

Answers to RST/Set-1

SECTION – A

1. (a)
2. (c) mucus and pepsin.
3. (d)
4. (c) cerebrum
5. (c) Both law of dominance and law of segregation can be explained.
6. (c) (iii) and (iv) only
7. (b) Newspaper, leather, used clothes
8. (a) Both A and R are true, and R is the correct explanation of A.
9. (a) Both A and R are true, and R is the correct explanation of A.
10. (a) To carry blood from the heart to kidneys.
(b) To expel urine out of the body.
(c) To filter the blood passing through it and initiate urine formation.
(d) Major function of tubules is reabsorption. Also, tubular secretion helps in urine formation without affecting the electrolyte balance of the body.
11. A. The main raw materials required for photosynthesis are carbon dioxide and water. Sunlight and chlorophyll are also required to make food.

OR

- B. It is because plant kept in dark could not photosynthesise and hence died due to non-availability of oxygen whereas plant kept in light was able to photosynthesise and hence produce oxygen required for its respiration.
12. Excess generation of biodegradable wastes can be harmful as:
(i) Its decomposition is a slow process leading to production of foul smell and gases.
(ii) It serves as the breeding ground for germs that create unhygienic conditions.
 13. Synapse is the junction between two adjacent neurons or nerve cells, i.e. between axon ending of one and the dendrite of the next.

Transmission of Nerve Impulse. 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 to its end. At the end of the 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. Synapse helps in transmitting impulses from one neuron to another.

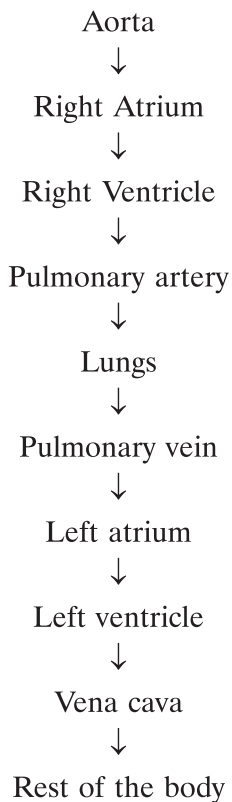
Dominant Trait	Recessive trait
(i) When both dominant and recessive traits are inherited, the dominant trait gets expressed.	(i) When both dominant and recessive traits are inherited, the recessive trait does not get expressed.
(ii) A single copy of dominant trait is enough to get it expressed.	(ii) Both the copies of a trait should be recessive to get it expressed.

75% of the plants in F₂ generation were with round seeds.

15. (a) The right side and the left side of the human heart are useful to prevent deoxygenated and oxygenated blood from mixing. This type of separation of oxygenated and deoxygenated blood ensures a highly efficient supply of oxygen to the body. This is useful in case of birds and mammals because it constantly gives energy to maintain their body temperature.

OR

(b)

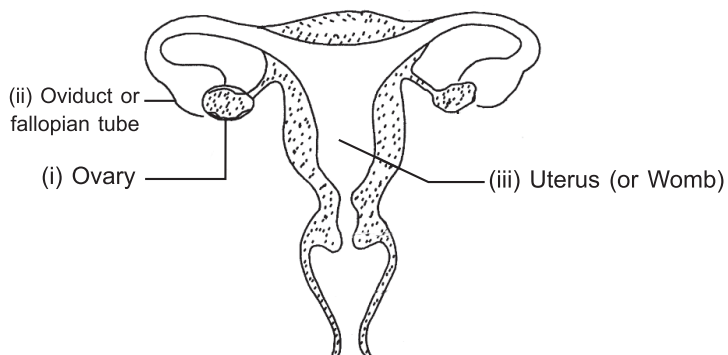


- (c) (i) The blood vessels that are clearly observed in older people are veins as these are superficially located.
(ii) Veins collect the deoxygenated blood from different organs and bring it back to the heart.

(d) The smallest vessels which are one-cell thick are called capillaries.

Exchange of materials between the blood and the surrounding cell takes place across the thin walls of capillaries.

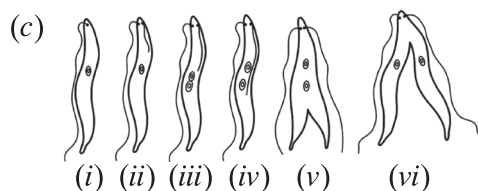
16. A. (a)



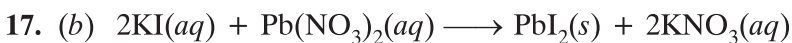
- (b) (i) If the egg is fertilised, a zygote is formed. The zygote starts dividing and form embryo. The embryo is implanted in the lining of the uterus where it continues to grow and develop organs to become foetus.
- (ii) If the egg is not fertilised, the thick and nourishing lining of the uterus breaks and comes out through vagina as blood and mucus which is called menstruation.

OR

- B. (a) (i) Traits of the parent plants are preserved.
- (ii) Since they do not possess viable seeds, vegetative propagation helps to reproduce.
- (b) The green shoots and roots were produced in only those potato pieces which have buds on them; pieces of potato without buds were not able produce green shoots and roots.



SECTION – B



18. (a) zinc is most reactive metal followed by iron and copper.

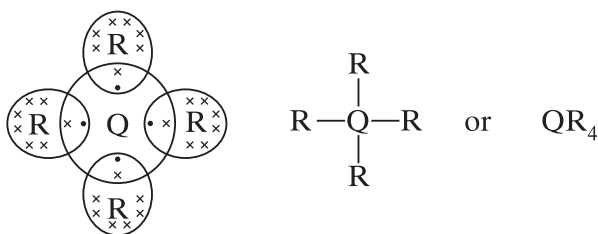
19. (b) Fe, Zn

20. (d) Yellowish-orange colour on pH paper is shown by acidic substance hence to change the colour of pH paper to greenish-blue (pH = 8), an antacid should be added since antacids are basic in nature.

21. (b) Q and R

Element	Electronic configuration	Valence electrons	Nature of element
P	2, 8, 1	1	Metal
Q	2, 4	4	Non-metal
R	2, 8, 7	7	Non-metal
S	2, 8	8	Noble gas

Covalent bonds are formed between non-metals. 'P' element is metal and 'S' is a noble gas.



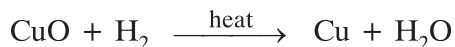
22. (c)

23. (d) It is double displacement reaction.

24. (d) A is false but R is true



The chemical change can be reversed by passing the hydrogen gas over heated CuO.



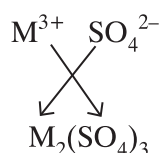
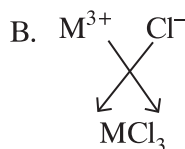
26. A. (a) It is because they are highly lustrous and least reactive.

(b) They are highly reactive. They catch fire and start burning when kept open in the air. To prevent their reaction with oxygen, moisture and carbon dioxide of air, they are stored under oil.

(c) It is because aluminium is a good conductor of heat.

(d) It is because it is easier to reduce oxide ores as compared to carbonates and sulphides.

OR

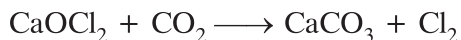


'M' forms mostly ionic bonds because after losing 3 electrons it forms M^{3+} (2, 8) which has stable electronic configuration. The compound formed will conduct electricity in molten state or in aqueous solution but not in solid state.



It is called chlor-alkali process.

- (b) When bleaching powder is exposed to air, it gives strong smell of chlorine because bleaching powder reacts with carbon dioxide from the atmosphere to produce calcium carbonate and chlorine.



Bleaching powder is a mixture of different calcium salts which are insoluble in water.

28. (a) (ii) < 20

because concentrated NaOH gives more OH⁻ ions than dilute base.

- (b) 3 mL of NaOH will be 60 drops, which will neutralise 6 mL of H₂SO₄

S.No.	Volume of dil.H ₂ SO ₄ taken (mL)	Drops of dil. NaOH used (mL)
1	2	20 (1 mL)
2	3	30 (1.5 mL)
3	4	40 (2mL)
4	6	60 (3 mL)


OR

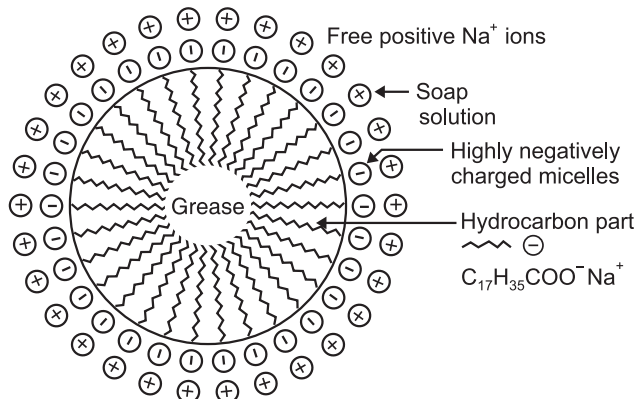
Colour will change from pink to colourless. Phenolphthalein is pink in basic solution and becomes colourless in acids.

- (c) $2\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + 2\text{H}_2\text{O}$

- (i) neutralisation and double displacement reaction.

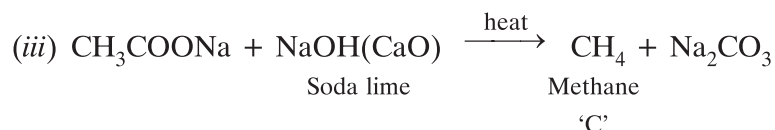
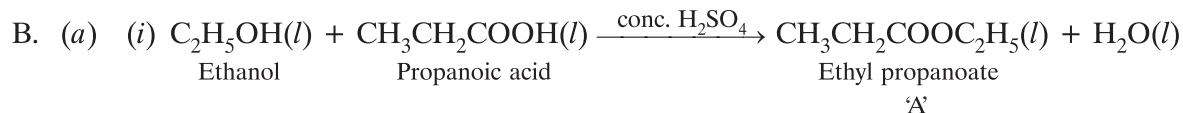
Acid H₂SO₄ is getting neutralised and forming salt + water. It is double displacement as Na⁺ ions are being replaced by H⁺ and OH⁻ by SO₄²⁻. It is not precipitation reaction because Na₂SO₄ is soluble in water.

29. A. (a) 
 long hydrocarbon chain (hydrophobic end) (water-repellent) polar end (hydrophilic) (water-loving)

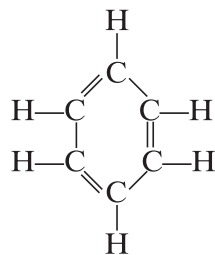


- (b) (i) 'Y' will have more foam because detergents work well even with hard water.
(ii) 'X' will have curdy solid because Ca^{2+} and Mg^{2+} present in hard water form insoluble calcium and magnesium salts of higher fatty acids by reacting with soap solution.

OR



- (b) 'X' is benzene. Its structural formula is as follows:



Benzene

It will not decolourise bromine water because position of double bonds is not fixed. The bonds are not purely double bonds. It burns with sooty flame due to presence of more percentage of carbon and less percentage of hydrogen.

SECTION – C

30. (c) Mirror formula, $\frac{1}{v} = \frac{1}{f} + \frac{1}{u}$ gives

$v = +7.5$ cm and

Magnification, $m = \frac{h_i}{h_o} = -\frac{v}{u}$

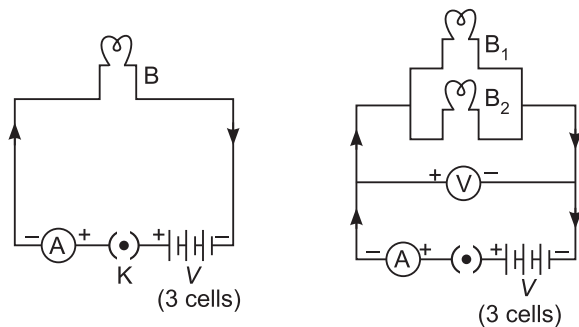
$\Rightarrow h_i = +1.0$ cm

31. (d)

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

33. The given mirror M is a concave spherical mirror. When the object lies between the pole and the focus of the concave mirror, an erect, virtual and enlarged image is formed. So one characteristic property of the image Q formed in the given figure is that it is virtual.

34. A.



OR

B. Given: $P_1 = 24 \text{ W}$, $V_1 = 12 \text{ V}$, $P_2 = ?$, $V_2 = 6 \text{ V}$

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

$$\frac{P_1}{P_2} = \frac{V_1^2}{V_2^2}$$

$$\Rightarrow P_2 = \left(\frac{V_2}{V_1}\right)^2 \times P_1 = \left(\frac{6}{12}\right)^2 \times 24 = \frac{1}{4} \times 24 = 6 \text{ W}$$

35. (a) A myopic person does not need spectacles while reading a book as he has the near point at 25 cm. If such person reads the book with corrective lens (concave) he will have to keep the book at a distance greater than 25 cm so that the image of book will be formed by the concave lens at 25 cm and moreover, the size of the book appears to him is also smaller than actual size. Therefore, the person prefer to remove his spectacles while reading a book.

(b) A hypermetropic person does not need spectacles to see distant objects as he has the far point at infinity.

If such person uses spectacles (convex lens) to see the distant objects, the image will be formed before the retina due to increase in converging power and hence the person cannot see distant objects distinctly. Therefore, such person prefers to remove his spectacles while looking at the sky.

36. Greater the slope of V-I graph, greater will be the resistance of given metallic wire. In the given graph, wire 'A' has greater slope than 'B'. Hence, wire 'A' has greater resistance.

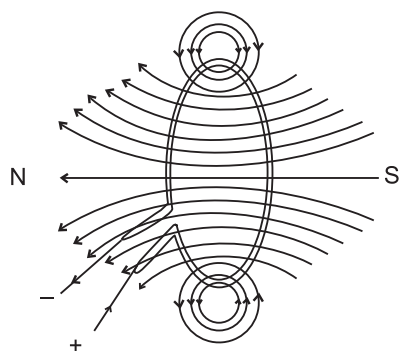
For the wires of same length and same thickness, resistance depends on the nature of material of the wire, i.e.

$$R_1 = \rho_1 \frac{l}{A} \quad \text{and} \quad R_2 = \rho_2 \frac{l}{A}$$

$$\Rightarrow \frac{R_1}{R_2} = \frac{\rho_1}{\rho_2} \quad \text{or} \quad R \propto \rho$$

Hence, wire 'A' is made of a material of high resistivity.

37. (a)



- (b) The pattern of magnetic field due to current carrying circular loop depends inversely on the distance from it. At every point of current carrying circular loop, the concentric circles representing the magnetic field around it would become larger and longer as we move away from the wire. At the centre of the circular loop, the arcs of these big circles would appear as straight lines.
- (c) If there is a circular coil having 'n' turns, the magnetic field produced by this current carrying circular coil will be 'n' times as that produced by a circular loop of a single turn, because the current in each circular turn of coil flows in the same direction and magnetic field produced by each turn of circular coil then just adds up.

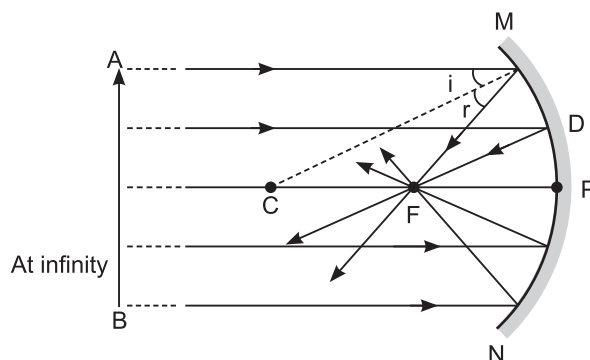
38. (a) The light from the sun is converged at a point as a sharp, bright spot by the mirror. In fact, this spot of light is the image of the sun on the sheet of paper.

The heat produced due to the concentration of sunlight at one point ignites the paper.

(b) Adi has concave mirror or converging mirror in his hand.

Principal Focus: It is a point on the principal axis at which all the incident rays parallel to principal axis meet after reflection from a concave mirror or appear to meet in case of convex mirror.

(c) Adi will be able to determine the approximate value of the focal length of concave mirror. The distance of the image from the position of the mirror gives the approximate value of focal length of the mirror.



OR

(d) Height of image $h_i = -6.0$ cm

Height of object $h_o = 4.0$ cm

$$m = \frac{h_i}{h_o} = \frac{-6.0}{4.0} = -1.5 \text{ cm}$$

Since the image formed is real, it will be inverted and is taken as negative. A negative sign in the value of magnification indicates that the image is real. The height of image (h_i) is taken positive for virtual images.

Radius of curvature of the concave mirror (R) = -25 cm

We know $R = 2f$

$$\begin{aligned} \therefore f &= \frac{R}{2} \\ &= \frac{-25}{2} = -12.5 \text{ cm} \end{aligned}$$

In a concave mirror, focal length is taken as negative.

39. A. (a) The lamps are in parallel.

(b) **Advantages:**

(i) If one lamp is faulty, it will not affect the working of the other lamps.

(ii) They will also be using the full potential of the battery as they are connected in parallel.

(c) The lamp with the highest power will glow the brightest.

$$P = VI$$

In this case, all the bulbs have the same voltage. But lamp C has the highest current.

Hence, for Lamp C,

$$\begin{aligned} P &= 5 \times 60 \text{ Watt} \\ &= 300 \text{ W (the maximum)}. \end{aligned}$$

(d) The total current in the circuit = $3 + 4 + 5 + 3 \text{ A} = 15\text{A}$

$$V = 60 \text{ V}$$

$$V = IR \text{ and hence } R = \frac{V}{I} = \frac{60 \text{ V}}{15 \text{ A}} = 4 \Omega$$

OR

B. (a) Electric line wires offer extremely low resistance to the flow of current, so they do not glow because negligible heat is produced in it.

The filament of bulb glows because it becomes red hot due to large amount of heat produced, as it offers high resistance to the flow of current through it.

(b) The filament of bulb when it glows at $2700\text{ }^{\circ}\text{C}$ does not get burnt because the tungsten metal of filament has

(i) a very high melting point (of $3380\text{ }^{\circ}\text{C}$) and

(ii) a high resistivity.

(c) Given : $I = 0.25\text{ A}$, $t = 4$, $h = 4 \times 60 \times 60\text{ sec}$.

So, amount of charge flowing the filament of electric lamp

$$q = It = 0.25 \times 4 \times 60 \times 60 = 3600\text{ C}$$

(d) Given: $P = 2\text{ kW} = 2000\text{ W}$, $V = 220\text{ V}$

Using,

$$P = VI$$

$$2000 = 220 \times I$$

$$\Rightarrow I = \frac{2000}{220} = 9.09\text{ A}$$

So, the capacity of the fuse that should be used for the electric iron is 10 A .