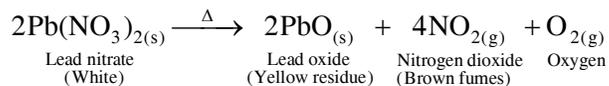


**SECTION-A**

1. Option (4)

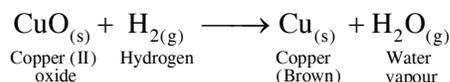
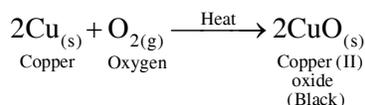
Brown fumes of nitrogen dioxide are evolved and a yellow residue of lead oxide is left behind in the test tube.



2. Option (4)

It is a neutralisation reaction which does not involve any change in oxidation states.

3. Option (4)



4. Option (2)

Copper is more reactive than silver and displaces silver from its salt solution.

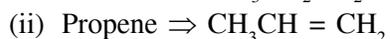
5. Option (2)

Sodium and potassium are very reactive that they have to be kept in kerosene.

6. Option (4)

The colour of pH paper is orange in acidic medium while it is blue in basic medium.

7. Option (2)



8. Option (2)

9. Option (1)

10. Option (4)

11. Option (1)

12. Option (3)

13. Option (4)

Magnetic field lines arrange themselves in form of concentric circles around a straight current carrying wire.

14. Option (1)

When a charged particle moves perpendicular to a magnetic field, it executes circular motion in the field.

15. Option (3)

For given conductor,  $R = \rho \frac{\ell}{A}$  .....(1)

For another conductor,  $R = \rho \frac{\ell'}{A'} = \rho \cdot \frac{2\ell}{A'}$  .....(2)

Using equation (1) and (2), we have

$$\rho \cdot \frac{\ell}{A} = \rho \cdot \frac{2\ell}{A'} \quad \Rightarrow A' = 2A$$

16. Option (2)

The human eye lens can adjust its focal length (with the help of ciliary muscles) to form clear images on retina for objects at different locations. This is called 'Power of accommodation' of eye.

17. Option (1)

Fe is oxidised to  $Fe^{3+}$  and acts as reducing agent.

18. Option (3)

19. Option (1)

20. Option (1)

Both assertion and reason are true and reason is the correct explanation of assertion.

### SECTION-B

21. (a) Acid A is concentrated HCl.

Acid B is concentrated  $HNO_3$ .

(b) 3 parts of concentrated HCl is mixed with 1 part of concentrated  $HNO_3$  to make royal water called aqua-regia.

**OR**

(a) Order of reactivity :  $C > A > B > D$

(b) Electrolysis of their molten or fused salts.

22 A-Cerebrum

B- Cranium

C-Midbrain

D-Spinal cord

E- Cerebellum

F- Medulla

23. The lining of the alimentary canal has muscles that contract rhythmically so that the food can be pushed down through it easily. This action is known as peristalsis. These movements of muscles help the passage of food through the gut.

24. (i) Nephron is the structural and functional unit of kidney. It has following functions:

(a) Filtration

(b) Selective reabsorption

(c) Tubular secretion

(ii) Ultrafiltration : The first step in clearing the blood is filtration under pressure, the passage of a liquid through a filter to remove impurities. Filtration occurs in the glomeruli. Blood pressure helps plasma (the liquid portion of the blood) to pass through the capillary walls in the glomerulus. Glomerular capillaries are more permeable than other capillaries. The filtrate contains water, glucose, amino acids, ions and urea.

25. Given : Concave mirror,  $h_o = 5$  cm,  $f = -10$  cm,  $|m| = 1.5$ ,  $u = -15$  cm,  $h_i = ?$ ,  $v = ?$

If the image formed is real,  $m = -1.5$

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

$$\therefore \text{Height of the image, } h_i = h_o \times m = 5 \times (-1.5) = -7.5 \text{ cm}$$

$$\text{Also, the position of image from the mirror, } v = m \times (-u) = (-1.5) \times [-(-15)] = -22.5 \text{ cm}$$

**OR**

Given : Concave mirror,  $h_o = 10$  cm,  $f = -10$  cm,  $m = +1.5$  (virtual image),  $u = ?$ ,  $h_i = ?$

$$\therefore m = \frac{h_i}{h_o} = \frac{f}{f-u}$$

Therefore,

$$+1.5 = \frac{f}{f-u} = \frac{-10}{-10-u}$$

$$\Rightarrow 15 + 1.5u = 10$$

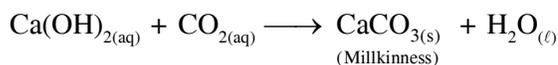
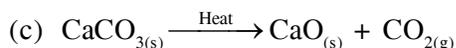
$$\Rightarrow u = -\frac{10}{3} = -3.33 \text{ cm} \quad (\text{Position of object from the mirror})$$

$$\text{Height of image, } h_i = h_o \times m = 10 \times 1.5 = +15 \text{ cm}$$

26. (i) Deer and rabbit belong to second trophic level. Frog, Fox, Eagle belong to third trophic level.  
 (ii) This phenomenon is called Biomagnification. It involves progressive increase in concentration of harmful non-biodegradable chemical at different trophic levels in a food chain.

### SECTION-C

27. (a) Limewater turns milky due to formation of a white precipitate.  
 (b) Calcium carbonate is a compound. It decomposes into simpler substances on heating.



28. (a) 'X' is  $\text{CaCO}_3$  (calcium carbonate). The gas evolved is  $\text{CO}_2$ .



- (c) Sodium hydrogen carbonate,  $\text{NaHCO}_3$  is an antacid. Antacids produces bicarbonate ions which neutralises excess of acid formed in the stomach.

29. (i) Haemoglobin is a protein molecule, which contains iron as a mineral element. It is present in RBCs of the blood in humans. It has a high affinity for oxygen and transport the same to all body parts along with blood. Thus, it plays an essential role of being a respiratory pigment as the diffusion pressure alone cannot take care of oxygen delivery to all body parts in large sized animal such as humans.

(ii) **Differences between Aerobic and Anaerobic respiration (any three)**

S.NO	Features	Aerobic Respiration	Anaerobic Respiration
1	O <sub>2</sub> requirement	O <sub>2</sub> required	Not required
2	Occurs in	Cytoplasm and mitochondria	Cytoplasm only
3	Breakdown	Complete breakdown of glucose takes place	Incomplete breakdown of glucose takes place
4	End products	CO <sub>2</sub> and H <sub>2</sub> O	CO <sub>2</sub> and ethyl alcohol or lactic acid
5	Energy produced from one glucose molecule	38 ATP	2 ATP

**OR**

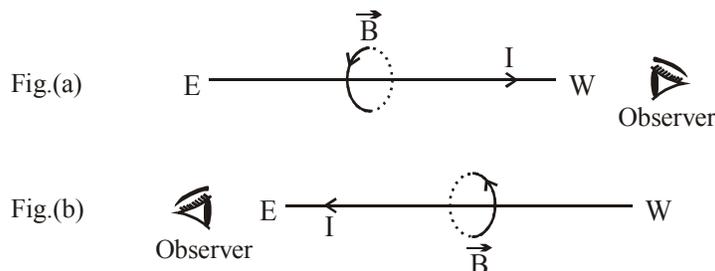
(i) **Blood vessels** They are of three types , i.e. arteries, veins and capillaries. They carry the oxygenated blood from heart to different parts of the body and return back to heart with deoxygenated blood.

(ii) **Lymph** It is colourless and flows from tissues to heart. It carries digested and absorbed fat from intestine. It drains excess fluid from extracellular space back into the blood.

(iii) **Heart** It is pumping machine that pushes out the blood into the blood vessels. It has four chambers separated by septum, which prevents the mixing of pure and impure blood.

30. Direction of current through the conductor will be from East to West direction, if the position of observer is at West [See figure (a)].

Direction of current through the conductor will be from West to East direction, if the position of observer is at East [See figure (b)].



Maxwell's right hand thumb rule.

31. Since all the cylindrical conductors are made from same material i.e. copper, their resistivity is same.

$$\text{Resistance of conductor (a), } R_1 = \rho \cdot \frac{L}{A}$$

$$\text{Resistance of conductor (b), } R_2 = \rho \cdot \frac{3L}{(A/3)} = 9 \cdot \frac{\rho L}{A} = 9R_1$$

$$\text{Resistance of conductor (c), } R_3 = \rho \cdot \frac{(L/3)}{3A} = \frac{1}{9} \cdot \rho \frac{L}{A} = \frac{R_1}{9}$$

$$\text{Therefore, } R_2 = 9R_1 \text{ and } R_3 = \frac{R_1}{9}$$

**OR**

The resistors B, C and D are connected in series, so their series equivalent,

$$R_s = 2 + 2 + 2 = 6 \Omega$$

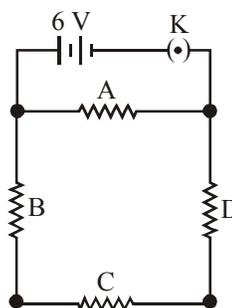
Resistor A is in parallel with the series combination of resistors B, C and D. So, the equivalent resistance of the network can be calculated as follows:

$$\frac{1}{R_{eq}} = \frac{1}{6} + \frac{1}{2} = \frac{4}{6}$$

or  $R_{eq} = \frac{3}{2} \Omega = 1.5 \Omega$

Current flowing through resistor A,

$$I_A = \frac{V}{R_A} = \frac{6}{2} = 3 \text{ A.}$$



32. (a) The defect that arises due to ageing in which a person cannot read comfortably and distinctly without corrective eye glasses is called 'presbyopia'.

**Cause of presbyopia :**

The power of accommodation of the eye decreases with ageing. For most of the people, the near point recedes, this means, the least distance of distinct vision increases. This phenomenon arises due to the gradual weakening of ciliary muscles and decreasing flexibility of the crystalline eye lens.

**Correction :**

Here, the cornea and lens together are not able to bring nearby objects into focus on the retina. The symptoms are the same as with hypermetropia or (farsightedness), and the condition can be corrected using a converging lens i.e., convex lens.

- (b) Given : Near point = 0.5 m, Far point = 3 m

**For correction of Near sightedness,**

$$u = -\infty, v = -3 \text{ m (Far point)}$$

Using lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{(-3)} - \frac{1}{(-\infty)} = -\frac{1}{3} \quad \Rightarrow \quad f = -3 \text{ m} = -300 \text{ cm}$$

**For correction of Far sightedness,**

$$u = -25 \text{ cm} = -0.25 \text{ m}, v = -0.5 \text{ m (Near point)}$$

Using lens formula,

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{(-0.5)} - \frac{1}{(-0.25)} = \frac{-100 + 200}{50} = \frac{100}{50}$$

$$\Rightarrow f = +\frac{1}{2} \text{ m} = +50 \text{ cm}$$

33. (i) The various methods of waste disposal are :

1. **Land fills :** In urban areas, majority of the solid wastes are buried in low lying areas to level the uneven surface of land. This method of waste disposal is commonly called land fills.
2. **Recycling of wastes :** Number of solid wastes (paper, plastics, metal etc.) can be recycled by sending them to respective recycling units. For instance, paper is sent for recycling into special paper mills ; broken plastic (e.g., plastic bags, buckets, bowls, dishes, mugs, discs, etc.) are sent to plastic processing factories.
3. **Preparation of compost :** Household waste such as peels of fruits and vegetables, left-over food, fallen dead leaves of kitchen garden plants and potted plants etc. can be converted into compost and used as manure.

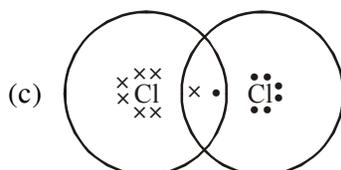
(ii) Abiotic components include the non-living physico-chemical factors of the environment.  
Ex. air, water.

**SECTION-D**

34. (a) Covalent bonds between carbon atoms in each layer and vander Waals' forces between the layers of carbon atoms.  
(b) Graphite is soft. The layers of carbon atoms can slide and glide over each other because the weak van der Waals' forces between the layers are easy to overcome.  
(c) Chemically graphite is carbon which combines with oxygen to form carbon dioxide.

**OR**

- (a) Single covalent bond is present between two chlorine atoms in a chlorine molecule.  
(b) The two chlorine atoms share one pair of electrons, so that both atoms achieve a noble gas configuration.



35. (i) Differences between pollen tube and style are:

<b>Pollen Tube</b>	<b>Style</b>
A tube growing out of pollen grain when it reaches stigma.	The middle elongated part of the carpel, i.e. female part of a flower.
It transports male gametes from pollen grains to ovules.	The attachment of stigma to the ovary.

(ii) Fission in *Amoeba* is binary and in *Plasmodium* is multiple. The difference is :

<b>Binary Fission</b>	<b>Multiple Fission</b>
The division of parental body into two identical daughter cells at a time.	The parental body divides into numerous daughter cells simultaneously.

(iii) Difference between fragmentation and regeneration is :

<b>Fragmentation</b>	<b>Regeneration</b>
The method in which multicellular organism breaks up into two or more smaller fragments.	The growth of a whole new organism from any of its body part, i.e. single segment forming new individual.

(iv) Difference between bud of *Hydra* and *Bryophyllum* is :

Bud of Hydra	Bud of Bryophyllum
It is seen during budding as an outgrowth on the body of Hydra which gets fully grown and then detaches from the body and becomes a new individual.	This is present on the leaves of Bryophyllum develop into a new plant when it comes in contact with soil and other favourable conditions.

(v) Difference between cross pollination and self pollination :

Cross pollination	Self pollination
It is the transfer of pollen grains from anther to the stigma of different plants of the same species, it is also called xenogamy. (e.g. Mango).	It is the transfer of pollen grains from an anther to the stigma of the same plant.

**OR**

(i) Scrotum (scrotal sacs)

(ii) Penis

(iii) Ovary

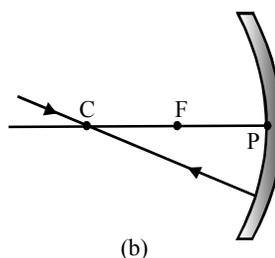
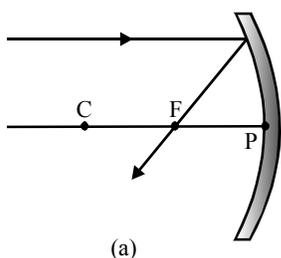
(iv) Semen

(v) Puberty

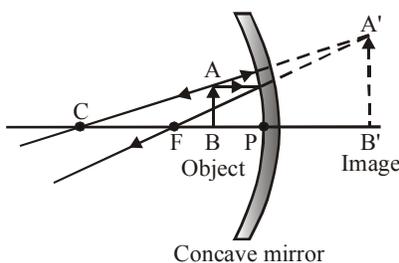
36. (a) Description of two rays to obtain image from concave mirror :

(i) A ray parallel to the principal axis passes through the principal focus F of a concave mirror, after reflection [see fig.(a)].

(ii) A ray passing through the centre of curvature of a concave mirror, is reflected back along its own path, after reflection [see fig.(b)].



**Ray diagram** (using above two rules) for position of the object between pole and focus of a concave mirror :



(b) Given : Concave mirror,  $m = -3$  (real image),  $u = -20$  cm,  $v = ?$

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

$$\Rightarrow -3 = -\frac{v}{[-20]} \Rightarrow v = -60 \text{ cm}$$

So, the screen should be placed at 60 cm in front of the concave mirror.

**SECTION-E**

37. (a) The spoiling of food due to oxidation of fats and oils present in the food material.  
 (b) The type of substances which can prevent the oxidation process of certain food materials are called as antioxidants. Some natural antioxidants are vitamin-C and vitamin-E.

**OR**

There are a few methods used by our ancestors to prevent rancidity:

- (a) Salting (b) Sugaring (c) Pickling

38.

♂	B	B	
♀	b	Bb Black	Bb Black
	b	Bb Black	Bb Black

F<sub>1</sub> Generation

In F<sub>1</sub> Generation, all rabbit will be black in colour.

♂	B	b
♀	B Homozygous black	Bb Heterozygous black
	b Heterozygous black	bb white

Phenotypes of offspring - 1 : 2 : 1

BB-Black : Bb-Black : bb-White

- (c) 25% of white rabbit in F<sub>2</sub> generation as black colour is dominant on white colour.

**OR**

- (c) Tt × tt  
 (heterozygous tall) × (homozygous dwarf)

♂	T	t
♀	Tt Tall	tt dwarf
	Tt Tall	tt dwarf

Out of four, two are heterozygous tall and two are dwarf.

39.

- (a) R<sub>eq</sub> = 5 + 10 + 15 = 30 Ω

$$I = \frac{V}{R_{eq}} = \frac{30}{30} = 1 \text{ A}$$

Potential difference across 15 Ω resistor  
 = I × R<sub>15</sub> = 1 × 15 = 15 V

- (b) When resistors are connected in parallel,

Current through 5 Ω resistor, I<sub>1</sub> =  $\frac{V}{R_1} = \frac{30}{5} = 6 \text{ A}$

Current through 10 Ω resistor, I<sub>2</sub> =  $\frac{V}{R_2} = \frac{30}{10} = 3 \text{ A}$

- (c) R<sub>AB</sub> = 10 Ω + (20 Ω || 20 Ω) = 10 Ω +  $\frac{20}{2}$  Ω  
 = 10 Ω + 10 Ω = 20 Ω

**OR**

- (c) R<sub>AB</sub> = (20 Ω + 10 Ω) || 20 Ω = 30 Ω || 20 Ω  
 =  $\frac{30 \times 20}{30 + 20} = \frac{600}{50} = 12 \text{ Ω}$

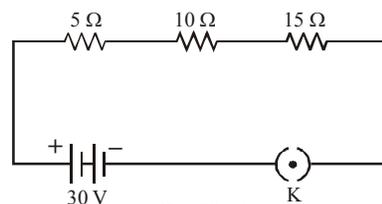


Fig. 39 (a)

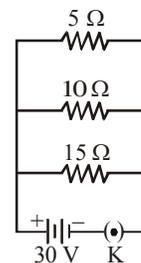


Fig. 39 (b)