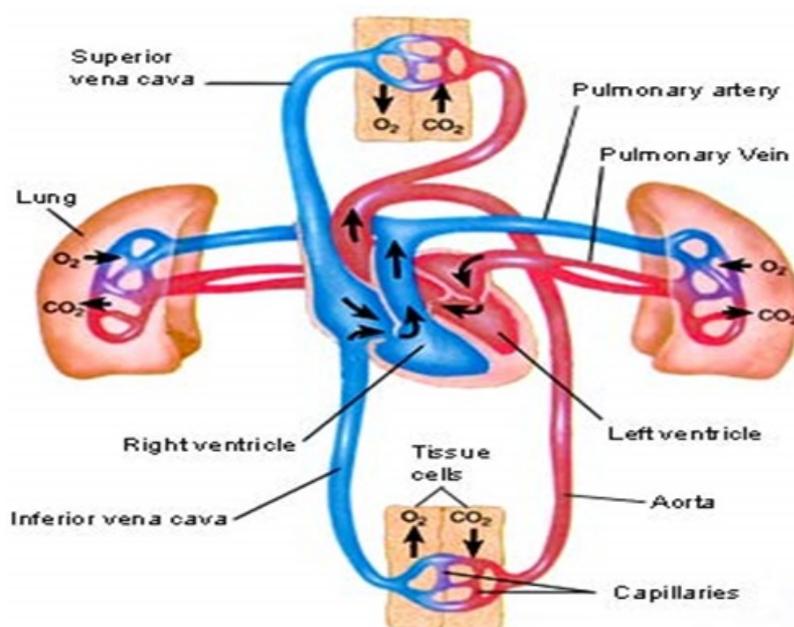
from the cell.

(iv) If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.

9.

Mendeleev's periodic table	Modern periodic table
Elements are arranged in the increasing order of their atomic masses.	Elements are arranged in the increasing order of their atomic numbers.
There are 8 Groups.	There are 18 Groups.
Each groups are subdivided into sub group 'a' and 'b'.	Groups are not subdivided into sub-groups.
Groups for Noble gas was not present as noble gases were not discovered by that time.	A seprate group is meant for noble gases.
There was no place for isotopes	This problem has been rectified as slots are determined according to atomic numbers

10. Diagram - Pulmonary circulation in man.



OR

Haemoglobin is the most important protein present in many animals including man. It is a respiratory pigment which combines with oxygen and increases the oxygen carrying capacity of the blood. Oxygen combines with haemoglobin in the red cells of the pulmonary capillaries to produce oxyhaemoglobin. As this oxygenated blood circulates through the tissues oxygen is released where its concentration is less. After releasing oxygen the oxyhaemoglobin which now becomes haemoglobin returns to the lungs again in deoxygenated blood. Each haemoglobin molecule can bind up to four oxygen molecules. It carries some of the body's respiratory carbon dioxide from the body cells to the lungs as carbaminohaemoglobin.

11. Mendel proposed the inheritance of traits from parents to offsprings by hereditary units called factors. Mendel suggested that every character is controlled by a pair of factors. Sutton and Boveri (1902) found striking similarities between the behaviours of Mendelian factors and the chromosomes during meiosis and fertilization. Factor and chromosomes are present in paired condition in the parents, separate during meiosis and again get paired after fertilization.

12.

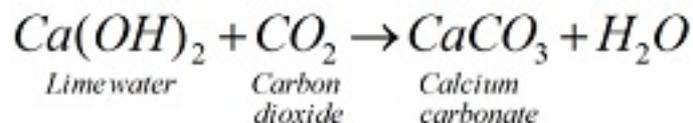
Chemical Evolution	Organic Evolution
It is the formation of the complex organic compound from simple compound or element.	It is the formation of complex form of life from simple form of life.
It occurred at the time of origin of life.	It is still occurring.
It is irreversible.	It is reversible.
Speed of evolution is fast.	Speed of evolution is slow.

13. Rice, potatoes and bread contain carbohydrates. During digestion, these carbohydrates are broken down into simpler substances called glucose. Digestion follows respiration. During respiration, the glucose combines with oxygen in the cells of our body and provides energy. Thus, respiration is an exothermic process because energy is produced during this process.



OR

Carbon dioxide (CO_2) gas turns lime water milky when passed through it due to the formation of insoluble calcium carbonate.



14. Radius of curvature, $R = + 3.00$ m;

Object distance, $u = - 5.00$ m;

Image distance, $v = ?$

Height of the image, $h' = ?$

$$\begin{aligned} \text{Focal length, } f &= \left(\frac{R}{2} = + \frac{3.00}{2} \right) \frac{R}{2} = + \frac{3.00}{2} \\ &= 1.50 \text{ m} \end{aligned}$$

$$\text{Since, } \frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\text{or } \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$\left(+ \frac{1}{1.50} - \frac{1}{-5.00} \right) \left(\frac{1}{1.50} + \frac{1}{5.00} = \frac{2}{3} + \frac{1}{5} \right) \left(\frac{1}{v} = \frac{13}{15} \right) \frac{1}{v} = \frac{13}{15}$$

$$v = \left(\frac{15}{13} \right)$$

$$= +1.15 \text{ m (approximately)}$$

The image is 1.15 m at the back of the mirror.

$$\text{Magnification} = m = \frac{h'}{h} = - \frac{v}{u}$$

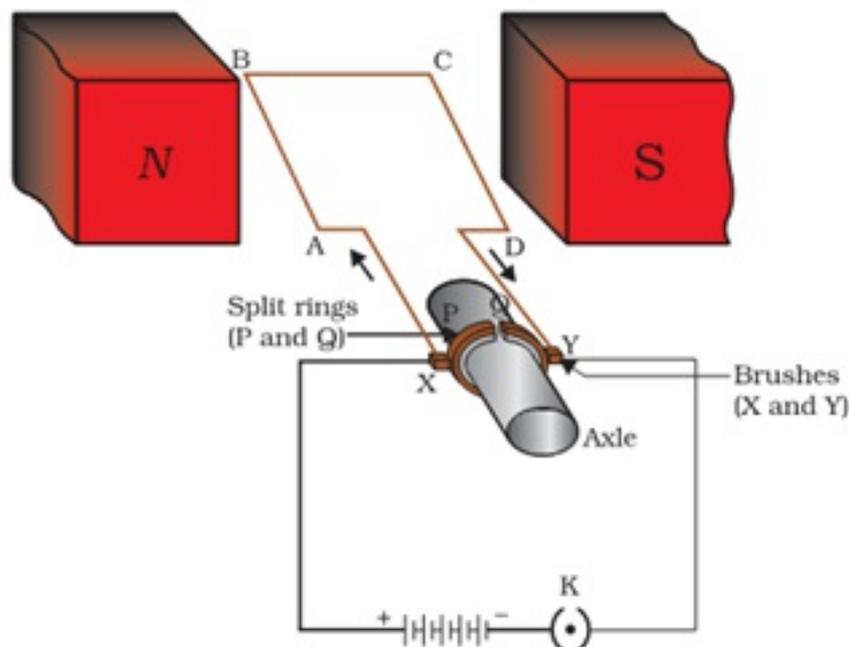
$$= - \frac{1.15m}{-5.00m}$$

$$= +0.23$$

Image is virtual, erect and smaller in size by a factor of 0.23.

15. The sexual act always has the potential to lead to pregnancy. Pregnancy will make major demands on the body and the mind of the woman and if she is not ready for it, her health will adversely affected. Therefore, adopting contraceptive methods are essential. Some contraceptive methods like condom also prevent spread of STDs and lethal diseases like HIV-AIDS

16. **Principle:** It is based on the principle that a current carrying conductor placed perpendicular to the magnetic field experiences a force.



Construction-

- (1) Armature or coil- It consist of an insulated copper wire wound on a soft iron core.
- (2) Strong field magnet- two pole pieces of a strong magnet provides a strong magnetic field.
- (3) Split ring- it consist of two halves (P and Q) of a metallic ring which reverses the direction of the current in a coil.
- (4) Brushes- two carbon brushes touch the commutator (split ring).
- (5) Battery – a battery is connected across the carbon brushes.

Working: When current flow through coil, arm AB and CD experience magnetic force. According to Fleming's Left hand rule, arm AB of coil experiences force in downward direction and arm CD experiences force in upward direction. Both these forces are equal and opposite. Two equal and opposite forces acting at different position of armature constitute a couple. The couple rotate the coil in clockwise direction until the coil is in vertical position. At this position, the contact of commutator and brushes break. Supply of current to coil is cut off. Hence no force acts on arms of coil. But coil goes on rotating due to inertia of motion of coil until commutator again comes in contact with brushes. When commutators comes in contact with brushes after rotation, direction of current in arm AB and CD is reversed. The force acting on arm AB is in downward direction and force acting on arm CD is in upward direction. These 2 equal and opposite forces constitute a

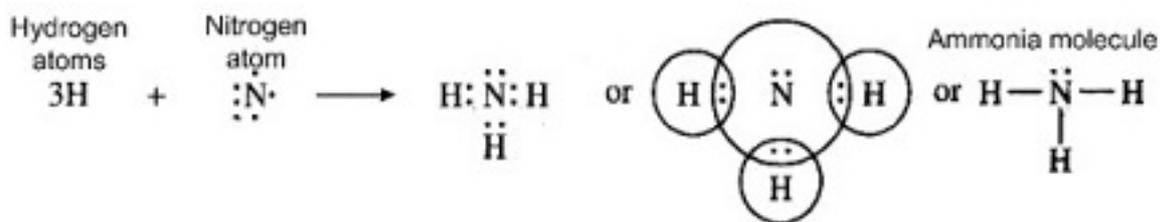
couple. this couple rotate coil again in clockwise direction. The coil of d.c. motor continues to rotate in same direction. Hence electrical energy is converted into mechanical energy.

17. The important characteristics of covalent compounds are as follows :

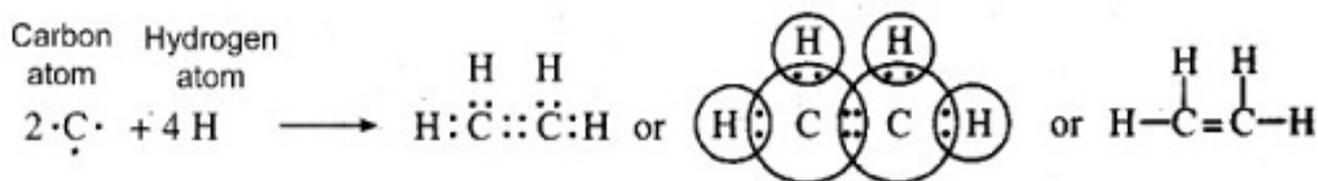
1. Covalent compounds consist of molecules. Covalent compounds do not have any ions. Therefore, they consist of molecules. For example, H_2 , Cl_2 , H_2O , NH_3 etc.
2. Covalent compounds are liquids or gases in nature. We have studied that the ionic compounds are crystalline solids. But only a few covalent compounds are solids (e.g. sugar, glucose, iodine). These are mostly liquids (water, ethyl alcohol) or gases (oxygen, hydrogen, ammonia) at room temperature. Actually, the attractive forces in covalent molecules are weak and these molecules are not as close to one another as the ionic solids.
3. Covalent compounds have low melting and boiling points. As covalent molecules do not have ions, the attractive forces among them are weak. Therefore, the covalent molecules can be easily separated from each other. In other words, they have low melting and boiling points.
4. Covalent compounds do not conduct electricity. Covalent compounds normally do not conduct electricity. Some of them are poor conductors of electricity. The current is carried by the ions. As covalent compounds do not have ions, these are poor conductors of electricity.
5. Covalent compounds are insoluble in water. Covalent compounds generally do not dissolve in water. They are soluble in alcohol, ether, benzene etc. which are called organic solvents. However some of them such as ammonia and ethyl alcohol are water soluble.

OR

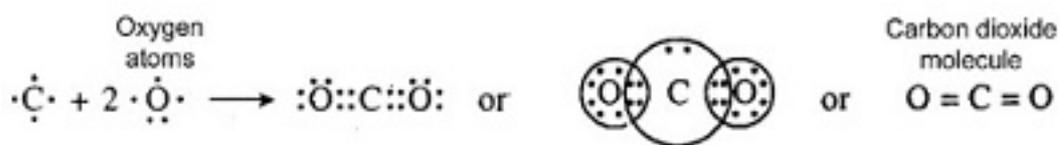
(i) Covalent bonds in ammonia (NH_3) molecule. The atomic number of nitrogen is 7. Its electronic configuration is 2, 5. This means that nitrogen atom has five valence electrons. In order to have eight electrons in the valence shell, the nitrogen atom shares three electrons with the electrons of three hydrogen atoms. Thus, nitrogen atom gets linked to three hydrogen atoms by three covalent bonds. The formation of ammonia molecule may be shown as follows:



(ii) Covalent bonds in ethylene (C_2H_4) molecule. Ethylene molecule has two carbon atoms. Each carbon atom shares two electrons with the two hydrogen atoms. At the same time, both the carbon atoms mutually share two electrons each. Thus both the carbon atoms get linked by double bond. Each carbon atom also gets linked to two hydrogen atoms by single bonds. The formation of ethylene molecule may be shown as follows:



(iii) Covalent bonds in carbon dioxide (CO_2) molecule. Carbon atom has four electrons. Each oxygen atom has six valence electrons (2, 6). The carbon atom shares its electrons with the electrons of the two oxygen atoms. As a result, the carbon atom gets linked to the oxygen atoms by double bonds. The formation of carbon dioxide molecule may be shown as follows:



18. Selye in 1948 defined hormones as "Physiological and organic compounds produced by certain cells (endocrine glands) for the sole purpose of directing the activities of distant parts of the same organism." They are also referred to as "chemical messengers". They have excitatory effects on some organs and inhibitory effects on others.

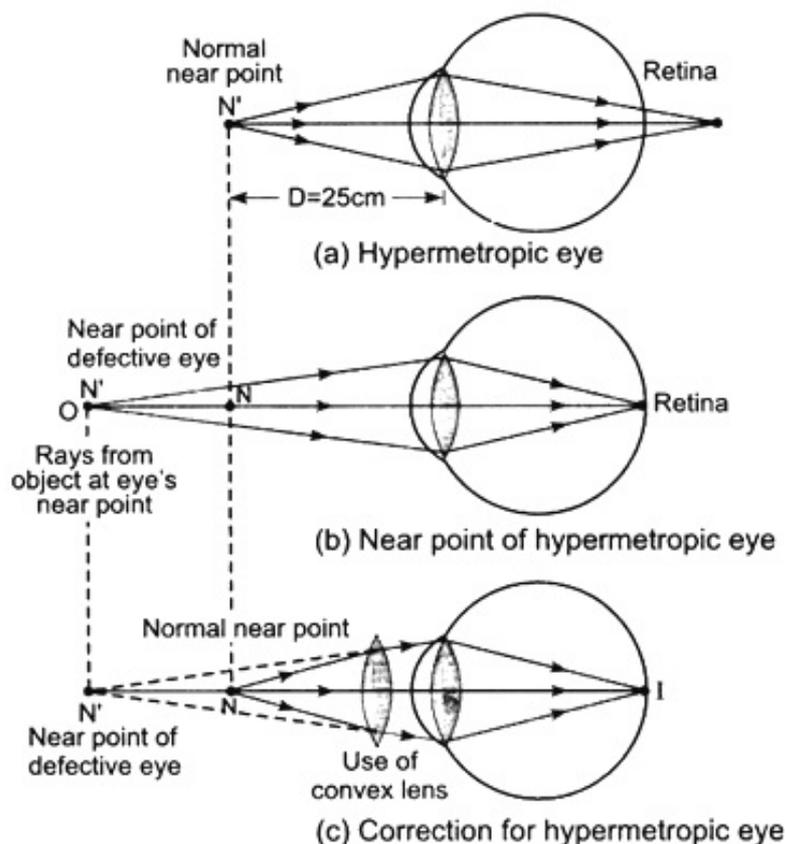
Functions of hormones:

- 1) Hormones stimulate the tissue activity.
- 2) Hormones regulate growth and reproduction.
- 3) Hormones control metabolism.

4) Hormones synthesize, store and utilize substances like glucose.

5) Hormones conserve water and minerals.

19. Hypermetropia refers to the condition of eyesight defect, when a person can see distant objects distinctly but cannot see nearby objects so clearly. This is also termed as long sightedness, it occurs when light from near objects is not quite brought to focus in time to hit the retina. The point of focus would in fact be behind the retina.



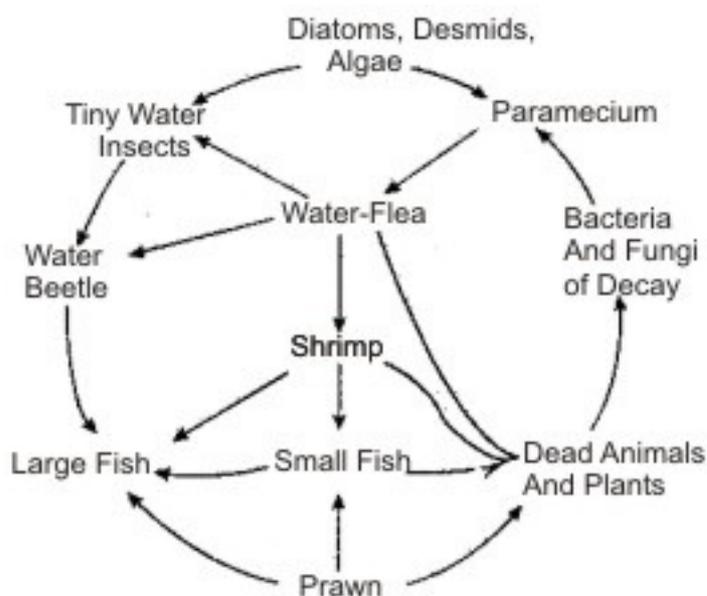
Causes of hypermetropia: This defect arises because of either,

(i) the focal length of the eye lens is too long, or

(ii) the eyeball becomes too short, so that light rays from the nearby object, say at point N, cannot be brought to focus on the retina to give a distinct image.

Hypermetropia can be corrected by using convex lens of suitable focal length in spectacles.

20. (i) Though hydrogen is not a metal but even then it has been assigned a place in the activity series. The reason is that like metals, hydrogen also has a tendency to lose electron and forms a positive ion H^+ .
The metals which lose electrons less readily than hydrogen are placed below it and the metals which lose electrons more readily than hydrogen are placed above it in the

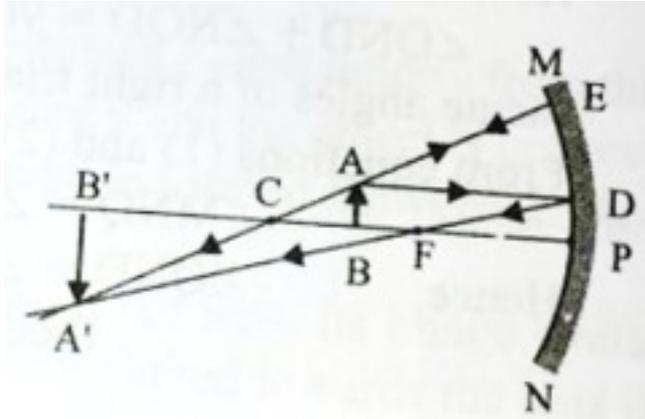


Section B

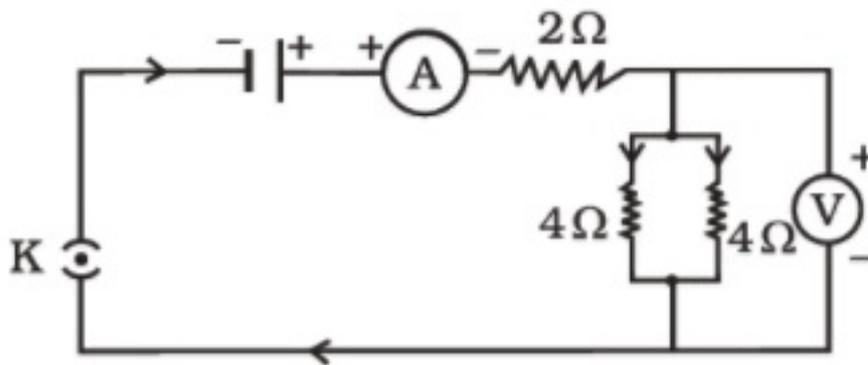
22. If zinc dust is used in place of zinc granules, the rate of reaction would be faster.
23. Silver chloride easily decomposes in the presence of sunlight to liberate silver. Silver chloride is kept in dark coloured bottles to prevent this reaction, i.e., decomposition of silver chloride.
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25.
 1. Cut the peel to a proper size and avoid folding it.
 2. Always place the peel at the centre of the slide and hold the slide at the edges.
 3. Do not overstrain or under strain the peel.
 4. Always handle the peel with a brush as a needle may damage the cells.
 5. Take care to prevent the peel from drying by using glycerin.
 6. Place the coverslip gently, avoiding any air bubbles.
 7. Remove excess stain and glycerine with a blotting paper.
26. Let us assume that the window pane is between F_2 and infinity from this lens and this is a convex lens. We know that when the object is between infinity and F_2 , its inverted and real images is formed between $2F$ and $2F_2$.

Now, the distant building is at infinity from the lens. Its image would be formed at $2F$. So, the screen needs to be moved towards the lens in order to get a sharp image. Its approximate focal length is 10 cm (less than image distance in earlier case).

OR



27.



Total resistance for parallel combination of 4Ω resistor can be calculated as follow:

$$\frac{1}{R} = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$$

$(R = 2\Omega)$ or,

Thus, resistance of parallel combination is equal to resistance of resistors in series. So, potential difference 2Ω across resistance will be same as potential difference across the other two resistors which are connected in parallel.

CBSE Class 10 Science
Sample Paper 09

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. How many male gametes are produced by pollen grains?
2. What criteria do we use to decide whether something is alive?
3. Why are the elements of group 18 called zero valent?
4. Find the power of a concave lens of focal length 2m?
5. What are limitations of the energy that can be obtained from the oceans?
6. (a) Name the raw materials used in the manufacture of sodium carbonate by Solvay process?

(b) How is sodium hydrogen carbonate from a mixture of NH_4Cl and $NaHCO_3$?

OR

A metal carbonate X on reacting with an acid gives a gas which when passed through a solution Y gives the carbonate back. On the other hand, a gas G that is obtained at anode during electrolysis of brine is passed on dry Y, it gives a compound Z, used for disinfecting drinking water. Identify X, Y, G, and Z.

7. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
8. How can three resistors of resistance 2Ω , 3Ω and 6Ω be connected to give a total resistance of (i) 4Ω , (ii) 1Ω ?
9. The following table shows the position of six elements A, B, C, D, E and F in the period table.

Groups	1	2	3 to 12	13	14	15	16	17	18
Periods									
2		A					B		C
3			D			E			F

Using the table answer the following:

- (a) Which element will form only covalent compounds?
 - (b) Which element is a metal with valency 2.
 - (c) Which element is a non-metal with valency 3.
 - (d) Out of D and E which has bigger atomic radius and why?
 - (e) Write a common name for the family of elements C and F.
10. What are the components of the transport system in human beings? What are the functions of these components?

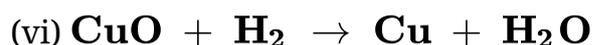
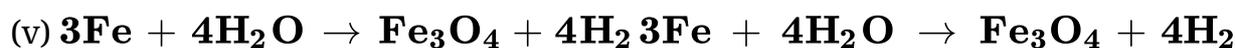
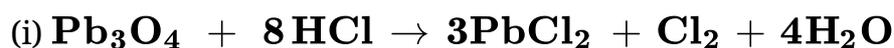
OR

Describe the structure of the nephron with a neat labelled diagram.

11. What evidence do we have for the origin of life from inanimate matter?
12. What is monohybrid and dihybrid cross? Give one example of each.
13. Define corrosion. Explain rusting of iron and give the chemical formula of rust. Why do we apply paint on iron articles?

OR

Identify the oxidising agent (oxidant) in the following reactions.



14. A convex lens of focal length 15 cm forms an image 10 cm from the lens. How far is the object placed from the lens? Draw the ray diagram.
15. What is grafting? Why is it used in horticulture practices?
16. Explain the underlying principle and working of an electric generator by drawing a labelled diagram. What is the function of brushes?
17. Explain the mechanism of the cleansing action of detergents.

OR

What are carboxylic acids? Give the common names, IUPAC names and structural formula of first four members of the homologous series.

18. Explain the reflex action by means of reflex arc with diagram.
19. How does atmospheric refraction affect sunrise and sunset?
20. An ore on treatment with dilute hydrochloric acid gives a smell like that of rotten eggs. What type of ore is this? How can it be concentrated? How can the metal be obtained from the concentrated ore?

21. Why use of coal and petroleum should be restricted?

OR

What are the two main components of an ecosystem? Describe the physical factors which affect the distribution of organisms in different habitats.

Section B

22. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. identify A, B and C.
23. Two beakers A and B contain Iron (II) sulphate solution. In the beaker A is placed a small piece of copper and in the beaker B is placed a small piece of zinc. It is found that a grey deposit forms on the zinc but not on the copper. What can be concluded from these observations?
24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?
25. Two green plants are kept separately in oxygen free containers, one in the dark and the other in contiguous light. Which one will live longer? Give reasons.
26. Draw ray diagram showing the image formation by a concave mirror when an object placed between pole and focus of the mirror.

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed between optical centre and focus of the lens.

27. What is the use of voltmeter and ammeter? How are they connected in circuit?

CBSE Class 10 Science
Sample Paper 09
Solution

Section A

1. Two, One fuses with ovum and another fuses with other cell in ovule which nourishes the zygote formed
2. All the living organisms must show activity at molecular levels along with respiration and other life processes like nutrition, respiration, transportation and excretion to be called alive.
3. Group 18 elements have their outermost shells completely filled and the atoms of these elements have no tendency to gain or lose electrons. Thus, the elements of this group are zero valent and almost unreactive.
4. $F = 2\text{cm}$
 $P = \frac{1}{f}$
 $P = \frac{1}{2} = 0.5\text{Dioptre}$
5. Limitations of energy obtained from oceans:
 - (a) There are very few locations where dams can be constructed to utilize tidal energy.
 - (b) Cost of installation of power houses is extremely high and efficiency of plants is comparatively small.
 - (c) Power plants built in oceans will need high continuous maintenance.
6. (a) Raw materials used are - NaCl, lime stone or $(CaCO_3)$ and $(NH_3)NH_3$
(b) Sodium hydrogen carbonate $NaHCO_3$ ($NaHCO_3$) is sparingly soluble or less soluble in water and it gets separated as a precipitate while NH_4Cl remains in solution. This precipitate is removed by filtration.

OR

The gas that is evolved at anode during the electrolysis of brine is chlorine. Hence, G

is **chlorine**.

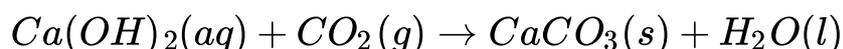


When chlorine gas is passed over dry slaked lime - $Ca(OH)_2$, it produces bleaching powder which is used for disinfecting drinking water. Hence, **Y** is **slaked lime** (calcium hydroxide) and **Z** is **calcium oxy-chloride** (bleaching powder).



Slaked lime Bleaching powder

Since Y and Z are calcium salts, therefore X is also a calcium salt. Since, **X** is a metal carbonate, it is **calcium carbonate**. Carbonates react with acids to produce carbon dioxide gas which when through a solution of slaked lime (Y) forms insoluble calcium carbonate.



X	Calcium carbonate
Y	Slaked lime (Calcium hydroxide)
G	Chlorine
Z	Calcium oxy-chloride (Bleaching powder)

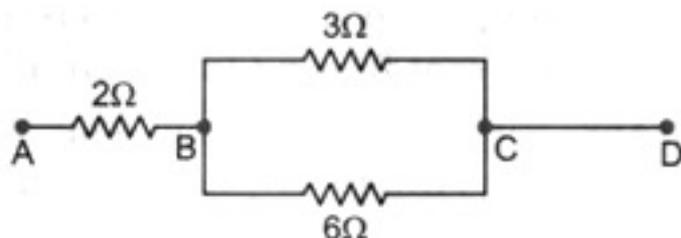
7. Advantages of connecting electrical devices in parallel with the battery are as follows:
- The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
 - Separate on/off switches can be applied across each device.
 - Total resistance in parallel circuit decreases, hence, a great current may be drawn from the cell.
 - If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.
8. (i) As the total resistance (equivalent resistance) is 4Ω , the 6Ω resistor cannot be in

series as in series combination the equivalent resistance is greater than the largest individual resistance. So, it must be in parallel with the other resistors.

In parallel connection, the equivalent resistance (4Ω) has to be less than all the resistances.

So, the resistors of 2Ω and 3Ω cannot be in parallel at one time with 6Ω

So, the resistors have to be in a mixed combination. Let us consider the combination shown in the figure.



The equivalent resistance between B and C (which are in parallel).

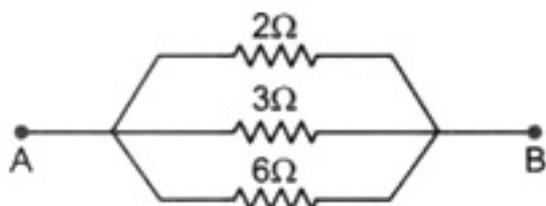
$$= \left(\frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega} \right) \frac{3\Omega \times 6\Omega}{3\Omega + 6\Omega}$$

$$= \left(\frac{18\Omega}{9\Omega} = 2\Omega \right) \frac{18\Omega}{9\Omega} = 2\Omega$$

The resistance between A and D = $2\Omega + 2\Omega = 4\Omega$.

So, the combination shown in the figure is true.

(ii) Here, $R_1 = 2\Omega$, $R_2 = 3\Omega$, $R_3 = 6\Omega$, and $R = 1\Omega$



Since the equivalent resistance of the combination is of lesser value than any of the resistors of the combination, it is clear that the resistors should be connected in parallel. It can be further confirmed by using the formula

$$\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$= \left(\frac{1}{2} + \frac{1}{3} + \frac{1}{6} \right) \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

$$= \frac{3+2+1}{6} = \frac{6}{6}$$

$$= 1\Omega$$

i.e, $R=1\Omega$

Therefore, resistors should be connected in parallel.

9. (a) Element (E) and its name is Phosphorous

(b) Element D and name is aluminium (Al) it exhibits valency 3 +

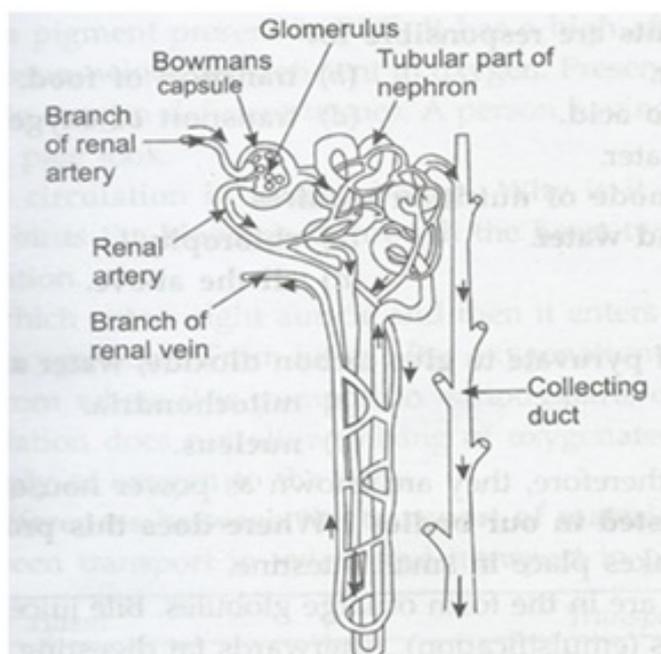
- (c) Element B is non-metal and name is Oxygen (O) and exhibits valency 2-
- (d) Element D has bigger atomic radius than E as size decreases along a period.
- (e) Element C and F are noble gases.

10. The components of human transport system include:

- (a) Heart- receives and pumps the blood.
- (b) Arteries- carry oxygenated blood away from the heart to various organs.
- (c) Veins- Bring back deoxygenated blood back to the heart.
- (d) Capillaries- exchange of various materials and gases between blood and tissues.

OR

Each nephron is a cluster of very thin-walled blood capillaries. Each capillary cluster in the kidney called glomerulus is associated with the cup shaped Bowman's capsule that collects the filtered urine. Nephron filters the blood in order to remove nitrogenous waste. They also absorb some useful substance such as glucose, amino acids, minerals and major amount of water from filtrate.



11. A British scientist, Haldane, suggested that life originated from simple inorganic when the earth was formed, it was a hot gaseous mass nitrogen, oxygen, carbon, hydrogen, etc. These elements like water (H₂O), carbon dioxide (CO₂), methane (CH₄), molecules. He believed that containing elements such as combined to form molecules ammonia (NH₃), etc. After the formation of water, slowly the earth surface cooled and the

inorganic molecules interacted with one another in water to form simple organic molecules such as sugars, fatty acids, amino acids, etc. The energy for these reactions was provided by solar radiations, lightning, volcanic eruptions, etc. This was proved by the experiment of Stanley L. Miller and Harold C. Urey in 1953. They took a mixture of water (H_2O), methane (CH_4), ammonia (NH_3), and hydrogen gas (H_2) in a chamber and sparks were passed through this mixture using two electrodes. After one week, 15% of the carbon from methane was converted into amino acids, sugars, etc. These organic molecules are polymerized and assembled to form protein molecules that gave rise to life on earth.

12. Monohybrid cross- It is the simplest cross in which inheritance of one character is studied. A cross is made between the pair of plants having one contrasting character such as tall or dwarf.

Dihybrid cross- A cross made between two plants having two pairs of contrasting character is called dihybrid cross. For ex. round and green seed crossed with yellow and wrinkled seed.

13. The process in which metals are eaten up gradually by the action of air, moisture or a chemical on their surface is called corrosion.

During rusting of iron, iron metal is oxidised by the oxygen of air in the presence of water to form hydrated iron (III) oxide ($Fe_2O_3 \cdot xH_2O$) called rust.

Paint is applied on iron articles to prevent rusting as paint keeps away air from the surface.

OR



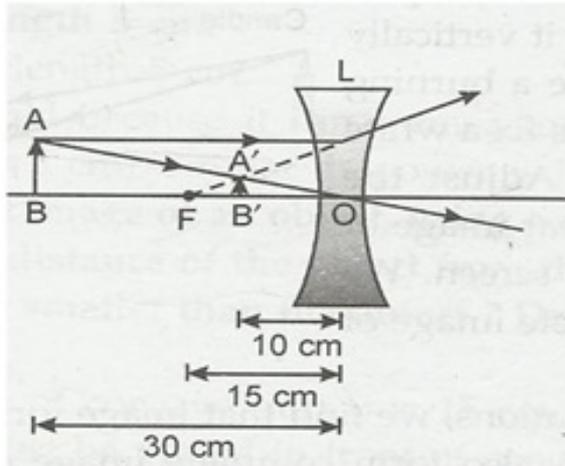
14. $f = -15$ cm, $v = -10$ cm

$$1/v - 1/u = 1/f$$

$$1/u = 1/15 - 1/10 = -1/30$$

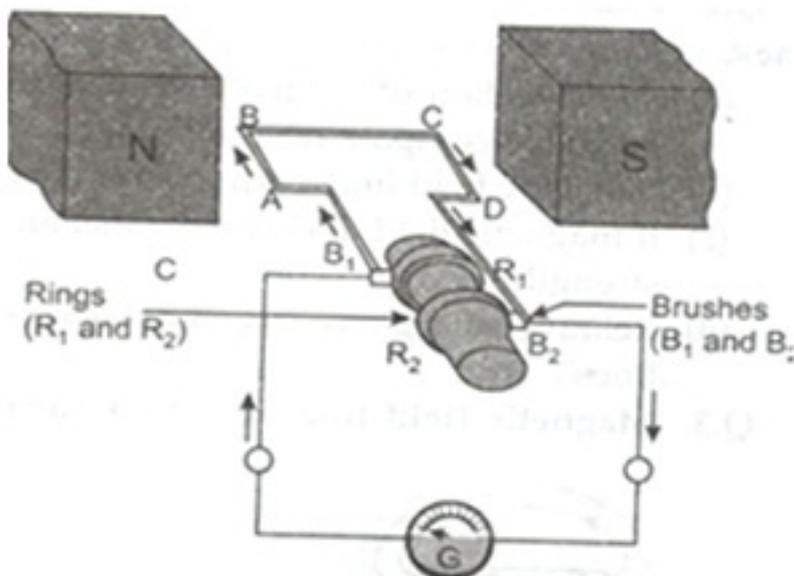
$$u = -30 \text{ cm}$$

Ray diagram as follows:



15. In grafting, cutting of a plant stem is attached to another rooted plant. The cutting of stem which is grafted on the other plant is scion and the rooted plant on which the cutting is grafted is called stock. The scion and stock are placed one over other and tied in such a way that there is no gap between them. The cambium activity takes place among them and they get joined. Grafting is used in plants which do not produce extensive roots.

16. Electric generator labelled diagram is as follows:



Principle: An electric generator works on the principle of electromagnetic induction.

Working: Let in the beginnings brushes B_1 and B_2 are kept pressed separately on rings R_1 and R_2 respectively. Let the axle attached to the rings is rotated such that arm

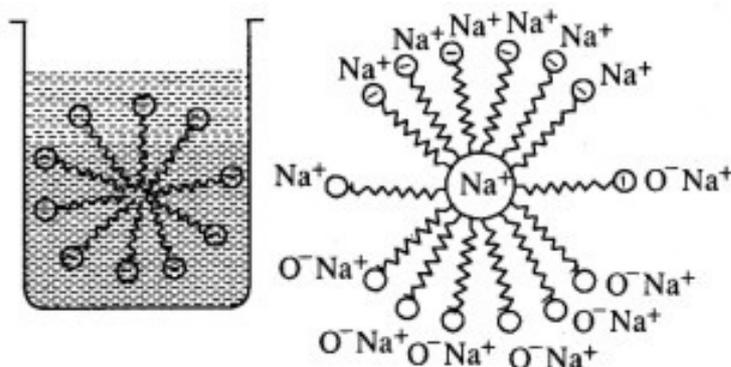
AB of the coil moves up and arm CD moves down in the magnetic field. Due to rotation of arms AB and CD induced current are set up in them. As per Fleming's right hand rule, induced current in these arms along the directions AB and CD respectively and current flows into B_1 and B_2 .

After half rotation, arm AB moves downward and arms CD upward to change the direction opposite to first case. Thus, after every half rotation current changes its direction and an alternate current is obtained in the generator.

Brushes are kept pressed on the two slip rings separately. Outer ends of the brushes are connected to the galvanometer. Thus, brushes help in transferring current from the coil ABCD to external circuit.

17. 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.

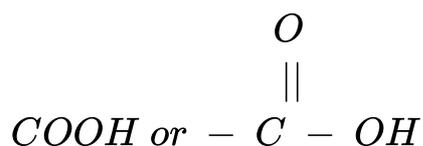
When a soap or detergent is dissolved in water, the molecules aggregate together as clusters, called micelles. The tails stick inwards and the heads outwards.



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.

OR

Carboxylic acids are organic compounds containing carboxylic acid group:



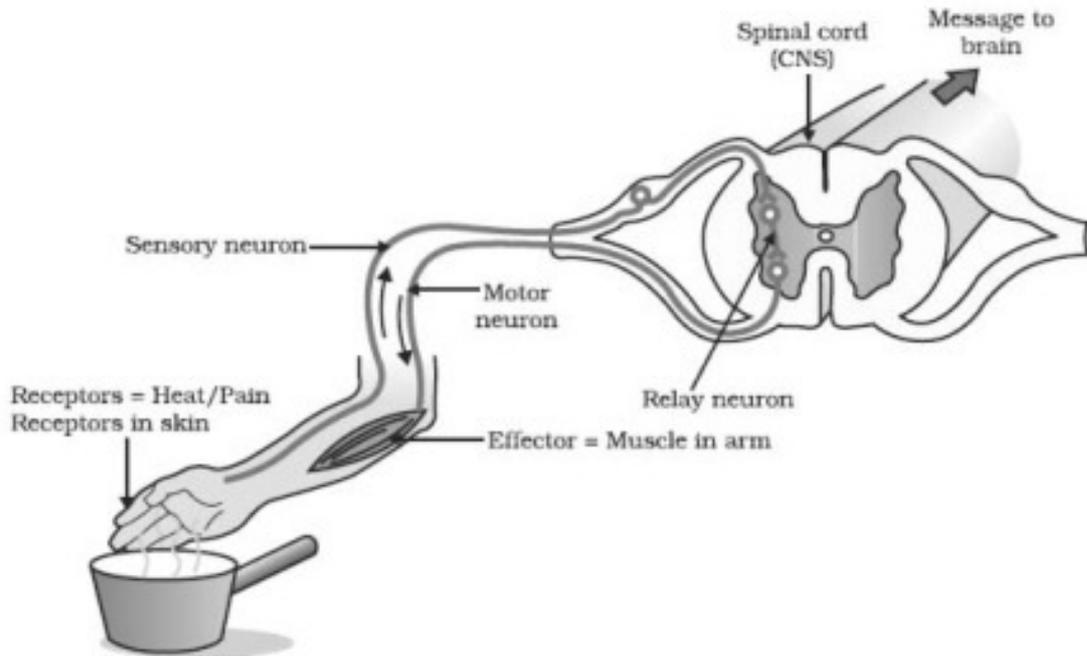
Their general formula is $C_nH_{2n+1}COOH$ or it may be written as $RCOOH$, where R is an alkyl group.

Members of the homologous series of carboxylic acids. The first four members of the homologous series of carboxylic acids are given ahead:

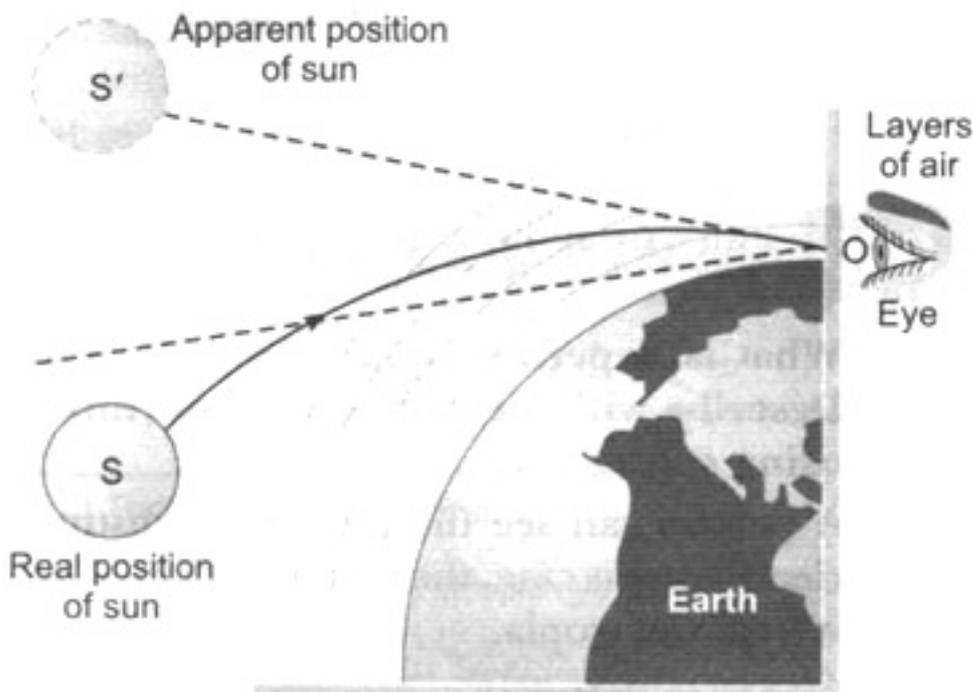
Molecular Formula	Structural Formula	Common name	IUPAC name
HCOOH	$\begin{array}{c} O \\ \parallel \\ H - C - OH \end{array}$	Formic acid	Methanoic acid
CH ₃ COOH	$\begin{array}{c} H & O \\ & \parallel \\ H - C - C - OH \\ \\ H \end{array}$	Acetic acid	Ethanoic acid
C ₂ H ₅ COOH	$\begin{array}{c} H & H & O \\ & & \parallel \\ H - C - C - C - OH \\ & \\ H & H \end{array}$	Propionic acid	Propanoic acid
C ₃ H ₇ COOH	$\begin{array}{c} H & H & H & O \\ & & & \parallel \\ H - C - C - C - C - OH \\ & & \\ H & H & H \end{array}$	n-Butyric acid	Butanoic acid

18. In man and other vertebrate animals, there are two types of actions viz. voluntary and involuntary actions. The actions carried out and regulated by brain are voluntary actions. The actions carried out without direct concern of brain are involuntary actions. The involuntary actions are conducted by spinal cord and are known as reflex actions.

Reflex arc. For a reflex action, the path taken by a stimulus from some reception to one or more effectors is known as reflex arc. Once the sensory organ is excited by some stimuli, the message is carried by the sensory nerves to the spinal cord. From the spinal cord the directions carried by the motor nerve fibres to one or more effector organs. The whole action is completed instantaneously. Some of the examples of reflex actions are blinking of eyes, sneezing, coughing in response to foreign particle that has entered in eye, nose, the throat respectively.

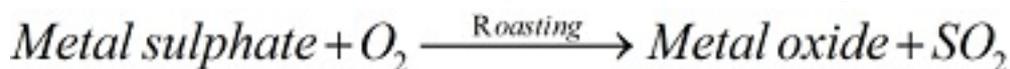


19. The layers of air nearer to earth are denser than those above it. At sunrise and sunset when the sun is below the horizon, the light rays starting from sun are falls on these layers. They pass through successively denser layers and thus get bent more and more towards the normal until they fall upon the eye of the observer O. To the observer O these rays appear to come from S' which is above horizon. It is for this reason that the sun is visible to us a little before it rises above the horizon and so also can be seen for more time as it sets below the horizon. The difference of time is about two minutes each for early rise and late setting of the Sun.



20. The gas which smells like that of rotten eggs is H_2S . Hence, the ore is a sulphide ore. It is concentrated by froth-floatation process. The metal is obtained from the concentrated ore in the following two steps:

(i) Roasting: Heating the ore strongly in the presence of air. The metal sulphide is converted into metal oxide along with evolution of sulphur dioxide gas.



(ii) Reduction with carbon: On heating the metal oxide with carbon, it is reduced to free metal.



21. Since coal and petroleum have been formed from biomass, in addition to carbon, these contain hydrogen nitrogen and sulphur. When these are burnt, the products formed are carbon dioxide, water, oxides of nitrogen and oxides of sulphur. When combustion takes place in insufficient air (oxygen), then carbon monoxide is formed instead of carbon dioxide. Of these products, the oxides of sulphur and nitrogen and carbon monoxide are poisonous at high concentration and carbon dioxide is a greenhouse gas.

Another way of looking at coal and petroleum is that they are huge reservoirs of carbon and if all of this carbon is converted to carbon dioxide, then the amount of carbon dioxide in the atmosphere is going to increase leading to intense global warming. Thus, we need to use these resources judiciously.

OR

Abiotic (physical) and biotic components are the two main components of an ecosystem.

Abiotic components or physical environment.

1) Temperature. The physiological and behavioral adaptations of most animals depend upon the changes in the environmental temperature. The rates of photosynthesis and respiration in plants also fluctuate depending upon the change in temperature.

2) Water. The extent to which an organism is dependant on an abundant water supply depends on its requirements and its ability to conserve it in adverse conditions. Organisms living in dry habitats generally have good water conservation such as in

cacti, camels.

3) Light. This is essential for all green plants and photosynthetic bacteria, and for all the animals dependant on the plants.

4) Humidity. This is important because it can affect the rate at which water evaporates from the surface of an organism, which in turn influence its ability to withstand drought.

5) Wind and air currents. This particularly applies to plants. Only plants with strong root systems and tough stems can live in exposed places where winds are fierce. Wind is also instrumental in the dispersal of spores and seeds.

6) pH. This influences the distribution of plants in soil and fresh water ponds. Some plants thrive in acidic conditions others in neutral or alkaline conditions. Most are highly sensitive to changes in pH.

7) Soil nutrients. These particularly affect the distribution of plants in the soil.

8) Water currents. Particularly in rivers and streams. Only organisms capable of swimming or avoiding strong currents can survive.

9) Topography. Minor topographical differences may be just as important in influencing the distribution of organisms as wide geographical separation.

10) Background. The distribution of organisms whose shape or colouration are such that they are camouflaged when viewed against a particular background is related to the general texture and pattern of the environment.

Section B

22. Salt A is sodium hydrogen carbonate (baking soda). When it is heated, it turns into sodium carbonate; which is salt B. In this reaction, carbon dioxide gas is also produced; which is the gas C.



Sodium hydrogen carbonate is used in bakery products. Sodium carbonate is used for removing hardness of water.

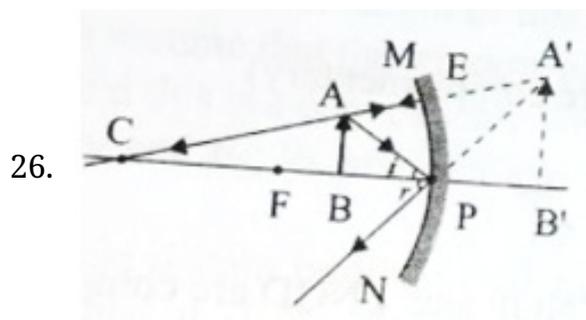
23. From these observation we can conclude that zinc is most active metal followed by iron and copper.

Copper does not react, but zinc reacts with ferrous sulphate solution. Thus, zinc is

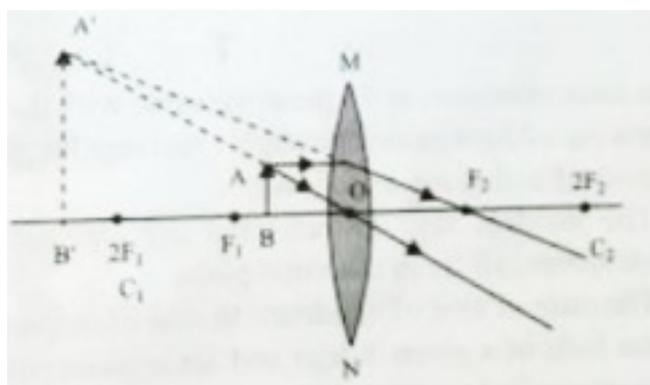
most reactive, followed by iron and copper.



24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25. The plants which is kept in continuous light will live longer. We know that plants release carbon dioxide during respiration. In case of plant which is being kept in dark, carbon dioxide will accumulate in the container. This will finally result in lack of oxygen for the plant and plant would die. In case of plant which is being kept in light, carbon dioxide shall be utilized during photosynthesis. This will help in maintaining the availability of oxygen for respiration. As a result, this plant will live longer.



OR



27. Voltmeter is used to find potential difference whereas ammeter is used to find current. Voltmeter is connected in parallel and ammeter in series.

CBSE Class 10 Science
Sample Paper 10

General Instructions:

1. The question paper comprises two sections, A and B. You are to attempt both the sections.
 2. All questions are compulsory.
 3. All questions of Section-A and B are to be attempted separately.
 4. There is an internal choice in two questions of three marks each and one question of five marks.
 5. Question numbers 1 and 2 in Section-A are one mark question. They are to be answered in one word or in one sentence.
 6. Question numbers 3 to 5 in Section- A are two marks questions. These are to be answered in 30 words each.
 7. Question numbers 6 to 15 in Section-A are three marks questions. These are to be answered in about 50 words each.
 8. Question numbers 16 to 21 in Section-A are 5 marks questions. These are to be answered in 70 words each.
 9. Question numbers 22 to 27 in Section- B are based on practical skills. Each question is a two marks question. These are to be answered in brief
-

Section A

1. What is the role of the seminal vesicles and the prostate gland?
2. What is urethra?
3. Why group 17 elements form uninegative anions?
4. Define the term power of a lens. Give its SI unit. State whether the power of a converging lens is positive or negative.
5. Write two advantages of using solar cooker?
6. A student heated a few crystals of copper sulphate in a dry boiling tube.

- (a) What will be the color of the copper sulphate after heating?
- (b) Will you notice water droplets in the boiling tube?
- (c) Where have these come from?

OR

The conditions preferred by some plants are shown in the table below:

Plant	Apple	Potato	Black currant	Mint	Onion	Strawberry	Lettuce
pH	5.0 - 6.5	4.5 - 6.0	6.0 - 8.0	7.0 - 8.0	6.0 - 7.0	5.0 - 7.0	6.0 - 7.0

- (i) Which plants grow well over the largest range of pH values?
 - (ii) Which plant can grow in the most acidic soil?
 - (iii) Which plant can grow in the basic soil?
7. A potential difference of 220 V is applied across a resistance of 440Ω in an electric ion.
 - (i) Find the current.
 - (ii) Heat energy produced is 30s.
 8. What are the advantages of connecting electrical devices in parallel with the battery instead of connecting them in series?
 9. Calcium is an element with $Z = 20$
 - (a) Is it a metal or a non-metal?
 - (b) Will its size be bigger or smaller than that of potassium?
 - (c) write the formula of its chloride
 10. Discuss the major steps involved in process of nutrition in human beings.

OR

How is transpiration pull responsible for upward movement of water?

11. Give differences between homologous and analogous organs.
12. How do variations occur in an offspring?

13. (i) What is the colour of ferrous sulphate crystals? How does this colour change after heating?
(ii) Name the products formed on strongly heating ferrous sulphate crystals. What type of chemical reaction occurs in this change?

OR

Translate the following statements into balanced chemical equations:

- (i) Phosphorus burns in oxygen to give phosphorus pentoxide.
(ii) Aluminium metal replaces iron from ferric oxide, Fe_2O_3 , giving aluminium oxide and iron.
(iii) Carbon disulphide burns in air to give carbon dioxide and sulphur dioxide.
(iv) Barium chloride reacts with zinc sulphate to give zinc chloride and barium sulphate.
14. An object 5.0 cm in length is placed at a distance of 20 cm in front of a convex mirror of radius of curvature 30 cm. Find the position of the image, its nature and size.
15. Describe any 3 methods of asexual reproduction.
16. Explain the principle, construction and working of an electric motor with a help of labelled diagram?
17. What are alcohols? What is its general formula? Give the names and molecular formula of first three members of the homologous series of alcohols.
18. Draw a labeled diagram of neuron and explain its function.
19. What is hypermetropia? Write two causes for development of this defect Describe with a ray diagram how this defect of vision can be corrected by using spectacles.
20. Give reasons:
(a) Platinum, gold and silver are used to make jewellery.
(b) Sodium, potassium and lithium are stored under oil.
(c) Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
(d) Carbonate and sulphide ores are usually converted into oxides during the

process of extraction.

(e) Lemon or tamarind juice are effective in cleaning tarnished copper vessels.

21. Why use of coal and petroleum should be restricted?

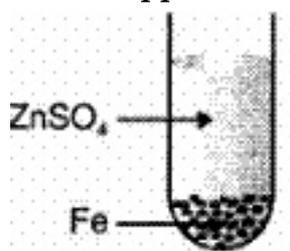
OR

Explain global Warming.

Section B

22. Salt A commonly used in bakery products on heating gets converted into another salt B which itself is used for removal of hardness of water and a gas C is evolved. The gas C when passed through lime water, turns it milky. identify A, B and C.

23. What happens in the test tube shown here?



24. In tobacco plant, the male gametes have twenty four chromosomes. What is the number of chromosomes in the female gamete? What is the number of chromosomes in the zygote?

25. Explain the correct way to observe guard cells and their nuclei under microscope.

26. Draw ray diagram showing the image formation by a concave lens when an object is placed between focus and twice the focal length of the lens.

OR

Draw ray diagram showing the image formation by a convex lens when an object is placed at infinity.

27. How does potential difference (V) across a resistor depend on current passing through it? What is nature of I-V graph obtained?

CBSE Class 10 Science
Sample Paper-10
Solution

Section A

1. Secretions of seminal vesicles and prostate gland provide fluid medium to sperm to move and also provide nutrition to them.
2. The urine collected into the urinary bladder passes out of the body through a muscular tube which is called urethra.
3. Group 17 elements have 7 valence electrons, one electron less than the maximum number of electrons that can be accommodated in the outermost shell. Therefore, it is easier for these elements to gain an electron and form uninegative anions, so as to attain noble gas configuration.
4. Power of a lens is defined as the reciprocal of its focal length f (in metres).
$$P = \frac{1}{f(\text{in m})}$$

The SI unit of power of a lens is Diopter. The power of a converging lens is positive as f is +ve.
5. The following are the two advantages of using solar cooker..
 - (i) It is Pollution free
 - (ii) Nutrition value of food is preserved when food is cooked inside a solar cooker.
6. **(a)** Crystals of copper sulphate are blue in colour. The colour of the crystals is due to the water of crystallisation. After heating, the color of copper sulphate will change from blue to **white**.
(b) Yes, water droplets will be observed by the student in the boiling tube when copper sulphate pentahydrate is heated.
(c) Water droplets in the boiling tube have come from the water of crystallisation. Copper sulphate crystals, which seem to be dry, contain water of crystallization.



OR

- (i) Plants which grow well over the largest range of pH values - Black currant (6.0 - 8.0) and strawberry (5.0 - 7.0)
- (ii) Plant which can grow in the most acidic soil - Potato (4.5 - 6.0)
- (iii) Plants which can grow in the basic soil - Black currant (6.0 - 8.0) and Mint (7.0 - 8.0)

7. Here $V = 220$ volts; $R = 440 \Omega$

$$\text{Now } I = \frac{V}{R} = \frac{220}{440} = 0.5\text{A}$$

$$\text{Heat energy produced in 30s.} = \frac{V^2}{R} t = \frac{(220)^2 \times 30}{440} = 3.300 \text{ J}$$

8. Advantages of connecting electrical devices in parallel with the battery are as follows:
- (i) The voltage across each connecting electrical device is same and the device consumes current as per its resistance.
 - (ii) Separate on/off switches can be applied across each device.
 - (iii) Total resistance in parallel circuit decreases, hence, a great current may be drawn from the cell.
 - (iv) If one electrical device is damaged; then other devices continue to work properly. Moreover, total resistance in parallel circuit arrangement decreases. Hence, there is less heat dissipated as compared to series connection.
9. $Z = 20$ is 2, 8, 8, 2
- (i) It is a metal which has two valence electrons, it is present in group 2
 - (ii) Both potassium (K) and calcium (Ca) are present in fourth period. Since atomic size decreases along a period calcium is slightly smaller in size than K whose electronic configuration is 2, 8, 8, 1
 - (iii) The valency of calcium is 2 and formula of its chloride is CaCl_2
10. There are five steps in the process of nutrition in Human beings.

1. Ingestion: The process of taking food into the body is called ingestion. Humans have holozoic mode of nutrition. They engulf solid particles.
2. Digestion: the process in which the food containing large, insoluble molecules is broken down into small, water soluble molecules is called digestion.
3. Absorption: The process in which the digested food passes through the intestinal wall into blood stream is called absorption.
4. Assimilation: The process in which the absorbed food is taken in by the body cells and used for energy, growth and repair is called assimilation.
5. Egestion: The process in which the undigested food is removed from the body is called egestion.

OR

The leaves lose water in the form of water vapours through stomata by a process known as transpiration. Continuous transpiration creates a suction force in the water column of the xylem elements which reaches upto the roots. This force is called transpiration pull. This causes the roots to take up more water is taken up by the roots to compensate the loss of water due to transpiration.

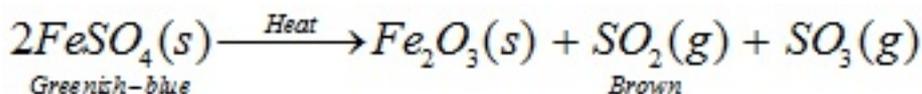
The transpiration pull is similar to the suction force when drinking some fluid from a bottle or glass with a straw. However the transpiration pull alone will not be sufficient to move water upward. The cohesion or the attraction of one molecule to another molecule of water through hydrogen bonding ensures that water moves in an unbroken, continuous column.

11.

Homologous organs	Analogous organs
Similar in origin and basic structure but may differ in function.	Dissimilar in origin and basic structure but may have similar function.
Provide idea of common ancestry.	Do not provide the idea of common ancestry.
For Ex- hands of human beings and forelimbs of horse.	For Ex- wings of birds and insects.

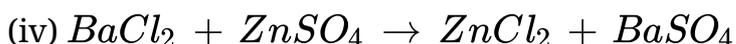
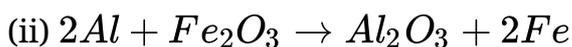
12. Dissimilarities between members of the same species is called variations. Two offsprings of the same parents show certain variations. Variations occur due to sex chromosomes. Variations arising in germplasm (genes) of the organism are heritable. Mother and father contribute to the gene pattern of the offsprings through their chromosomes, in which recombination occurs at the time of gametogenesis. In zygote formation, gene pattern of both parents come together, that causes some variations between parents and offsprings and amongst offsprings also.
13. (i) The colour of ferrous sulphate crystals is green. On heating, $FeSO_4 \cdot 7H_2O$ first decomposes to form anhydrous ferrous sulphate $FeSO_4$ which is white in colour.

(ii) The products formed on strongly heating ferrous sulphate crystals are ferric oxide, sulphur dioxide and sulphur trioxide.



This is a type of decomposition reaction (thermal decomposition).

OR



14. Radius of curvature (R) = 30 cm

$$f = R/2 = 30/2 = 15 \text{ cm}$$

$$u = -20 \text{ cm}, h = 5 \text{ cm.}$$

$$1/v + 1/u = 1/f$$

$$1/v = 1/15 + 1/20 = 7/60$$

$$v = 60/7 = 8.6 \text{ cm.}$$

image is virtual and erect and formed behind the mirror.

$$h_i/h_o = v/u$$

$$h_i/5 = 8.6/20$$

$$h_i = 2.2 \text{ cm.}$$

Size of image is 2.2 cm.

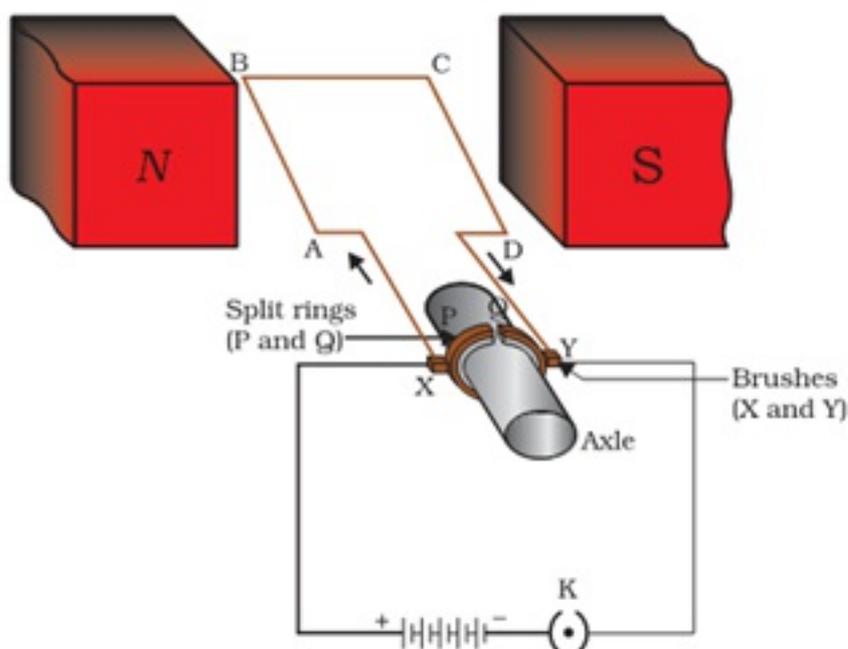
15. Methods of asexual reproduction-

a) Primary fission- It is a type reproduction in which one parent organism divides into two new organisms. Firstly nucleus divide and then division of cytoplasm takes place.

b) Spore formation- A spore is a small microscopic structure with a thick wall. Spores are formed in a structure called sporangium. Nucleus inside sporangium divides repeatedly and produces many nuclei. Each nucleus is surrounded by cytoplasm and called spore.

c) Fragmentation- It is the breaking of an organism into two or more parts upon maturation, each of which grows to form a new individual.

16. **Principle:** It is based on the principal that a current carrying conductor placed perpendicular to the magnetic field experiences a force.



Construction-

(1) Armature or coil- It consist of an insulated copper wire wound on a soft iron core.

(2) Strong field magnet- two pole pieces of a strong magnet provides a strong magnetic field.

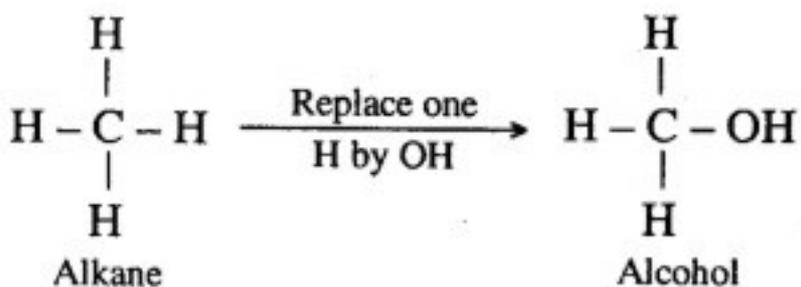
(3) Split ring- it consist of two halves (P and Q) of a metallic ring which reverses the direction of the current in a coil.

(4) Brushes- two carbon brushes touch the commutator (split ring).

(5) Battery – a battery is connected across the carbon brushes.

Working: When current flow through coil, arm AB and CD experience magnetic force. According to Fleming's Left hand rule, arm AB of coil experiences force in downward direction and arm CD experiences force in upward direction. Both these forces are equal and opposite. Two equal and opposite forces acting at different position of armature constitute a couple. The couple rotate the coil in clockwise direction until the coil is in vertical position. At this position, the contact of commutator and brushes break. Supply of current to coil is cut off. Hence no force acts on arms of coil. But coil goes on rotating due to inertia of motion of coil until commutator again comes in contact with brushes. When commutator comes in contact with brushes after rotation, direction of current in arm AB and CD is reversed. The force acting on arm AB is in downward direction and force acting on arm CD is in upward direction. These 2 equal and opposite forces constitute a couple. This couple rotate coil again in clockwise direction. The coil of d.c. motor continues to rotate in same direction. Hence electrical energy is converted into mechanical energy.

17. The organic compounds containing the hydroxyl or alcoholic group (–OH) as the functional group are called alcohols. These are obtained by replacing one hydrogen atom of an alkane by –OH group. For example,



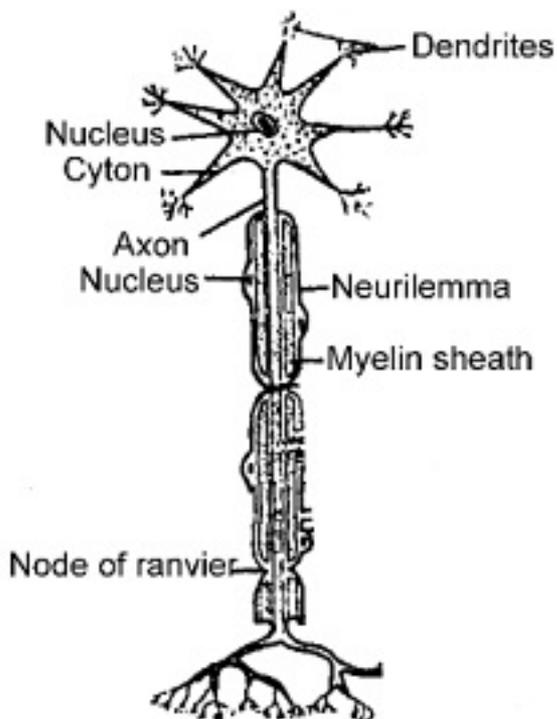
They are represented by the general formula $\text{C}_n\text{H}_{2n+1}\text{-OH}$ or ROH , where R stands for alkyl group ($\text{C}_n\text{H}_{2n+1}$ -)

First three members of the series are:

Formula	Common name	IUPAC name
CH_3OH	Methyl alcohol	Methanol

$\text{CH}_3\text{CH}_2\text{OH}$	Ethyl alcohol	Ethanol
$\text{CH}_3\text{CH}_2\text{CH}_2\text{OH}$	Propyl alcohol	Propanol

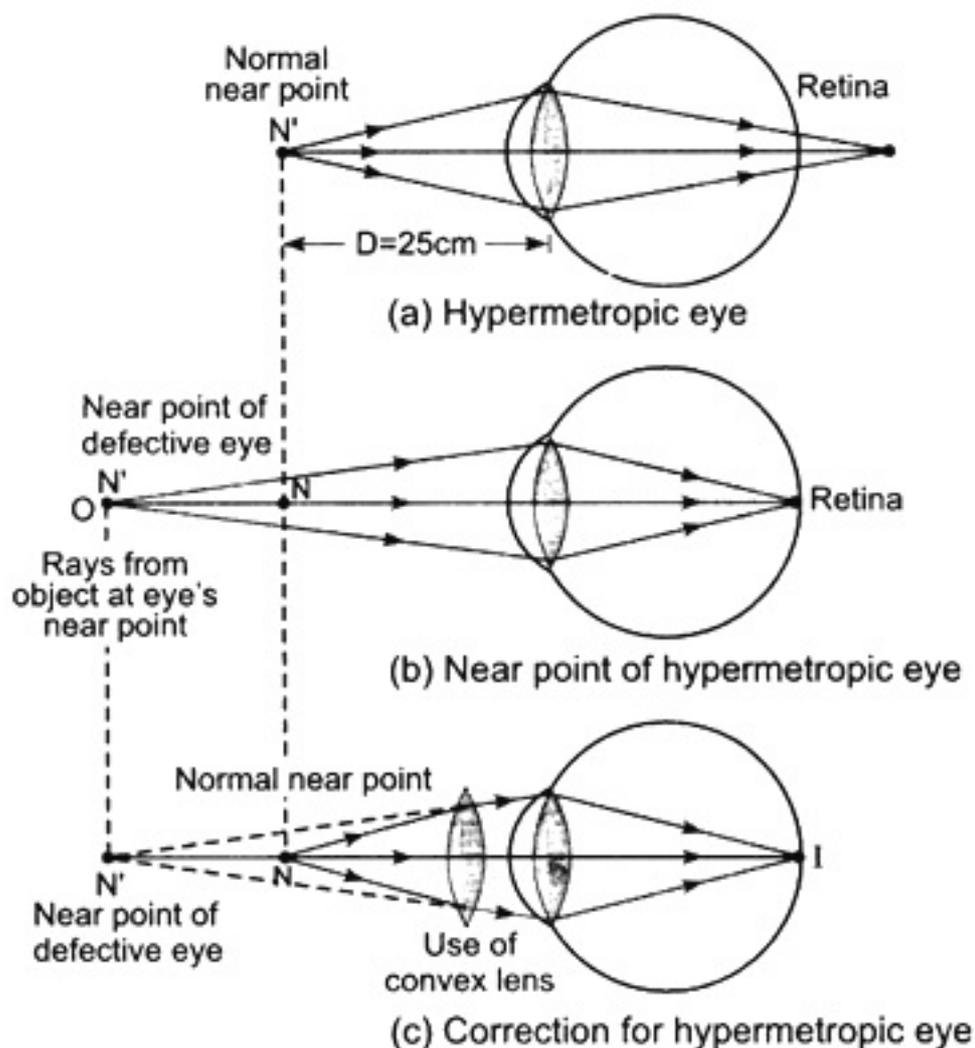
18. Neuron



Functions :

- 1) Nerve cells are specialized for conducting information via electrical impulses from one part of the body to another part.
- 2) Dendrites acquire the information.
- 3) Axon conducts information as electrical impulse.
- 4) Terminal arborization pass the information as chemical stimulus at synapse for onward transmission.

19. Hypermetropia refers to the condition of eyesight defect, when a person can see distant objects distinctly but cannot see nearby objects so clearly. This is also termed as long sightedness, it occurs when light from near objects is not quite brought to focus in time to hit the retina. The point of focus would in fact be behind the retina.



Causes of hypermetropia: This defect arises because of either,

- (i) the focal length of the eye lens is too long, or
- (ii) the eyeball becomes too short, so that light rays from the nearby object, say at point N, cannot be brought to focus on the retina to give a distinct image.

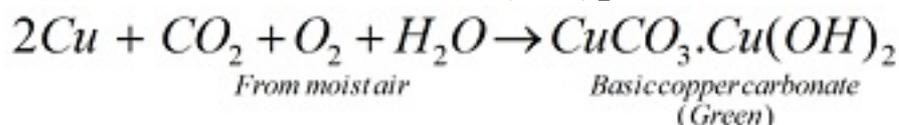
Hypermetropia can be corrected by using convex lens of suitable focal length in spectacles.

20. (a) Platinum, gold and silver are used to make jewellery because of their bright shiny surface and high resistance to corrosion. Also they have high malleability and ductility.
- (b) Sodium, potassium and lithium are stored under oil to prevent their reaction with oxygen, moisture and carbon dioxide of air so as to protect them.
- (c) Aluminium metal forms a thin layer of aluminium oxide all over its surface under the action of moist air. This layer prevents the metal underneath from further corrosion. It is cheap, easily available, malleable and ductile. Therefore, it is

used to make utensils for cooking.

(d) It is easier to obtain a metal from its oxides as compared to its sulphides and carbonates. So, prior to reduction, metal carbonate and sulphides must be converted into metal oxides. A carbonate ore is converted into oxide by calcination whereas a sulphide ore is converted into oxide by roasting.

(e) When copper vessels are exposed to moist air, they form a green coating of basic copper carbonate [$CuCO_3 \cdot Cu(OH)_2$].



The sour substances such as lemon or tamarind juice contain acids. Lemon juice contains citric acid and tamarind contains tartaric acid. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

21. Since coal and petroleum have been formed from biomass, in addition to carbon, these contain hydrogen nitrogen and sulphur. When these are burnt, the products formed are carbon dioxide, water, oxides of nitrogen and oxides of sulphur. When combustion takes place in insufficient air (oxygen), then carbon monoxide is formed instead of carbon dioxide. Of these products, the oxides of sulphur and nitrogen and carbon monoxide are poisonous at high concentration and carbon dioxide is a greenhouse gas.

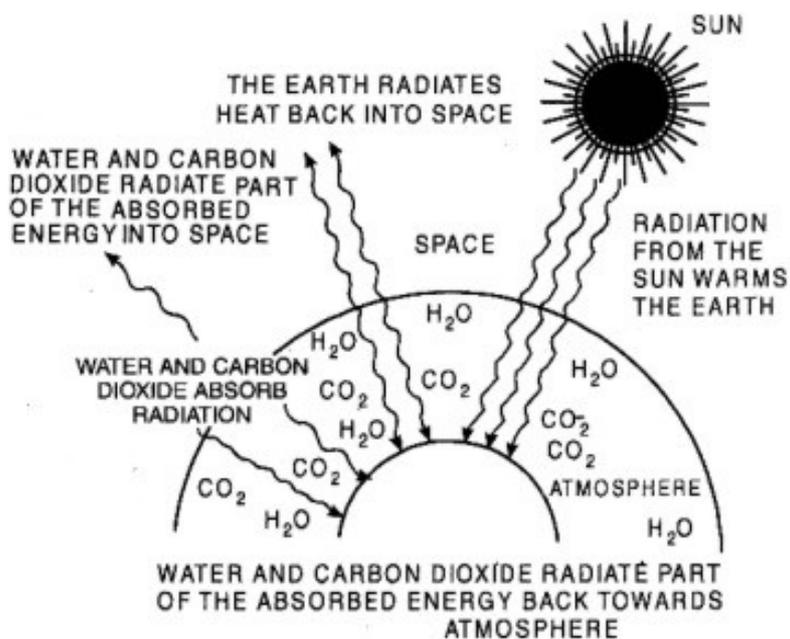
Another way of looking at coal and petroleum is that they are huge reservoirs of carbon and if all of this carbon is converted to carbon dioxide, then the amount of carbon dioxide in the atmosphere is going to increase leading to intense global warming. Thus, we need to use these resources judiciously.

OR

Carbon dioxide content of the air is increasing due to deforestation and combustion in industries, automobiles and planes, and is likely to become double by 2020. This increase is affecting the atmospheric composition and balance of gases, which are among the factors that control earth's climate. Increase of carbon dioxide may cause rise in atmospheric temperature, producing what is called the greenhouse effect. A rise of global temperature by more than 2 or 3 degrees may melt glaciers and polar

ice. This will consequent flooding of coastal towns and submission of islands. Rainfall pattern may also change, affecting agricultural output.

Green House Effect

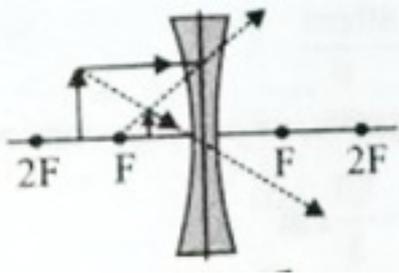


Section B

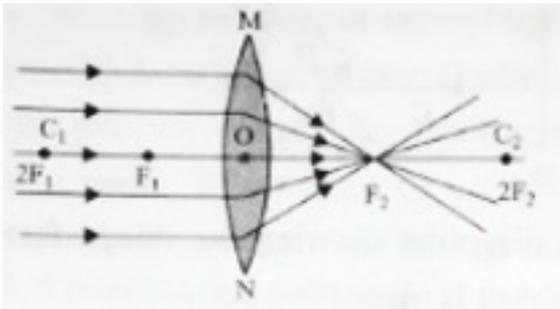
22. Salt A is sodium hydrogen carbonate (baking soda). When it is heated, it turns into sodium carbonate; which is salt B. In this reaction, carbon dioxide gas is also produced; which is the gas C.
- $$2NaHCO_3 + Heat \rightarrow Na_2CO_3 + CO_2 + H_2O$$
- Sodium hydrogen carbonate is used in bakery products. Sodium carbonate is used for removing hardness of water.
23. No reaction takes place because Fe is less reactive than Zn
- $$Fe + ZnSO_4 \rightarrow \text{No reaction}$$
24. Number of chromosomes in both the gametes is equal. Hence, female gametes of tobacco plant will have 24 chromosomes. Number of chromosomes in zygote would double the number in gametes, hence it would be 48.
25. Take a young leaf (hibiscus is preferable) and try to get its top white layer by tearing the leaf. Keep it in a watch glass. Add a few drops of water and then stain to it. Make sure no air bubbles are formed. Keep it under the microscope and use coarse adjustment to focus them under high power to look at the beautiful images. Explain

the correct way to observe guard cells and their nuclei under microscope.

26.



OR



27. If temperature and other physical conditions such as pressure, mechanical strain, etc. Remain the same, the current (I) flowing through a conductor is directly proportional to be potential difference (V) across the conductor, i.e.,

$$I \propto V \text{ or } V = IR$$

Where R is a constant called resistance.

If a graph is plotted between the current (I) flowing through the condutor and the applied potential difference (V) between its ends, it will be straight line.