

CLASS : X

SUBJECT – SCIENCE

SOLUTIONS

- (c) i – B, ii – C, iii – D, iv – A
- (c) Carbon di-oxide in human cell
- (c) CNS
- (d) i – B, ii – D, iii – A, iv – C
- (b) Rr and Rr
- (c) (ii) & (iii)
- (c) 10%
- (c) Assertion (A) is true but reason (R) is false.
- (b) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)
- Filteration:** Nitrogenous wastes such as urea or uric acid are removed.

Reabsorption: Glucose, amino acids, salts useful materials & major amount of water reabsorbed.

The amount of water absorbed depends on :-

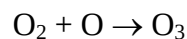
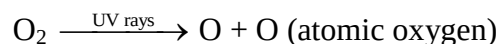
- How much water is their in the body.
 - How much dissolved waste is there to be excreted.
- (i) The correct sequence is blood flow from
 The lungs $\xrightarrow[\text{Vein}]{\text{Pulmonary}}$ Left sides of the heart $\rightarrow$ Ventricle $\rightarrow$ Aorta $\rightarrow$ Body organs
 (ii) The leaked blood flows into surrounding tissues leading to accumulation of blood. It also results in loss of blood pressure that reduce the efficiency of pumping system.

OR

This prevents oxygenated and deoxygenated blood from mixing. This allows a highly efficient supply of oxygenated blood to all parts of body. This is useful in animals with high energy needs such as birds and mammals.

- (a) By the action of UV radiations on

oxygen molecules which splits to from free oxygen atoms. These free oxygen atoms combine with oxygen molecules to form ozone.

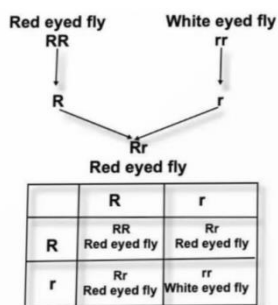


Ozone layer shields the earth from the harmful ultraviolet (UV) radiations from the sun.

- The compound responsible for ozone depletion is chlorofluorocarbons (CFCs), along with other halogenated compounds such as chloride & Bromine containing compounds.
- Difference between movement of leaves of sensitive plant and movement of shoot towards light -

Movement of Leaves of Sensitive Plant	Movement of a Shoot towards Light
(i) Growth is not involved	(i) Growth is involved
(ii) movement is away from the source of stimulus (Touch)	(ii) movement is towards the source of sunlight (Light)
(iii) It is a nastic movement called thigmonasty	(iii) It is a trophic movement called phototropism
(iv) These movements are fast	(iv) These movements are slow
(v) These are non-directional movement	(v) These are directional movement

- The dominant trait is identified by observing its expression in the F_1 generation.
 - The recessive trait is the one that is suppress in the presence of the dominant trait and only expressed in the homozygous recessive state.
 - The ratio of red eyed to white eyed individual is 3 : 1.



White eyed individuals are $\frac{1}{4} \times 12 = 3$

15. (a) Chlorophyll capture sunlight energy, which is essential for converting carbon dioxide & water into glucose.
- (b) Photosynthesis occurs in three steps -
- Absorption of sunlight by chlorophyll.
 - Conversion of light energy to chemical energy & splitting of water molecule into hydrogen & oxygen.
 - Reduction of carbon dioxide into carbohydrate.
- $$6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{Sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$$
- (c) The plant in darkness could not produce starch because photosynthesis did not occur due to the absence of sunlight.

OR

Stomata are tiny pores in leaves that allow the exchange of gases (CO_2 and O_2) which is necessary for photosynthesis.

16. (i) Placenta is a fully formed reddish brown disc embedded in the uterine wall. It also contain villi.

Role of placenta :-

1. Provide a large surface area for glucose & oxygen to pass from the mother to the embryo.
 2. Waste generated by the embryo will be removed by transferring them into the mother's blood.
- (ii) Use of condoms are beneficial for both the sexes as it prevents the spread of sexual transmitted diseases (STDs).
- These are popularly called Nirodh.
 - These are very widely used contraceptive in India because they are

easily available, low cost, reliable, effective & with no side effect.

- (iii) Sex selective abortion is aborting a child on the basis of sex. It effects a healthy society in most negative way as it disturbs the sex ratio in the population and now a sex selective abortion is a crime.

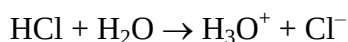
OR

- (i) Function of Testis –
- a) Formation of sperm
 - b) Secretion of sex hormone, testosterone
- Role of -
- a) Vas deferens - Delivery of sperm from testes to urethra.
 - b) Seminal vesicle - Provides nutrition to sperm/make the transport (movement) of sperm easier.
 - c) Urethra - common passage for sperm & urine
 - d) Scrotum - Providing required temperature for sperm formation.
- (ii) Reproduction at its most basic level involves making copies of the blueprints of body design. The DNA in the cell nucleus is the formation source for making proteins. If the information is changed, different proteins will be made. Different proteins will eventually lead to altered body designs.
17. (d) Weak acid and strong base
 18. (b) Blue to white
 19. (b) $\text{CuO} + \text{H}_2 \rightarrow \text{Cu} + \text{H}_2\text{O}$
 20. (b) It reacts with cold water to form magnesium oxide and evolves hydrogen gas.
 21. (a) Has carbon atoms arranged in large plates of rings of strongly bonded carbon atoms with weak interplate bonds
 22. (b) (ii) and (iii)
 23. (d) (iii) and (iv)
 24. (a) Both A and R are true and R is the correct explanation of A.
 25. (i) Ionic compounds have high melting points because of the strong electrostatic forces of attraction between their oppositely charged ions

(ii) Electric wires have a plastic covering to act as an insulator, preventing electric shock.

26. (a) The black copper oxide dissolves, and the solution turns bluish-green. This colour change is due to the formation of copper chloride, a Soluble salt that is green in colour.

(b) HCl solution show acidic properties because it produce hydrogen ions when dissolved in water. The solutions of compounds like alcohol and glucose do not show acidic character because they do not ionise in water to produce hydrogen ions.



(c) Because the acids present in them react with the metals, causing the vessels to corrode and produce toxic metal compounds like copper salts that spoil the food and can cause food poisoning.

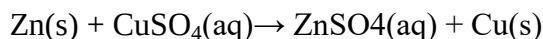
OR

(a) Using baking soda instead of baking powder will make a cake taste bitter or soapy taste because formation of sodium carbonate

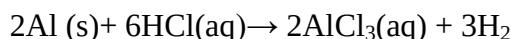
(b) By adding or mixing it with weak, edible acid like tartaric acid with baking soda

(c) Tartaric acid can neutralize basic nature of baking soda and can neutralize its bitter taste of sodium carbonate.

27. (a) If Zinc is combined with copper sulphate solution, Zinc displace copper to form Zinc sulphate. Displacement reaction takes place.



(b) Aluminium metals interact with dilute HCl to form Aluminium chloride, and Hydrogen gas is evolved in this reaction.



(c) When silver metal is added to the copper sulphate solution, there will not be any reaction as silver is less reactive metal as compared to copper.

28. (i) (a) Al

(ii) (c) Pb

(iii) (a) Tungsten

(iv) (b) Al

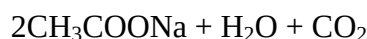
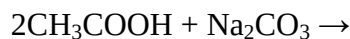
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(iv) (d) Sodium and potassium

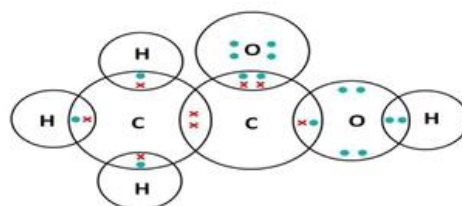
29. (i) Ethanol ($\text{C}_2\text{H}_5\text{OH}$); B: Ethanoic acid (CH_3COOH); C: Ethene (C_2H_4).

(ii) Molecular Mass of C: $\text{C}_2\text{H}_4 = (2 \times 12) + (4 \times 1) = 28 \text{ u}$.

(iii) Reaction: CO_2 gas evolves, turning lime water milky.

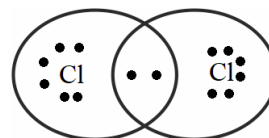


(iv) Electron Dot Structure of B (CH_3COOH)

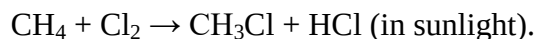


OR

(i) Cl_2 Structure:



(ii) Reaction: Substitution;



(iii) Oxidising Agents: KMnO_4 , $\text{K}_2\text{Cr}_2\text{O}_7$.

(iv) Differences:

Covalent: Low melting/boiling points;
Ionic: High melting/boiling points.
Covalent: Poor conductor;

Ionic: Conduct in molten/aqueous state.

Covalent compound : Soluble in organic solvents;

Ionic compound : Soluble in water.

Covalent compound: found in solid, liquid and gaseous state;

Ionic compound: found in mainly solid state

30. (c) Concave, plane and convex

31. (c) Tyndall effect

32. (c) A is true, but R is false.

33. Given, $f = -30 \text{ cm}$, $v = -15 \text{ cm}$, $h = 5 \text{ cm}$

From the lens formula,

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \Rightarrow \frac{-1}{15} - \frac{1}{u} = \frac{-1}{30}$$

$$\Rightarrow \frac{-1}{u} = \frac{-1}{30} + \frac{1}{15} = \frac{-1+2}{30} = \frac{1}{30}$$

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

34. (i) When two 6Ω resistances are connected in parallel and connected to another 6Ω in series, we get 9Ω resistance.

$$\frac{1}{R_p} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3} \Rightarrow R_p = 3 \Omega$$

$$\Rightarrow R_{\text{net}} = R_3 + R_p = 6 + 3 = 9 \Omega$$

- (ii) When three resistors are connected in parallel, we get 2Ω resistance.

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

$$\frac{1}{R_s} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} \Rightarrow \frac{1}{R_s} = \frac{3}{6}$$

$$R_s = 2$$

OR

- (a) Two resistances of 2Ω are in series

$$R_s = R_1 + R_2 = 2 + 2 = 4 \Omega$$

The third resistance of 4Ω is parallel to R_s , $R_p = R/n = 4/2 = 2 \Omega$

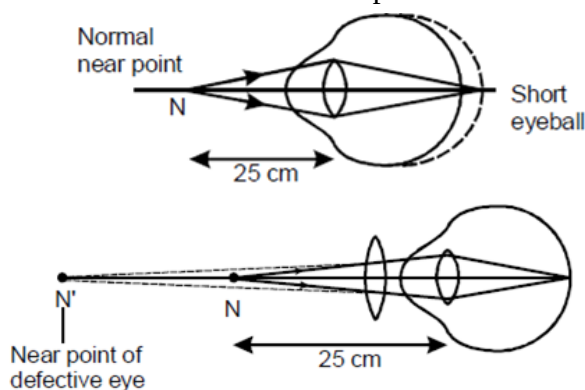
- (b) $I = V/R = 30/2 = 15 \text{ A}$

35. Far Sightedness (or Hyperopia or Hypermetropia): A person with hypermetropia can see distant object clearly but cannot see nearby objects distinctly.

This defect arises because:

- (i) Increase in focal length of eye lens.
(ii) The eye ball has become too small.

This defect can be corrected by using by convex lens of suitable power.



36. $R = \rho \times \frac{\ell}{A}$

$$R = 10 \Omega, r = 0.01 \times 10^{-2} \text{ m}$$

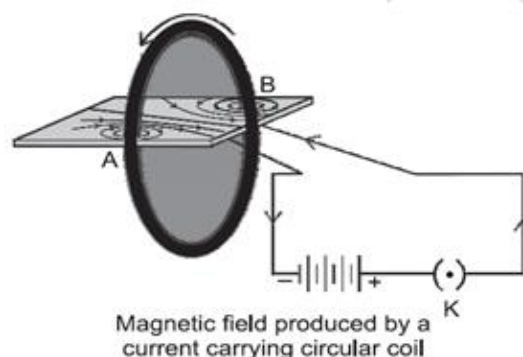
$$= 1 \times 10^{-4} \text{ m}, A = \pi r^2 = \frac{22}{7} \times 1 \times 10^{-8} \text{ m}^2$$

$$\rho = 50 \times 10^{-8} \Omega \text{ m}$$

$$\therefore \ell = \frac{R \times A}{\rho} = \frac{10 \times 22 \times 10^{-8}}{50 \times 10^{-8} \times 7} = \frac{220}{350}$$

$$= 0.628 \text{ m} = 62.8 \text{ cm}$$

37. On observing the field lines, it shows that magnetic field due to the current carrying circular loop is maximum and normal to the current carrying loop at its center because magnetic field due to each part of loop adds up.



38. (a) Given, refractive index of medium x with respect to y, ${}^y\mu_x = 2/3$

Refractive index of medium y with respect to z, ${}^z\mu_y = 4/3$

$\therefore$ Refractive index of medium X with respect to z,

$${}^z\mu_x = {}^y\mu_x \times {}^z\mu_y = 2/3 \times 4/3 = 8/9$$

$\therefore$ Refractive index of medium z with respect to X,

$${}^x\mu_z = 1 / {}^z\mu_x = 9/8$$

- (b) Now speed of light in x = $3 \times 10^8 \text{ m/s}$
Speed of light in y, $v_y = ?$

$$\therefore {}^y\mu_x = \frac{\text{Speed of light in y}}{\text{Speed of light in x}} = \frac{v_y}{3 \times 10^8 \text{ m/s}}$$

$$v_y = 2/3 \times 3 \times 10^8 = 2 \times 10^8 \text{ m/s}$$

OR

Now speed of light in x = $3 \times 10^8 \text{ m/s}$

Speed of light in Z, $V_z = ?$

$$\therefore {}^z\mu_x = \frac{V_z}{V_x}$$

$$V_z = 8/9 \times 3 \times 10^8 = 8/3 \times 10^8 \text{ m/s}$$

$$= 2.67 \times 10^8 \text{ m/s}$$

39. (a) $R_s = R_1 + R_2 = 20\Omega + 4\Omega = 24\Omega$

(b) $I = \frac{V}{R} = \frac{6V}{24\Omega} = 0.25A$

(c) (i) $V = I \times R = 0.25 A \times 20\Omega = 5V$

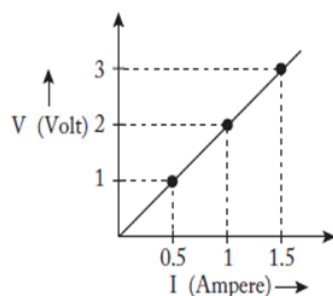
(ii) $V = I \times R = 0.25 A \times 4 = 1V$

(d) (i) $P = I^2 \times R = \left(\frac{1}{4}\right)^2 \times 20$

$$= \frac{1}{16} \times 20 = 1.25W$$

OR

- (a) Electric power is the rate of doing work by an energy source or the rate at which the electrical energy dissipated or consumed per unit time in the electric circuit.



So, Power (P) = $\frac{\text{Work done (W)}}{\text{Time (t)}}$

$P = \frac{\text{Electrical energy dissipated}}{\text{Time (t)}}$

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

- (b) It means the maximum current will flow through it is only 2 A. Fuse wire will melt if the current flowing through it exceeds 2 A value.

(c) Given: $P = 1 \text{ kW} = 1000 \text{ W}$, $V = 220 \text{ V}$

Current drawn, $I = \frac{P}{V} = \frac{1000}{220} = \frac{50}{11}$

$= 4.54 \text{ A}$

To run electric iron of 1 kW efficiently, rated fuse of 5 A should be used.