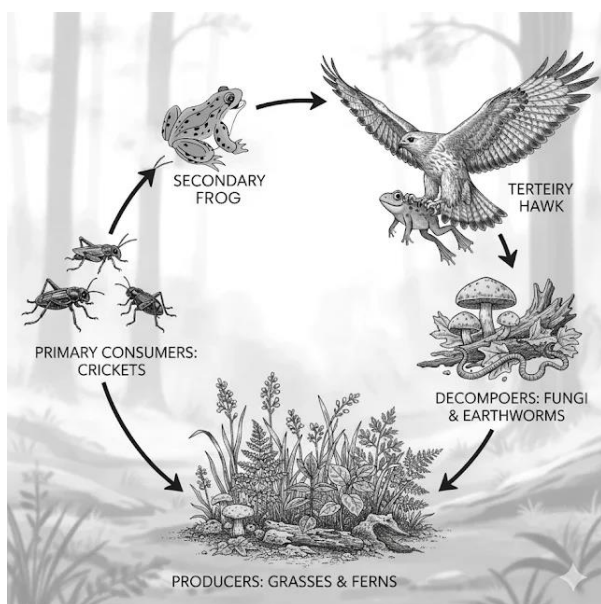


CLASS : X

SUBJECT – SCIENCE

SOLUTIONS

1. (c) A-ii, B-iv, C-i, D-iii
2. (a) Glucose, amino acids, salts and major amount of water
3. (a) (A)-(i), (B)-(iv), (C)-(iii), (D)-(ii)
4. (d) Cerebellum
5. (b) Enrichment of oxygen in atmosphere
6. (c) A decrease in frog numbers due to reduced food source.



7. (d) ii and iii
8. (d) A is false but R is true
9. (b) Both are true but not the correct explanation
10. Water travels from the soil to plant leaves via xylem vessels, a process known as the ascent of sap, driven by transpiration pull. Roots absorb water from the soil through root hairs. This water is then transported up the plant's vascular tissue, where transpiration of water from the leaves creates a suction force, or pull, that draws more water from the roots to the leaves.
11. (A)
 - (i) Absorption of Light Energy by Chlorophyll.
 - (ii) Photolysis of Water and Conversion of Light Energy to Chemical Energy:

- (iii) Reduction of CO_2 to glucose
Desert plants such as cacti and succulents open their stomata at night and take in carbon dioxide (CO_2) and store it as an intermediate. During the day, when the stomata are closed to prevent water loss, the stored CO_2 is used to carry out photosynthesis.

OR

- (B) I would modify the plant to have enhanced salt tolerance by improving its ability to regulate ion balance and osmotic pressure.
12. The concentration of DDT increases at each successive trophic level — a phenomenon known as biological magnification. Therefore, the organisms at the top of the food chain (like the hawk) are the most severely affected, even though the pesticide was introduced at the lowest level (the water).
13. (i) The adrenal gland releases the hormone Adrenaline
It Increases heart rate and blood pressure – to supply more oxygen and glucose to muscles. These changes help the body to react quickly and efficiently in emergency situations — either to fight the threat or flee from it.
- (ii) People with diabetes are often advised to take insulin injections because their body either does not produce enough insulin or cannot use insulin properly.
- (iii) Information is passed to the central nervous system (CNS) — which includes the brain and spinal cord — through sensory neurons (afferent neurons).
14. (a) Seed shape and seed colour are inherited independently.
- (b) The Law of Independent Assortment states that alleles of different genes segregate into gametes independently of one another. Counting phenotypes here gives the 9 round yellow : 3 round green

: 3 wrinkled yellow : 1 wrinkled green ratio. That match between theory and observation shows the R and r alleles assorted independently of the Y and y alleles.

- (c) Probability of a wrinkled green (rr yy) offspring from $RrYy \times RrYy$

Probability of rr from $Rr \times Rr = 1/4$.

Probability of yy from $Yy \times Yy = 1/4$.

So probability of rr yy = $1/4 \times 1/4 = 1/16$

15. (a) Carbon dioxide

OR

- (b) Leaf is boiled in alcohol to remove chlorophyll.
(c) Carbon dioxide is necessary for photosynthesis
(d) It does not receive carbon dioxide as it was absorbed by soda lime.

16. (A)

- (i) A-Ovary, B-Uterus, and C-Cervix.

- (ii) A (ovary)- Release eggs (ova) — the female gametes needed for fertilization.

B (Uterus)- It is the Site for Implantation and provides a nourishing environment for the developing embryo.

- (iii) C (Cervix)- connects the uterus to the vagina and provide Passage for Sperm:

- (iv) Even if fertilization occurs, pregnancy depends on successful implantation and a genetically healthy zygote. Failure of either prevents pregnancy.

OR

- (B) (i) Steps of Sexual Reproduction in flowering plants-

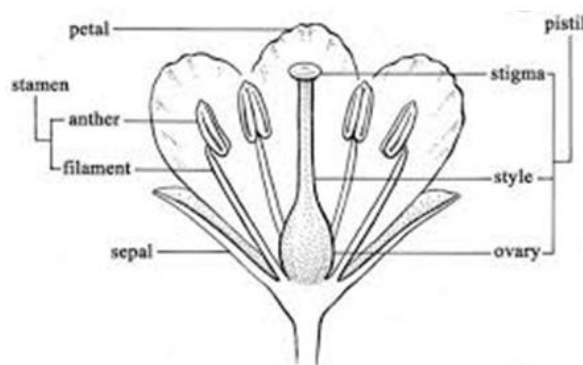
(a) Formation of male and female Gametes.

(b) Pollination: Transfer of pollen from the anther (male part) to the stigma (female part) of a flower.

(c) Fertilization: Pollen germinates on the stigma, forming a pollen tube that grows toward the ovule. Pollen nuclei travel through the pollen tube and fuse with the egg cell inside the ovule to form zygote.

(d) Seed and Fruit Formation: The zygote develops into an embryo inside the seed. The ovule develops into a seed, and the ovary develops into a fruit that protects

the seed and aids in dispersal.



- (ii) Pollination ensures that male and female gametes meet.

Fertilization ensures that these gametes fuse to form a viable zygote, which develops into a seed capable of producing a new plant.

Together, these processes are crucial for reproduction, survival, and evolution of flowering plants.

17. (d) Greater than 7
18. (b) HCl
19. (d) K
20. (a) CaO
21. (a) Al_2O_3
22. (c) 8
23. (b) 1st
24. (b) Both A and R are true, and R is not the correct explanation of A.

- 25.

	Calcination	Roasting
(1)	It is the process of heating the ore strongly in the absence of air.	It is the process of heating the ore strongly in the presence of excess of air.
	$ZnCO_3 \xrightarrow[\text{Absence of air}]{\Delta} ZnO + CO_2$	$2ZnS + 3O_2 \xrightarrow[\text{Excess of air}]{\Delta} 2ZnO(s) + 2SO_2(g)$
(2)	It is used for carbonate ore.	It is used for sulphide ore.

26. (a) Melting and boiling points

Ionic compounds have high melting and boiling points, due to the strong electrostatic force of attraction between the oppositely charged ions. Therefore, large amount of energy is needed to break these bonds.

- (b) **Uses of bleaching powder :**

(i) For bleaching cotton and linen in the

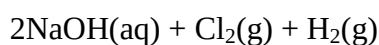
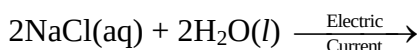
textile industry, for bleaching wood pulp in paper factories and for bleaching washed clothes in laundry.

(ii) As an oxidising agent in many chemical industries.

OR

(a) **Chlor-alkali process for obtaining sodium hydroxide**

When we pass electricity through a solution of sodium chloride, commonly called brine, it decomposes to form sodium hydroxide according to the following equation:

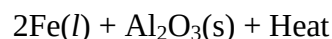
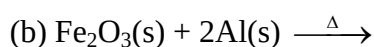


On electrolysis, chlorine gas is formed at anode and hydrogen at cathode, sodium hydroxide solution is formed near the cathode. All these products are commercially important.

(b) (i) Methanol

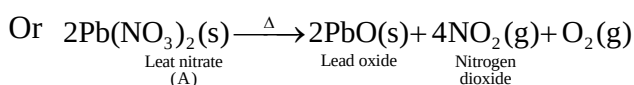
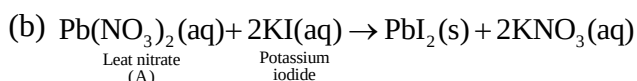
(ii) Methanoic acid

27. (a) Thermite reaction



(c) In this reaction large amount of heat is evolved so it is called thermite reaction and metals are produced in molten state.

28. (a) A = $\text{Pb(NO}_3)_2$, B = KI
C = PbI_2 D = NO_2



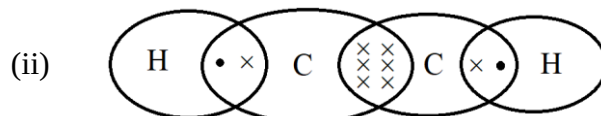
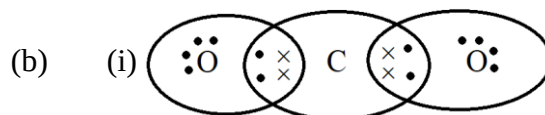
(c) Moist blue litmus turn red

29. (A)

(a) **Homologous Series**

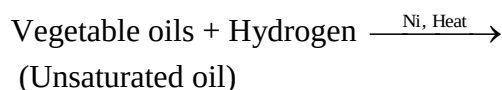
"A series of organic compounds having similar structures and similar chemical properties in which the successive members differ in their molecular formula by $-\text{CH}_2$ group" is known as homologous series.

The different members of the series are called as homologous.



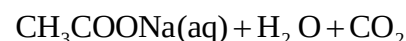
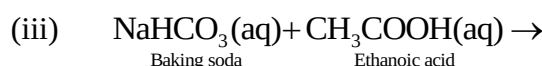
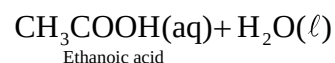
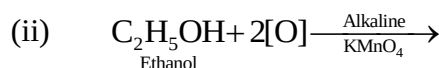
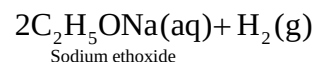
(c) **Denatured alcohol:** Ethanol to which certain poisonous and nauseating substances like methyl alcohol, pyridine, etc. have been added is termed as denatured alcohol. To prevent the misuse of industrial alcohol.

(d) The vegetable oils undergo hydrogenation, like alkenes, to form saturated products called vanaspati ghee, which is semi-solid at room temperature.



Vanaspati Ghee
(Saturated ghee)

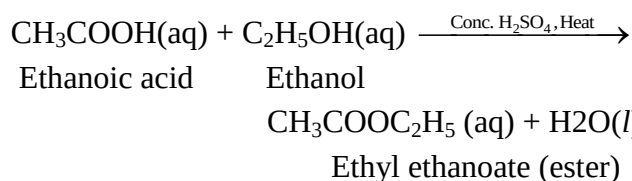
OR



(b) **Esterification :**

Esters are sweet-smelling substances. These are used in making perfumes and as flavouring agents.

Ethanoic acid reacts with ethanol in the presence of conc. H_2SO_4 to form ethyl ethanoate which is an ester.

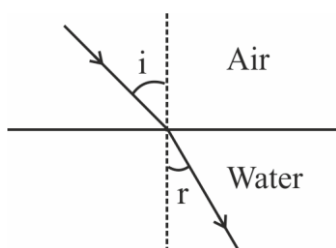


30. (a) (i) and (ii)

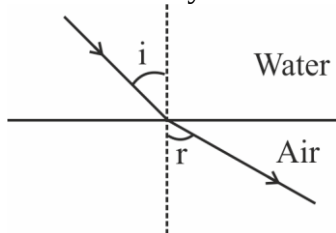
31. (a) Violet and red

32. (a) Both A and R are true, and R is the correct explanation of A.

33. (a) From air to water : Since light is going from rarer to denser medium, therefore it will bend towards normal.



- (b) From water to air : Since light is going from water (denser) to air (rarer) so it will bend away from normal.



34. Given, Power (P) = 1100 W

Voltage (V) = 220 V

Find : (i) its resistance

(ii) the current drawn

- (i) For resistance,

By applying formula, $P = \frac{V^2}{R}$

$$R = \frac{V^2}{P} = \frac{(220)^2}{1100} = \frac{220 \times 220}{1100} = 44\Omega$$

- (ii) For current, $P = VI$

$$I = \frac{P}{V} = \frac{1100}{220} = 5A$$

Current is 5A and resistance is 44Ω.

OR

- (i) The current is directly proportional to applied potential difference on increasing potential current increases.

- (ii) First calculate resistance

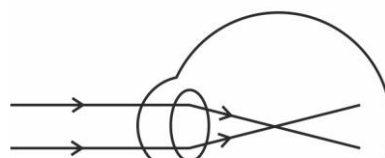
$$R = \frac{\Delta V}{\Delta I} = \frac{4 - 0}{0.4 - 0} = \frac{4}{0.4} = 10\Omega$$

Now, calculate I

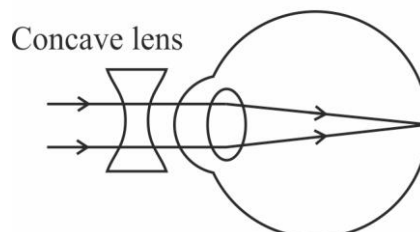
$$I = \frac{V}{R} = \frac{2.5}{10} = 0.25A$$

35. This student is unable to see far objects. This means that the student is suffering from myopia. Doctor will prescribe a concave lens of suitable focal length to correct defect.

Defective eye



Corrected eye



36. (a) One ampere : One ampere is the current that flows through a conductor when one coulomb of charge passes through it in one second.

- (b) Given, $R = 14\Omega$, $l = ?$,
 $r = 0.01 \text{ cm} = 0.01 \times 10^{-2} \text{ m}$
 $\rho = 44 \times 10^{-8} \Omega\text{m}$

$$R = \frac{\rho \ell}{A}$$

$$\ell = \frac{RA}{\rho} = 14 \times \frac{22}{7} \times \frac{(0.01 \times 10^{-2})^2}{44 \times 10^{-8}}$$

$$l = 1\text{m}$$

37. (a) Fleming's Left Hand Rule : - Place your centre finger, fore finger and thumb of left hand in such a way that all are mutually perpendicular to each other, then centre finger shows direction of current, fore finger shows direction of magnetic field and thumb shows direction of force on current carrying conductor.

- (b) (i) Maximum force when motion of charge perpendicular to magnetic field.
(ii) Minimum force when motion of charge parallel to magnetic field.

38. (i) Given, $h_0 = 4 \text{ cm}$

$u = -10 \text{ cm}$, $f = 20 \text{ cm}$

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{20} = \frac{1}{v} + \frac{1}{10}$$

$$\frac{1}{v} = \frac{1}{20} - \frac{1}{10} = \frac{1-2}{20} = \frac{-1}{20}$$

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

- (ii) $m = \frac{V}{u} = \frac{-20}{-10} = +2$

$$\frac{H_1}{H_0} = m$$

$$H_1 = 2 \times 4 = 8 \text{ cm}$$

(iii) Given, $u = -50 \text{ cm}$, $v = -10 \text{ cm}$

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

$$\Rightarrow \frac{1}{f} = \frac{1}{-10} + \frac{1}{50} = \frac{-1}{10} + \frac{1}{50} = \frac{-5+1}{50}$$

$$f = \frac{-50}{4} = -12.5 \text{ cm}$$

OR

Focal length for convex lens = +5 cm

$$p = \frac{1}{f} = \frac{100}{f} = \frac{100}{5} = +20\text{D}$$

Focal length for concave lens = -5 cm

$$p = \frac{1}{f} = \frac{100}{-5} = -20\text{D}$$

39. (i) Electric power : Rate of electrical energy dissipated or consumed to maintain the flow of current through a circuit.

$$P = VI$$

$$\text{Put, } I = V/R$$

$$P = \frac{V^2}{R}$$

(ii) (a) As given, $E = 11 \text{ units} = 11 \text{ kWh}$

$$\text{We know that, } P = \frac{E}{t} = \frac{11000}{5}$$

$$= 2200 \text{ W}$$

$$P = 2.2 \text{ kW}$$

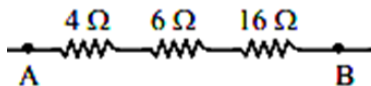
(b) We know that, $I = \frac{P}{V} = \frac{2200}{220} = 10\text{A}$

(c) $P = \frac{V^2}{R}$ by using formula

$$R = \frac{V^2}{P} = \frac{(220)^2}{2200} = 22\Omega$$

OR

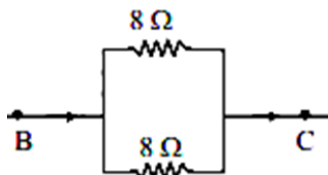
(a) The total resistance between A and B



All are in series.

$$\text{So, } R_{AB} = 4+6+16 = 26\Omega$$

(b) Resistance between BC



All are in parallel.

$$\text{So, } R_{BC} = \frac{8 \times 8}{8+8} = \frac{8 \times 8}{16} = 4\Omega$$

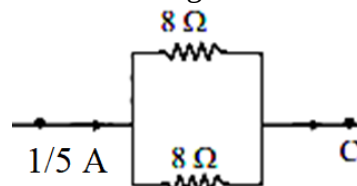
(c) Total current drawn

$$I = \frac{V}{R_{eq}}$$

$$R_{eq} = 4 + 26 = 30\Omega$$

$$I = \frac{6}{30} = \frac{1}{5} \text{ A}$$

(d) Current through 8Ω resistance



As current get divide equal in both resistors so current through 8Ω resistor is $\frac{1}{10} \text{ A}$.

(e) Potential across 16Ω resistance

By Ohm's law, $V = IR$

Current through 16Ω resistor is $\frac{1}{5} \text{ A}$.

$$\text{So, } V = \frac{1}{5} \times 16 = \frac{16}{5} = 3.2\text{V}$$