

Answers to RST/Set-2

SECTION – A

1. (a) In absence of oxygen, in our muscle cells lactic acid is formed.
2. (c) (i), (iii) and (iv) only
3. (b) II, III
4. (b) The medulla oblongata controls many involuntary actions such as salivation, vomiting, breathing, heartbeat and peristalsis.
5. (d)
6. (b) 1,00,000J
7. (c) Earthworm is biotic factor. Soil is abiotic factor.
8. (d) A is false but R is true.
9. (a) Both A and R are true, and R is the correct explanation of A.
10. Through the pores present in the walls of capillaries some amount of plasma proteins and blood cells escape into intercellular spaces in the tissue to form the tissue fluid called lymph.

Function

Lymph carries digested and absorbed fat from intestine.

11. A. Two ways are:
 - (i) Transpiration - Leaves lose extra water through stomata in the form of water vapour.
 - (ii) Shedding of leaves - Plants deposit waste products like resins, tannins and other metabolic by-products in the leaves. When old or dry leaves fall off, these wastes are also removed from the plant body.

OR

- B. Herbivores eat plant-based food, which is rich in cellulose. Cellulose is hard to digest, therefore a longer intestine provides more time and surface area for breaking down cellulose with the help of enzymes and symbiotic microbes. Carnivores eat mainly meat, which is rich in proteins and fats and easier to digest. Their intestine is shorter because digestion and absorption of such food is faster.
12. **Biodegradable substances** – Substances which can be broken down by microorganisms like bacteria and fungi. For example – fruit peels, paper, vegetable, human excreta.
Non-biodegradable substances – Substances which cannot be broken down by microorganisms into simpler and harmless substances. For example – pesticides, polythene bags, aluminum cans.

13. (a) Haemoglobin

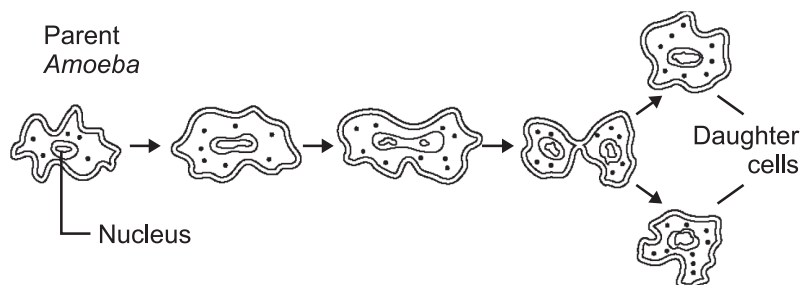
Function

To take up oxygen from lungs and carry it to tissues which are deficient in oxygen.

- (b) To provide sufficient time for oxygen to be absorbed and for carbon dioxide to be released.
- (c) ATP provides energy for various cellular processes.
14. (a) No, we cannot say whether light eye colour is a dominant trait or a recessive trait. For considering a trait as dominant or recessive, we need data of at least three generations. This data is about only two generations. Moreover, unless we know the nature of these two variants of traits it cannot be predicted which is recessive because recessive traits appear when both the parents each contribute recessive allele.
- (b) A homozygous black male dog and a homozygous white female dog are taken and given to mate and produce offspring in F_1 generation. In F_1 generation all the dogs will be black if black colour is dominant. However all the dogs will be white if white colour is dominant.
15. (a) Abscisic acid is called as stress hormone because it signals the closure of stomata to prevent water loss during severe drought, intense sunlight and heat and other adverse environmental conditions.

OR

- (b) • Auxin diffuses towards shady side.
• Causes elongation on one side (shady side) resulting in bending of growing shoot.
- (c) – Gibberellins help in the elongation of stem.
– They also promote seed germination.
- (d) – Cytokinins promote cell division.
– They also regulate axillary bud growth.
16. A. (a) Binary fission is the division of one cell which cuts into two similar or identical cells.



Binary fission in Amoeba

- (b) *Plasmodium* and *Leishmania* reproduce through fission an asexual method of reproduction. *Leishmania* reproduce with the help of binary fission. *Plasmodium* reproduce by multiple fission dividing itself into many daughter cells inside its cell wall.

- (c) Budding, fragmentation and regeneration are all considered as asexual type of reproduction because they involve the formation of new individuals from single parent without fertilisation or fusion of gametes.

OR

B. A seed is the reproductive unit of a plant.

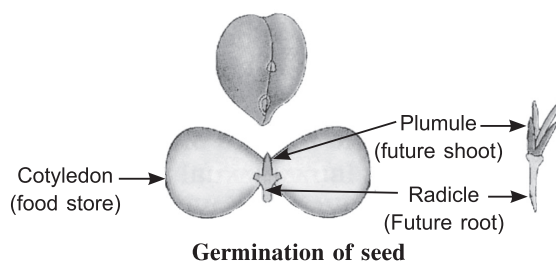
A seed has following parts:

Seed coat: It is the protective covering of the seed.

Cotyledons: These are the embryonic leaves that store food for the germination of young plant.

Plumule: It is the part of embryo that gives rise to shoot.

Radicle: It is the part of embryo that gives rise to roots.



Seed provide the following advantages to a plant:

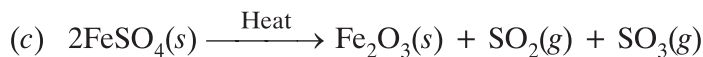
- (i) Seed provide protection to young embryo.
- (ii) Seed formation is more dependable, therefore, it helps the species to spread in other areas by different modes of dispersion.
- (iii) Seeds stores food for embryo to be nourished.

SECTION – B

17. (c) Heat is evolved.
18. (b) It cannot have low melting point.
19. (c) MnO_2 is oxidising agent and HCl is reducing agent
20. (b) Fe
21. (d) NaCl is neutral salt.
22. (d) $:\text{N}::\text{N}:$
23. (b) (ii), (i), (iv), (iii)
24. (c) A is true but R is false.

25. (a) (i) Green colour of FeSO_4 disappears and reddish brown Fe_2O_3 is formed.
(ii) Smell of burning sulphur.

(b) Decomposition reaction.



26. A. (a) Hydrochloric acid is a strong acid because it has more number of hydronium (H_3O^+) ions whereas acetic acid contains less number of hydronium (H_3O^+) ions. So it is a weak acid.

Sulphuric acid (H_2SO_4) is also a strong acid.

- (b) Au and Pt can dissolve in aqua regia.

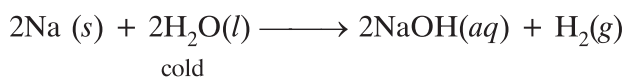
OR

B. (a) $\text{pH} = 7$ for NaCl.

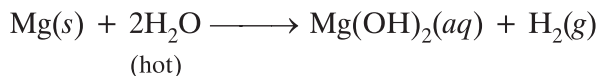
(b) NH_4NO_3 will be acidic salt, it will give orange colour with universal indicator.

(c) K_2CO_3 will be basic salt, blue litmus will remain blue.

27. **Activity 1:** Sodium reacts with cold water to form sodium hydroxide and hydrogen gas.

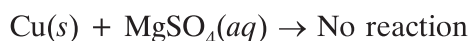
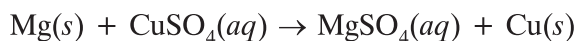


Magnesium does not react with cold water but with hot water to form magnesium hydroxide and hydrogen gas.



Hence sodium is more reactive than magnesium.

Activity 2:



So magnesium is more reactive than copper.

Concluding from activity 1 and 2 $\text{Na} > \text{Mg} > \text{Cu}$.

28. (a) (i) Hg_2Cl_2

Hg_2^{2+} is losing electron to form 2Hg^{2+}

- (b) H_2S is getting oxidised to S and Cl_2 is getting reduced to HCl.

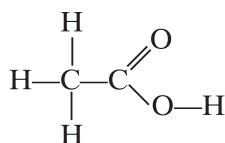
OR

It is because Mg is losing 2 electrons to form Mg^{2+} and 2H^+ are gaining 2 electrons to form $\text{H}_2(g)$.

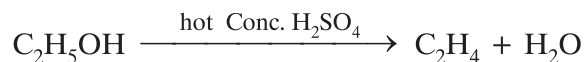
- (c) (i) KMnO_4 is an oxidising agent, it oxidises FeSO_4

KMnO_4 oxidises FeSO_4 to $\text{Fe}_2(\text{SO}_4)_3$ and gets reduced to MnSO_4 .

29. A. (a) D is a saturated hydrocarbon
 (b) B is an organic acid (ethanoic acid).
 Structural formula



- (c) C is the compound.
 Conc. H_2SO_4 acts as a dehydrating agent and removes a water molecule from ethanol.

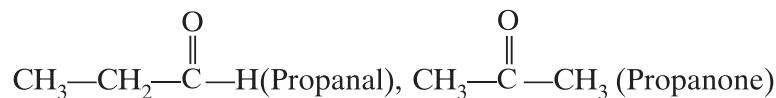


- (d) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Conc. H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$

Major product is ester and it is used in making perfumes/flavouring agents.

OR

- B. (a) Those compounds which have same molecular formula but different structural formula are called isomers.



- (b) Soaps are sodium or potassium salts of fatty acids.

Soaps contain $-\text{COONa}$ group attached with alkyl group where as detergents contain $-\text{SO}_3\text{Na}$ or $-\text{SO}_4\text{Na}$ group attached with alkyl group.

Soaps do not work effectively in hard water because Ca^{2+} and Mg^{2+} present in hard water react with soap to form scum and soap goes waste.

SECTION - C

30. (d) $R = -30$ cm

$$\Rightarrow f = \frac{R}{2} = -15 \text{ cm}$$

To obtain virtual image from converging mirror object should be kept at a distance less than its focal length.

31. (c)

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

33. Given: $h' = -\frac{2}{3}h$, $u = -12$ cm

- Magnification,

$$m = \frac{h'}{h} = \frac{v}{u}$$

⇒

$$v = \frac{h'}{h} \times u$$

$$= \frac{-\frac{2}{3}h}{h} \times -(12) = 8 \text{ cm}$$

- Using lens formula

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{8} - \frac{1}{-12}$$

$$= \frac{1}{8} + \frac{1}{12} = \frac{5}{24}$$

$$f = +\frac{24}{5} = +4.8 \text{ cm}$$

34. A. (a) No bulb will glow when the plug key is in open position because no current will flow through the circuit.

- (b) Power of bulb, $P = I^2R$

for the same current $P \propto R$

but for the same voltage $P \propto \frac{1}{R}$ or $R \propto \frac{1}{P}$

So, resistance order of all bulb is,

$$R_{25} > R_{40} > R_{60}$$

According to Joule's law of heating, $H \propto R$ (for the same current and time)

Hence, order of heating produced is

$$H_{25} > H_{40} > H_{60}$$

which is order of brightness of the bulbs when key is closed.

OR

- B. We know that resistance is directly proportional to the length of wire i.e. $R \propto l$.

Given: A piece of wire of Resistance 'R' wire is cut in three equal parts

$$\therefore \text{Resistance of each part} = \frac{R}{3} \Omega$$

Equivalent resistance in the combination when these parts are connected in parallel

$$\frac{1}{R_1} = \frac{3}{R} + \frac{3}{R} + \frac{3}{R} = \frac{9}{R}$$

$$\Rightarrow R_1 = \frac{R}{9}$$

$$\therefore \frac{R_1}{R} = \frac{1}{9}$$

35. (a) (i) The emergent beam, refracted through rectangular glass slab, emerges parallel to the incident ray and is shifted sideward slightly. Therefore, no dispersion occurs.
- (ii) A prism splits the incident thin narrow beam of white light into a band of seven colours which are violet, indigo, blue, green, yellow, orange and red. These coloured rays emerge out through the prism along different direction and become distinct, hence the incident white light beam gets dispersed.
- (iii) The emergent beam from the second identical inverted prism is again a beam of white light and emerges parallel to the incident beam and shifted sideward slightly.
- (b) The similarity between the emergent beam in cases (i) and (iii) is the same as in both the cases, the emergent beam emerges from the opposite parallel faces and parallel to the incident ray.

36. R_3 and R_4 are in series. Hence their equivalent resistance

$$\begin{aligned} R_{S_1} &= R_3 + R_4 \\ &= 6 + 4 = 10 \Omega \end{aligned}$$

Now R_2 and R_{S_1} are in parallel

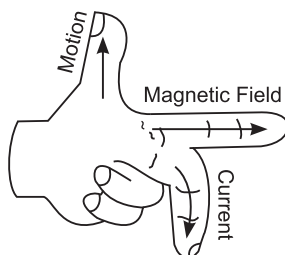
$$\therefore R_p = \frac{R_2 \cdot R_{S_1}}{R_2 + R_{S_1}} = \frac{10 \times 10}{10 + 10} = \frac{100}{20} = 5 \Omega$$

Now R_1 and R_p are in series

$$\therefore R_s = R_1 + R_p = 7 + 5 = 12 \Omega$$

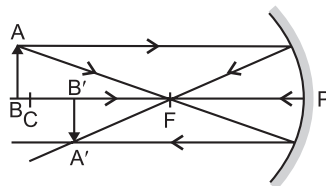
$$\text{By Ohm's law, } I = \frac{V}{R_s} = \frac{24}{12} = 2 \text{ A}$$

37. (a) **Fleming's Left-Hand Rule:** Stretch the thumb, forefinger and middle finger of the left hand mutually perpendicular to each other such that the forefinger point towards the direction of magnetic field, the middle finger points in the direction of current, then the thumb will indicate the direction of motion or force experienced by the conductor. It is to be applied only when the current and magnetic fields both are perpendicular to each other.

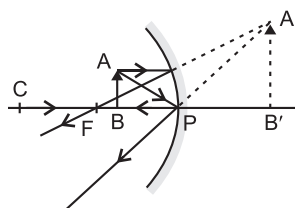


- (b) (1) Force on the electron will be **maximum** in the case of figure (i) because the direction of motion of electron and magnetic field both are perpendicular to each other.
- (2) Force on the electron will be **minimum** in the case of figure (iii) because the electron is moving along the direction of magnetic field.

38. (a) Concave mirror A will form the diminished image of the object as the object is placed beyond the centre of curvature ($> 2f$) of the mirror.



- (b) Real, inverted and same size. (any two)
 (c) Virtual, erect, enlarged image is formed behind the mirror.



OR

- (d) To find the position of the image formed by a concave mirror, we can use the mirror formula:

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

where f is the focal length, u is the object distance and v is the image distance.

Given that $f = -12$ cm and $u = -18$ cm (negative sign indicates that the object is on the left of the mirror), we can substitute these values in the formula and solve for v :

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{-12} - \frac{1}{-18}$$

$$\frac{1}{v} = \frac{-3+2}{36} = \frac{-1}{36}$$

$$v = -36 \text{ cm}$$

Therefore, the image is formed at a distance of 36 cm from the pole of the mirror on the same side of the object.

39. A. (a) Difference between electric energy and electric power:

Electrical energy	Electric power
<p>(i) The work done or energy supplied by the source in maintaining the flow of electric current is called electrical energy. It appears in the form of heat given by</p> $H = VI t = \frac{V^2 t}{R} = I^2 R T$	<p>(i) The time rate at which electric energy is consumed or dissipated by an electrical device is called electric power and is given by</p> $P = VI = \frac{V^2}{R} = I^2 R$

<p>(ii) It is equal to the product of power and time</p> $E = P \times t$	<p>(ii) It equal to the rate of doing work by an energy source.</p> $P = \frac{W}{t}$
<p>(iii) Its SI unit is joule (J)</p> $1 \text{ J} = 1 \text{ W} \times 1 \text{ s}$	<p>(iii) Its SI unit is watt (W)</p> $1 \text{ W} = 1 \text{ J s}^{-1}$

(any two)

(b) For the same applied voltage, $P \propto \frac{1}{R}$ or $R \propto \frac{1}{P}$

i.e. less the power of electrical device, higher is its electrical resistance.

Therefore, a 40 W lamp has higher electrical resistance when in use.

(c) Kilowatt hour – Commercial unit of electrical energy

$$1 \text{ kWh} = 1000 \text{ Wh} = 1000 \frac{\text{J}}{\text{S}} \times 3600 \text{ sec} = 3600000 \text{ J} = 3.6 \times 10^6 \text{ J}$$

OR

B. (a) It has high melting point and emits light at a high temperature.

(b) It has more resistivity and less temperature coefficient of resistance.

(c) (i) All appliances do not get same potential in series arrangement.

(ii) All appliances cannot be individually operated.

(d) $R \propto \frac{1}{\text{Area of cross - section}}$

(e) They are very good conductors of electricity.