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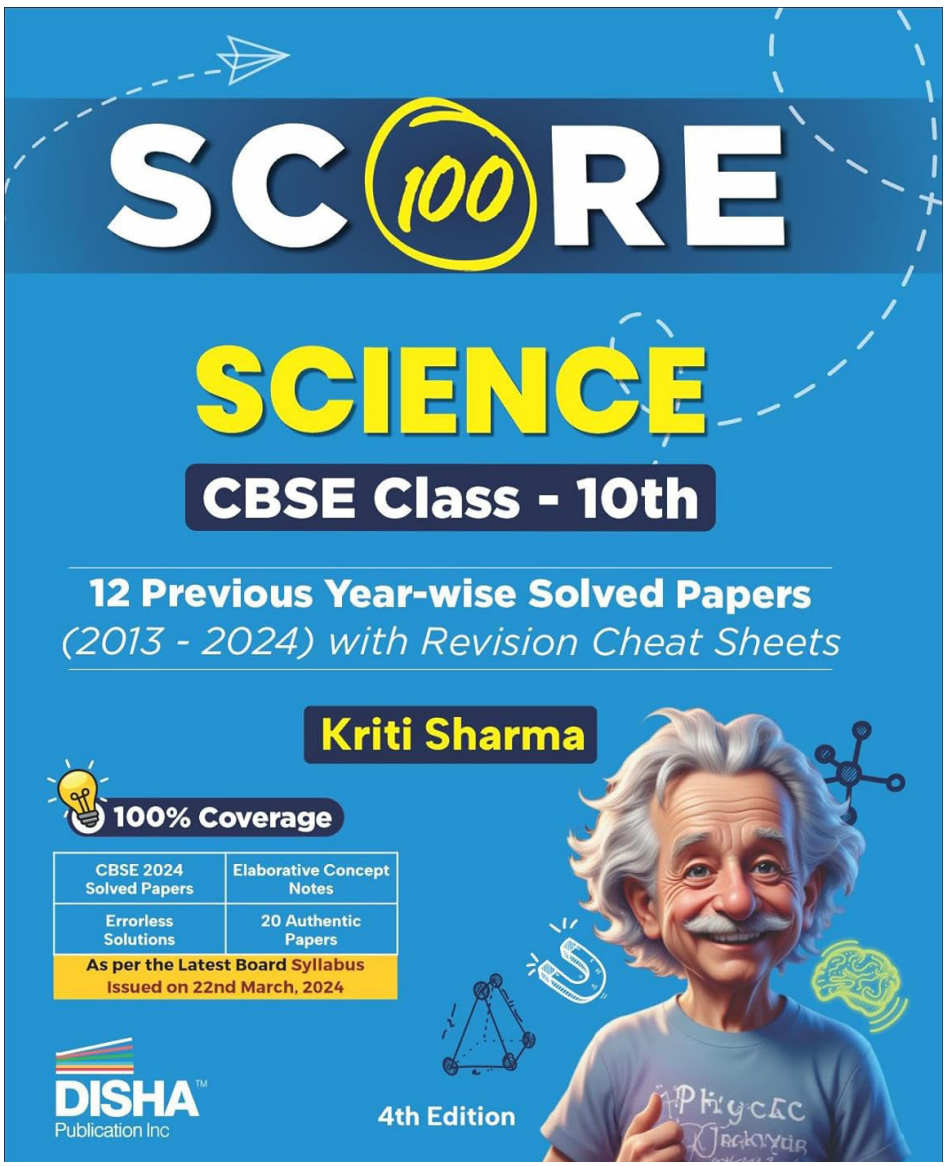
All India 2024 Solved Paper

This sample is taken from the **"Score 100 Science CBSE Class 10th 12 Previous Year-wise Solved Papers (2013 - 2024) with Revision Cheat Sheets 4th Edition"**



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All India 2024

CBSE Board Solved Paper

Time Allowed : 3 hrs. *Maximum Marks : 80*

General Instructions:

Read the following instructions very carefully and strictly follow them :

(i) This question paper comprises **39** questions. **All** questions are compulsory.
(ii) This question paper is divided into **FIVE** sections – **Sections A, B, C, D** and **E**.
(iii) In **section A** – Questions No. 1 to 20 are multiple choice questions. Each question carries **1** mark.
(iv) In **section B** – Questions No. 21 to 26 are very short answer type questions. Each question carries **2** marks. Answer to these questions should be in the range of 30 to 50 words.
(v) In **section C** – Questions no. 27 to 33 are short answer type questions. Each question carries 3 marks. Answer to these questions should in the range of 50 to 80 words.
(vi) In **section D** – Questions No. 34 and 36 are long answer type questions each question carries **5** marks. Answer to these questions should be in the range of 80 to 120 words.
(vii) In **section E** – Questions No. 37 to 39 are of 3 **source - based /case - based units of assessment** carrying **4** marks each with sub - parts.
(viii) There is no overall choice . However, an internal choice has been provided in some sections. Only one of the alternatives has to be attempted in such questions.

SECTION - A

Select and write the most appropriate option out of the four options given for each of the questions no. 1 to 20.

1. Which of the following is **not** a thermal decomposition reaction? **1**

(a) $2\,FeSO_4 \longrightarrow Fe_2O_3 + SO_2 + SO_3$
(b) $CaCO_3 \longrightarrow CaO + CO_2$
(c) $2\,AgCl \longrightarrow 2\,Ag + Cl_2$
(d) $Pb(NO_3)_2 \longrightarrow 2\,PbO + 4\,NO_2 + O_2$

2. The process in which transport of soluble products of photosynthesis takes place in plants is known as: **1**

(a) Transpiration
(b) Evaporation
(c) Conduction
(d) Translocation

3. Sense organ in which olfactory receptors are present is: **1**

(a) Nose
(b) Skin
(c) Tongue
(d) Inner ear

4. The **incorrect** statement about placenta is: **1**

(a) It is a disc embedded in the uterine wall.
(b) It contains villi on the embryo's side of the tissue.
(c) It has a very small surface area for glucose and oxygen to pass from mother to the embryo.
(d) The embryo gets nutrition from the mother's blood through it.

5. Which of the following is a redox reaction, but **not** a combination reaction? **1**

(a) $C + O_2 \rightarrow CO_2$
(b) $2\,H_2 + O_2 \rightarrow 2\,H_2O$
(c) $2\,Mg + O_2 \rightarrow 2\,MgO$
(d) $Fe_2O_3 + 3\,CO \rightarrow 2\,Fe + 3\,CO_2$

6. The salt present in tooth enamel is: **1**

(a) Calcium phosphate
(b) Magnesium phosphate
(c) Sodium phosphate
(d) Aluminium phosphate

7. Identify an involuntary action from the following: **1**

(a) Riding a bicycle
(b) Pricking up a pencil
(c) Regular beating of heart
(d) Walking in a straight line

8. An aqueous solution of sodium chloride is prepared in distilled water. **1**

The pH of this solution is:

(a) 6 (b) 8
(c) 7 (d) 3

9. A metal 'X' is used in thermit process. When 'X' is heated with oxygen, it gives an oxide 'Y', which is amphoteric in nature. 'X' and 'Y' respectively are: 1

(a) Mn, MnO_2 (b) Al, Al_2O_3

(c) Fe, Fe_2O_3 (d) Mg, MgO

10. Which one of the following is **not** a natural ecosystem? 1

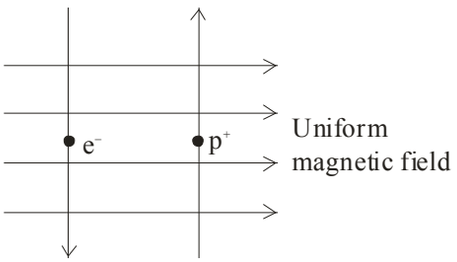
(a) Pond ecosystem

(b) Grassland ecosystem

(c) Forest ecosystem

(d) Cropland ecosystem

11. 1



A uniform magnetic field exists in the plane of paper as shown in the diagram. In this field, an electron (e^-) and a positron (p^+) enter as shown. The electron and positron experience forces:

(a) both pointing into the plane of the paper.

(b) both pointing out of the plane of the paper.

(c) pointing into the plane of the paper and out of the plane of the paper respectively.

(d) pointing out of the plane of the paper and into the plane of the paper respectively.

12. The current carrying device which produces a magnetic field similar to that of a bar magnet is: 1

(a) A straight conductor

(b) A circular loop

(c) A solenoid

(d) A circular coil

13. Select from the following the conditions responsible for the rapid spread of bread mould on a slice of bread: 1

(i) Formation of large number of spores

(ii) Presence of moisture and nutrients in bread

(iii) Low temperature

(iv) Presence of hyphae

(a) (i) and (ii)

(b) (ii) and (iv)

(c) (ii) and (iii)

(d) (iii) and (iv)

14. How will the image formed by a convex lens be affected, if the upper half of the lens is wrapped with a black paper? 1

(a) The size of the image formed will be one - half of the size of the image due to complete lens.

(b) The image of upper half of the object will not be formed.

(c) The brightness of the image will reduce.

(d) The lower half of the inverted image will not be formed.

15. The phenomena of light involved in the formation of rainbow are: 1

(a) Refraction, reflection and dispersion

(b) Refraction, dispersion and internal reflection

(c) Reflection, dispersion and internal reflection

(d) Refraction, dispersion, scattering and total internal reflection

16. The colour of light for which the refractive index of glass is minimum, is: 1

(a) Red

(b) Yellow

(c) Green

(d) Violet

For Questions 17-20 are Assertion – Reasoning based questions.

These consists of two statements - Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).

(b) Both Assertion(A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

17. **Assertion (A) :** Ozone layer protects the surface of the Earth from harmful UV radiations.

Reason (R) : Chlorofluorocarbons (CFCs) are responsible for depletion of ozone layer.

18. **Assertion (A) :** Some vegetable oils are healthy.

Reason (R) : Vegetable oils generally have long unsaturated carbon chains.

19. **Assertion (A) :** Sex of the children will be determined by what they inherit from their mother.

Reason (R) : Women have XX sex chromosomes.

20. **Assertion (A) :** Electrons move from lower potential to higher potential in a conductor.

Reason (R) : A dry cell maintains electric potential difference across the ends of a conductor.

SECTION - B

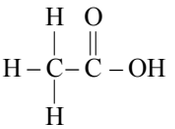
Q. No. 21 to 26 are Very Short Answer Questions.

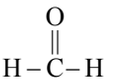
21. (a) Sometimes while running, the athletes suffer from muscle cramps. Why? How is the respiration in this case different from aerobic respiration? **2**

OR

(b) Write the other name given to lymph. State its two functions. **2**

22. Identify the functional group present in the following compounds and also name them:

(a) 

(b) 

23. (a) Copper powder is taken in a china dish and heated over a burner. Name the product formed and state its colour. Write the chemical equation for the reaction involved. **2**

OR

(b) Write chemical equation for the chemical reaction which occurs when the aqueous solutions of barium chloride and sodium sulphate react together. Write the symbols of the ions present in the compound precipitated in the reaction. **2**

24. Explain how the original number of chromosomes present in the parents are restored in the progeny. Name the cell division by which chromosome number is maintained in the progeny. **2**

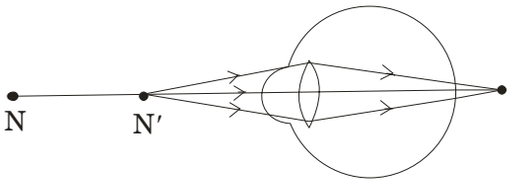
25. Define power of a lens. Find power of a lens whose focal length is 50 cm. **2**

26. An electric source can supply a charge of 750 coulomb. If the current drawn by a device is 15 mA, find the time in which the electric source will be discharged completely. **2**

SECTION - C

Q. No. 27 to 33 are Short Answer Questions.

27. (a) Study the diagram given below and answer the questions that follow:



(i) Name the defect of vision depicted in this diagram stating the part of the eye responsible for this condition.

(ii) List two causes of this defect.

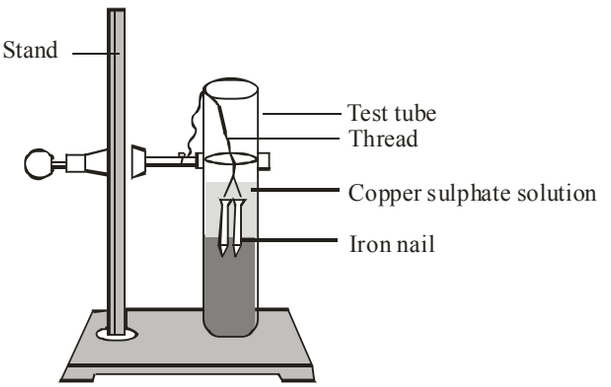
(iii) Name the type of lens used to correct this defect and state its role in this case. **3**

OR

(b) What is dispersion of white light? State its cause. Draw a diagram to show dispersion of a beam of white light by a glass prism. **3**

28. Suggest an activity to differentiate between the chemical properties (acidic or basic character) of the product obtained on burning a metal (magnesium) and a non - metal (sulphur). **3**

29.



Study the experimental set - up shown in the diagram and write chemical equation for the chemical reaction involved. Name and define the type of reaction. List two other metals which can be used in place of iron to show the same type of reaction with copper sulphate solution. **3**

30. A plant with violet flowers (VV) was crossed with a plant with white flowers (vv).

(a) What colour of flowers was obtained in the plants of F_1 generation and why?

(b) Write the percentage of plants with white flowers in F_2 generation plants, if F_1 plants were self - pollinated. Give reason why this trait was not expressed in F_1 generation.

(c) In what ratio did we get the plants with (VV) and (Vv) gene combination in the F_2 generation? **3**

31. Taking the example of any two animal hormones along with their gland of secretion, explain how these hormones help (i) in growth and development and (ii) regulate metabolism, in the body. **3**

32. Earth wire is a safety measure in domestic electric circuits". Justify this statement explaining its role in case of accidental leakage of electric appliances. 3

33. Differentiate between food chain and food web. In a food chain consisting of deer, grass and tiger, if the population of deer decreases, what will happen to the population of organisms belonging to the first and third trophic levels? 3

SECTION - D

Q. No. 34 to 36 are Long Answer Questions.

34. (a) Explain chlor - alkali process and write balanced chemical equations for the reactions that occur. Name the gases obtained at the anode and cathode respectively. Mention two uses each of the two gases obtained in the above process. 5

OR

(b) Common salt is a very important raw material as many compounds of industrial use can be prepared from it. Explain, giving chemical equations, the method of preparation of washing soda from sodium chloride. List four industrial / domestic uses of washing soda. 5

35. (a) (i) The potential difference across the two ends of a circuit component is decreased to one - third of its initial value, while its resistance remains constant. What change will be observed in the current flowing through it? Name and state the law which helps us to answer this question.

(ii) Draw a schematic diagram of a circuit consisting of a battery of four 1.5 V cells, a 5Ω resistor, a 10 Ω resistor and a 15 Ω resistor and a plug key, all connected in series. Now find (I) the electric current passing through the circuit, and (II) potential difference across the 10 Ω resistor when the plug key is closed.

OR

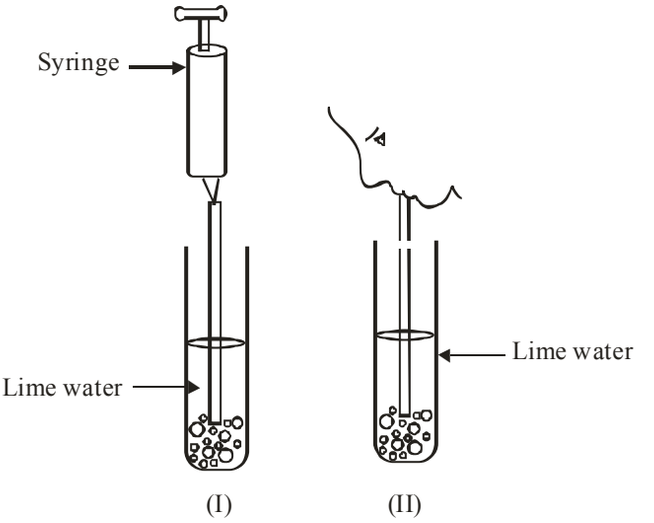
(b) (i) When is the potential difference between two points said to be 1 volt?

(ii) A copper wire has a diameter of 0.2 mm and resistivity of 1.6×10^{-8} Ω m. What will be the length of this wire to make its resistance 14 Ω? How much does the resistance change, if the diameter of the wire is doubled? 5

36. (a) Design an experiment to demonstrate that carbon dioxide is essential for photosynthesis. Write the observation and conclusion of the experiment. 5

OR

(b) (i)



In the experimental set - up shown above in diagram (I) atmospheric air is being passed into lime water with a syringe while in diagram (II) air is being exhaled into lime water. The time taken for the lime water to turn milky in both the test tubes is different. Give reason.

(ii) Draw the diagram of an open stomatal pore and labelled (I) Guard cells, and (II) Chloroplast on it. Mention two functions performed by stomata. 5

SECTION - E

Q. No. 37 to 39 are case based/data based questions with 2 to 3 short sub-parts. Internal choice is provided in one of these sub-parts.

37. A highly polished surface such as a mirror reflects most of the light falling on it. In our daily life we use two types of mirrors – plane and spherical. The reflecting surface of a spherical mirrors may be curved inwards or outwards. In concave mirrors reflection takes place from the inner surface, while in convex mirrors reflection takes place from the outer surface.

(a) Define the principal axis of a concave mirror. 1

(b) A ray of light is incident on a concave mirror, parallel to its principal axis. If this ray after reflection from the mirror passes through the principal axis from a point at a distance of 10cm from the pole of the mirror, find the radius of curvature of the mirror. 1

(c) (i) An object is placed at a distance of 10cm from the pole of a convex mirror of focal length 15cm. Find the position of the image.

OR

(c) (ii) A mirror forms a virtual, erect and diminished image of an object. Identify the type of this mirror. Draw a ray diagram to show the image formation in this case. **2**

38. Carbon is a versatile element that forms the basis of all living organisms and many of the things we use. A large variety of compounds is formed because of its tetravalency. Compounds of carbon are formed with oxygen, hydrogen, nitrogen, sulphur, chlorine and many other elements.

Answer the following questions:

(a) What are hydrocarbons? **1**

(b) List two properties of virtue of which carbon can form a large number of compounds. **1**

(c) (i) Write the formula of the functional group present in (1) aldehydes, and (2) ketones. Write chemical equation for the reaction that occurs between ethanoic acid and ethanol in the presence of a catalyst. **2**

OR

(c) (ii) What are structural isomers? Write the structures of two isomers of butane (C_4H_{10}). **2**

39. Pollination is an important process in sexual reproduction of plants. It is an essential process that facilities fertilisation in plants. Pollinating agents can be wind, water, insects and birds. Several changes take place in the flower after the fertilization has taken plane.

(a) Write the main difference between self - pollination and cross - pollination **1**

(b) Name the part of the flower which attracts insects for pollination. What happens to this part after fertilisation? **1**

(c) (i) Define fertilisation. What is the fate of ovules and the ovary in a flower after fertilisation? **2**

OR

(c) (ii) In a germinating seed, which part are known as future shoot and future root? Mention the function of cotyledon. **2**

Solutions

1. **(c)** $2AgCl \longrightarrow 2Ag + Cl_2$

Silver chloride decomposes in the presence of light not heat. **(1 mark)**

2. **(d)** **Translocation :** Translocation refers to transport of soluble products of photosynthesis in plants. **(1 mark)**

Note

Translocation is the mode of transport that involves both active and passive processes as well as this transport is bidirectional in nature.

3. **(a)** **Nose :** Olfactory receptors are present in nose for detection of smell. **(1 mark)**

4. **(c)** Actually placenta has a very large surface area for glucose and oxygen to pass from mother to the embryo due to presence of villi. **(1 mark)**

Note

Placenta is a temporary endocrine gland that facilitates the transport of nutrients from mother to growing embryo.

5. **(d)** $Fe_2O_3 + 3\,CO \longrightarrow 2\,Fe + 3\,CO_2$

This is redox reaction and not a combination reaction. In which Fe_2O_3 is reduced and CO is oxidised to form the products. **(1 mark)**

6. **(a)** Calcium phosphate Enamel is composed of the mineral calcium phosphate that is arranged in a crystal structure. It is called Hydroxyapatite.

7. **(c)** Regular beating of heart.

Involuntary actions are those actions that are not controlled by our own will. **(1 mark)**

Note

Involuntary actions are performed by midbrain and hindbrain.

8. **(c)** When sodium chloride is dissolved in water. It dissociate into Na^+ and Cl^- ions. These ions do not significantly affect the pH of the solution which remain close to neutral around pH 7 **(1 mark)**

Note

The pH of solution is a measure of the concentration of hydrogen ions in the solution. Higher the concentration of hydrogen ions lower is the pH value.

9. **(b)** Al is used in thermit process. When Al is heated with oxygen then it gives Al_2O_3. Al_2O_3 is amphoteric in nature.

$4Al\,(s) + 3O_2\,(g) \longrightarrow 2Al_2O_3(s)$ **(1 mark)**

10. **(d)** **Cropland ecosystem :** It is not a natural ecosystem. Cropland ecosystem is a man - made ecosystem. **(1 mark)**

11. **(a)** Direction of the current will be opposite to direction of the motion of electron while it will be in the same direction in case of positron.

According to the fleming left hand rule, electron and positron both experience force in a direction pointing into the plane of paper. **(1 mark)**

12. **(b)** Field lines of solenoid is similar to the magnetic field lines for a bar magnet. **(1 mark)**

13. **(a)** (i) and (ii) : The conditions like formation of large number of spores and presence of moisture and nutrients are responsible for the rapid spread of bread mould. **(1 mark)**

Note

Spore formation is one of the asexual mode of reproduction followed in kingdom fungi.

14. **(c)** Lens will produce a complete image of the object. The nature, size and location of the image will not change but the intensity of the image will become half. **(1 mark)**

15. **(a)** Phenomenon of light that involved in the formation of rainbow are refraction, reflection and dispersion of light. **(1 mark)**

16. Speed of light = frequency × wavelength

Speed $\propto$ wavelength

When frequency = constant

and, wavelength of red > wavelength of violet.

So, speed of red > speed of violet.

Also, refractive index is given by

$$n = \frac{\text{Speed in vaccum}}{\text{Speed in medium}}$$

Hence,

refractive index of violet is largest among other colours. and refractive index of red is lowest **(1 mark)**

17. **(b)** Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A). **(1 mark)**

Note

Ozone gas is poisonous for human beings besides this it performs an essential function of protecting the surface of the earth from harmful UV radiation.

19. **(d)** Assertion (A) is false, but Reason (R) is true.

Sex of the children will be determined by what they inherit from their father. **(1 mark)**

Note

Sex determination in different organisms is dependent on different kinds of factors like: - genetic basis, temperature etc.

20. **(a)** Electron moves from lower potential to higher potential in a conductor and energy required for this movement is provided by potential difference maintained by dry cell across the ends of a conductor. **(1 mark)**

21. (a) During running there is a lack of oxygen in muscle cells. Here the pyruvate is converted into lactic acid which is a three - carbon molecule. This build - up of lactic acid in muscles during running causes muscle cramps and the athlete will suffer. **(1 mark)**

The energy released during the respiration in this case is comparatively very low as compared to aerobic respiration. **(1 mark)**

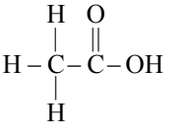
OR

(b) Extracellular Fluid / Tissue Fluid. **(1 mark)**

(i) Lymph carries digested and absorbed fat from intestine

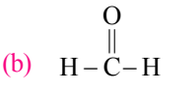
(ii) Lymph drains excess fluid from extra cellular space back into the blood **(1 mark)**

22. (a)



It is carboxylic acid functional group. The compound is known as acetic acid. **(1 mark)**

(b)



It is Aldehyde group.

The compound is known as Methanol or it is the first compound of aldehyde family called formaldehyde. **(1 mark)**

23. (a) When copper powder is taken into a china dish and heated, a black coloured substance is formed. **(½ mark)**

This substance is a copper oxide (CuO) **(½ mark)**

$$2Cu(s) + O_2(g) \xrightarrow{\Delta} 2CuO(s)$$

The crimson red copper is converted into black copper oxide. **(1 mark)**

OR

(b) Sodium sulphate reacts with barium chloride to give barium sulphate and sodium chloride.

$BaCl_2(aq) + Na_2SO_4(aq) \longrightarrow BaSO_4(s) + 2NaCl(aq)$.

Barium sulphate is insoluble in water and will precipitate as a white solid.

This reaction is an example of double displacement reaction. **(2 marks)**

Note

In double displacement two ionic compound exchanging anion and cations. They are of two types.

(1) Precipitation reaction (2) Neutralization reaction

24. During the formation of male and female gametes the chromosome number gets reduced to half in both the cells. So when these gametes. Fused together to form the zygote of progeny the original number of chromosomes gets restored in the progeny. **(1 mark)**

Meiosis is the cell division by which chromosome number is maintained in the progeny. **(1 mark)**

Note

Meiosis is a type of cell division which takes place in reproductive tissue.

25. The power of a lens is defined as the reciprocal of its focal length (f) expressed in metres. SI unit of power is dioptre. **(1 mark)**

$$\text{Power, } P = \frac{100}{50} = -2D$$ **(1 mark)**

26. $I = \frac{Q}{t}$ **(½ mark)**

$I = 15 \times 10^{-3}$ A

$Q = 750$C

$\therefore \quad t = \frac{Q}{I} = \frac{750}{15 \times 10^{-3}}$ **(½ mark)**

t = 50000 seconds **(1 mark)**

27. (a)

(i) Hypermetropia

A focal length of the eye lens is too long. The eyeball becomes too small. **(1 mark)**

(ii) **Two possible causes:**

Greater focal length of the lens.

Eye ball becoming smaller.

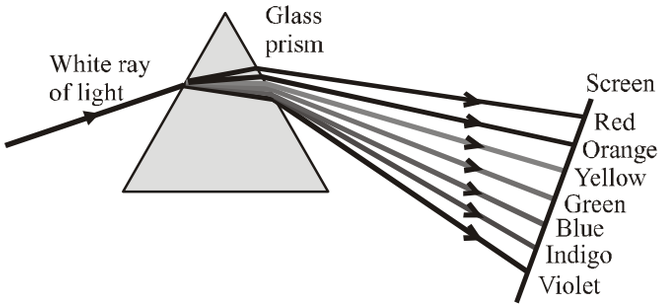
Convex lens will enhance the combined converging power of eye lens. **(½ mark)**

(iii) This defect can be corrected by using convex lens of appropriate focal length **(½ mark)**

OR

(b) The phenomenon of decomposition of the white light into its seven component colours when passing through a prism or through a transparent object delimited by non parallel surfaces is called dispersion of light. **(1 mark)**

Dispersion of light occur because light of different colours (wavelengths) has different velocities while travelling in a glass prism.



(1 mark)

Activity:

- Take a magnesium ribbon and some sulphur powder.
- Burn the magneslium ribbon. Collect the ahses formed and dissolved them in water.
- Test the resultant solution with both red and blue litmus paper.
- Is the product formed on burning magnesium acidic or basic?
- Now burn sulphur powder. Place a test tube over the burning sulphur to collect the fumes produced.
- Add some water to the above test tube and shake.
- Test this solution with blue and red litmus paper.

28. We can differentiate the chemical properties of MgO and SO_2 with litmus paper.

Metal oxide (MgO) **(Product by burning of metal)**: -

MgO is basic in nature and turns red litmus to blue but have no effect on blue litmus.

Non metal oxides (SO_2) **(Product by Burning of non - metal)**

SO_2 is acidic in nature and turns blue litmus to red but have no effect on red litmus. **(3 marks)**

29. The Chemical reaction takes place as

$Fe(s) + CuSO_4(aq.) \longrightarrow FeSO_4(aq.) + Cu(s)$ **(1 mark)**

In this reaction, Iron has displaced or removed another element copper, from copper sulphate solution. This reaction is known as displacement reaction. **(1 mark)**

Zn and Pb are the two metals which can be used at the place of Fe in this reaction.

$Zn + CuSO_4 \longrightarrow ZnSO_4 + Cu$

$Pb + CuSO_4 \longrightarrow PbSO_4 + Cu$

Zinc and lead (Pb) are more reactive elements than copper.

30. (a) Violet colour flowers was obtained in the plants of F_1 generation as only dominant trait is able to express in heterozygous condition (Vv). **(1 mark)**

(b) 25% of plants with white flowers were obtained in F_2 generation plants. In F_1 generation the genotype of the plants were in heterozygous condition (Vv) and in this case only dominant trait will express, not the recessive one. So for that reason white flower colour trait was not expressed in F_1 generation. **(1 mark)**

(c) In F_2 generation the ratio of (Vv) and (Vv) will be $\Rightarrow 1:2$ **(1 mark)**

Note

Recessive traits will only express in homozygous recessive condition.

31. (i) Growth hormone secreted by the pituitary regulates growth and development of the body. If there is a deficiency of this hormone in childhood, it leads to dwarfism. **(1½ marks)**

(ii) Thyroxin secreted by the thyroid gland regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.

(1½ marks)

32. The earth wire, which has insulation of green colour, is usually connected to a metal plate deep in the earth near the house. This is used as a safety measure, especially for those appliances that have a metallic body, for example, electric press, toaster, table fan, refrigerator, etc. The metallic body is connected to the earth wire, which provides a low-resistance conducting path for the current. Thus, it ensures in case of any leakage of current from the metallic body of the appliance have its potential equal to that of the earth, and the user may not get a severe electric shock. **(3 marks)**

33.

Food Chain	**Food Web**
– The series or organisms taking part at various biotic levels by feeding on one another forms food chain.	– When several inter-connected food chains are joined together to form a series of branching lines is called food web. **(1 mark)**
– Organisms beeding on one another in a linear fashion.	– Each organism is gene-rally eaten by two or more other kinds of organisms which in turn are eaten by several other organisms. **(1 mark)**

As the population of deer decreases, then the population organisms belonging to the first trophic level will increase due to low population of primary consumer and population of third trophic level will decreases as the population of their food source is decreased. **(1 mark)**

In nature due to complex dependency of different organisms on one another, there is only food web which is existing in nature.

34. (a) Chlor-Alkali process is the one in which electricity is passed through an aqueous solution of sodium chloride or brine which will decomposes to form sodium hydroxide (NaOH).

It is called so because the product form in this process is chlorine and sodium hydroxide. The term Chloro stand for Cl and alkali stand for sodium hydroxide. **(2 marks)**

The balance chemical equation can be written as

$$2\,NaCl + 2H_2O \longrightarrow 2\,NaOH + Cl_2 + H_2$$

In this process Hydrogen gas produce at cathode and chlorine gas produced at anode. **(1 mark)**

Use of Hydrogen (H_2)gas :-

(1) Hydrogen gas is used as fuel.

(2) Hydrogen gas is extensively used for hydrogenation of vegetable oil. **(1 mark)**

Use of Chlorine gas :-

(1) It is used as an antiseptic.

(2) It is used to get rid of the smell of purification. **(1 mark)**

OR

(b) The neutralisation of sodium hydroxide (NaOH), a base with Hydrogen Chloride (HCl) an acid produces sodium chloride (salt) and water. **(1 mark)**

Chemical Equation

$$HCl + NaOH \longrightarrow NaCl + H_2O$$ **(1 mark)**

Production of Washing soda: Washing soda is produced from sodium chloride in the following three steps:-

(i) A cold and concentrated solution of NaCl react with NH_3 and CO_2 to obtain $NaHCO_3$(sodium hydrogen carbonate)

$$NaCl + NH_3 + H_2O + CO_2 \longrightarrow NaHCO_3 + NH_4Cl$$

(ii) Sodium Hydrogen carbonate is separated by filteration dried and heated. On heating sodium hydrogen carbonate decomposes to form sodium carbonate

$$2NaHCO_3 \xrightarrow{\text{Heat}} Na_2CO_3 + CO_2 + H_2O$$

(iii) $Na_2CO_3 + 10\,H_2O \longrightarrow Na_2CO_3.\,10\,H_2O(aq.)$ **(2 marks)**

Use of Washing Soda : -

(1) It is used as a cleansing agent for domestic purpose.

(2) It is used for removing permanent hardness of water.

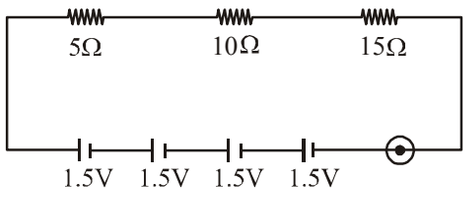
(3) It is used in the manufacture of soap and glass.

(4) It is used in manufacture of paper, Textile and paint etc. **(1 mark)**

35. (a) (i) As R is constant, so by Ohm's law current through the conductor is directly proportional to potential difference across it. Therefore if

potential difference is decreased to one-third of initial value, current will also decrease to one-third of initial value. **(2 marks)**

(ii)



(1 mark)

(I) Electric current through the circuit;

$$I = \frac{V_{net}}{R_{net}}$$ **(½ mark)**

$V_{net} = 1.5 + 1.5 + 1.5 + 1.5 = 6V$

$R_{net} = 5 + 10 + 15 = 30\Omega$

$$I = \frac{6}{30} = \frac{1}{5} = 0.2A$$ **(½ mark)**

(II) Potential difference across 10Ω resistor

$V = IR$

$V = 0.2 \times 10 = 2V$ **(1 mark)**

OR

(b) (i) If amount of work done in bringing a one coulomb charge from one point to the other is 1 joule then potential difference between two points is said to be1 volt. **(2 marks)**

(ii) $d = 0.2\ mm = 0.2 \times 10^{-3}\ m$

$\rho = 1.6 \times 10^{-8}\ \Omega m$

$R = 14\Omega,\ \ell = ?$

$$R = \rho\frac{\ell}{A} \Rightarrow \ell = \frac{RA}{\rho}$$ **(1 mark)**

$$\therefore \quad \ell = \frac{14 \times 22 \times 0.2 \times 0.2 \times 10^{-6}}{7 \times 4 \times 1.6 \times 10^{-8}} = 27.5\ m$$ **(1 mark)**

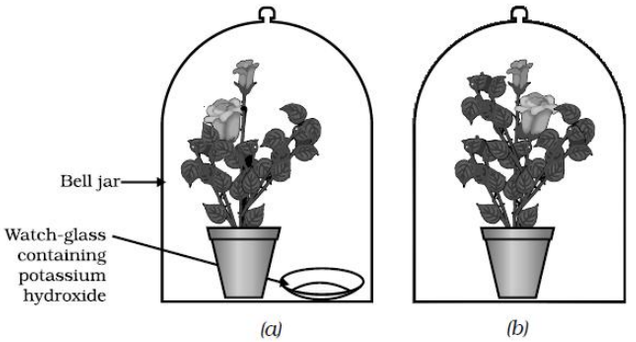
If diameter is doubled, then resistance becomes one fourth. **(1 mark)**

36. (a) (i) Take two healthy potted plants which are nearly the same size.

(ii) Keep them in a dark room for three days.

(iii) Now place each plant on separate glass plates. Place a watch - glass containing potassium hydroxide by the side of one of the plants. The potassium hydroxide is used to absorb carbon dioxide.

(iv) Cover both plants with separate bell - jars.



(v) Use Vaseline to seal the bottom of the jars to the glass plates so that the set - up is air - tight.

(vi) Keep the plants in sunlight for about two hours.

(vii) Pluck a leaf from each plant and perform iodine test for starch. **(2 marks)**

Observation: - The plant with potassium hydroxide do not show blue - black colour on leaf while performing iodine test whereas the plant without potassium hydroxide shows blue - black colour on leaf on performing iodine test. This indicates starch formation takes place in leaves which are not placed with potassium hydroxide and the leaves which are placed with potassium hydroxide do not show starch synthesis. **(2 marks)**

Conclusion : This means carbon dioxide is essential for photosynthesis. **(1 mark)**

Note

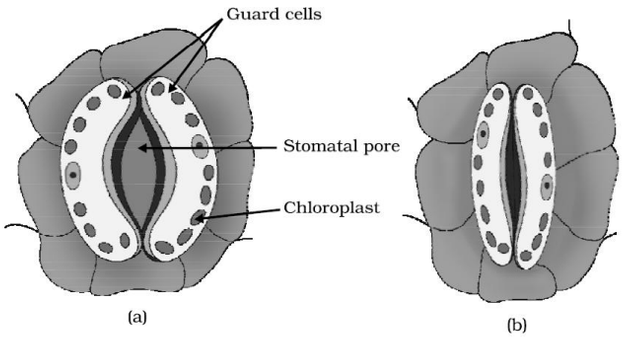
Carbon dioxide, sunlight, chlorophyll, Water are the essential components required for photosynthesis.

OR

36. (b) (i) In test tube (I) atmospheric air is passed through line water that is having very low concentration of carbon dioxide, so it takes time to turn lime water milky. Whereas in test tube (II) exhaled air is passed through lime water which is rich in carbon dioxide, so it takes lesser time to turn line water milky.

(2 marks)

(ii)



(1 mark)

- Stomata plays important role in gaseous exchange for photosynthesis.
- Stomata helps in transpiration which is required for water transportation in plants.

(2 marks)

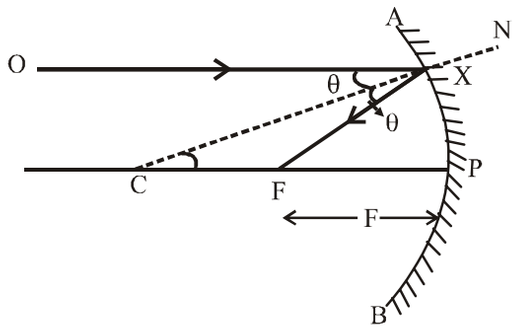
Note

Lime water test is a well - known test for checking the presence of carbon dioxide.

37. (a) **Principal axis:** Straight-line passing through the pole and the centre of curvature of a spherical mirror is called principal axis. **(1 mark)**

(b) The focal length (f) of a mirror is half of the radius of curvature (R), that is, $f = \frac{R}{2}$

$\therefore$ $R = 2f = 2 \times 10 = 20$ cm **(1 mark)**



(c) (i) $f = 15$ cm ; $u = -10$ cm ; $v = ?$

$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$ **(½ mark)**

$\frac{1}{v} = \frac{1}{15} + \frac{1}{10} = \frac{2+3}{30} = \frac{5}{30} = \frac{1}{6}$ **(½ mark)**

Position of image = 6 cm **(½ mark)**

Image is formed on right side of mirror, so it is virtual and erect. **(½ mark)**

(c) (ii) Convex mirror always forms virtual, erect and diminished image of distant objects. **(1 mark)**

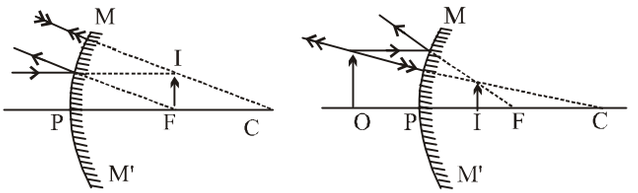


Fig. : Image formation by convex mirror

(1 mark)

38. (a) Hydrocarbons are organic compounds that entirely made up of only two kinds of atom – carbon and hydrogen. Lighter hydrocarbons are colourless gases that have fainted odours. **(1 mark)**

(b) The valency of carbon is four. Thus it can form covalent bonds with other atom. This property is known as tetravalency.

Carbon has the ability to form long chain when it gets linked with other carbon atom. This property is known as catenation. Carbon can form single / double / Triple bond. **(1 mark)**

(c) (i) The formula of the functional group ketone is R COR, where R $\Rightarrow C_nH_{2n+1}$

The formula of the functional group aldehyde is – CHO.

The reaction of alcohol with organic acid in the presence of catalyst forms the ester and water. The reaction is known as esterification.

$$CH_3COOH + CH_3CH_2OH \overset{H^{\oplus}}{\rightleftharpoons} CH_3COOC_2H_5 + H_2O$$

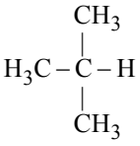
(2 marks)

OR

(c) (ii) Structural Isomers are those isomer in which the atoms are completely arranged in a different structure with the same molecular formula. Structural isomers have different connectivity of atoms.

The two structure isomers of butane (C_4H_{10}) is–

$CH_3 - CH_2 - CH_2 - CH_3$ (n - Butane)



(methyl propane / Isobutane)

(2 marks)

39. (a)

Self - Pollination		**Cross - Pollination**
In self-pollination the transfer of pollen to stigma occurs in same flower.	–	If the pollen is transfe -rred from one flower to another, it is known as cross - pollination

(1 mark)

(b) Petals attracts insects for pollination. After fertilisation petals may shrivel and fall off. **(1 mark)**

(c) (i) Fertilisation is the process of fusion of male and female gamete.

After fertilisation the ovules will turn into seed and ovary will turn into fruit. **(2 marks)**

OR

(c) (ii) In a germinating seed, plumule is known as future shoot and radicle is known as future root.

Cotyledon contains reserve food material for germinating seed. **(2 marks)**

As the male and female gametes are immobile, so pollination occurs in flowering plants with the help of pollinating agents.