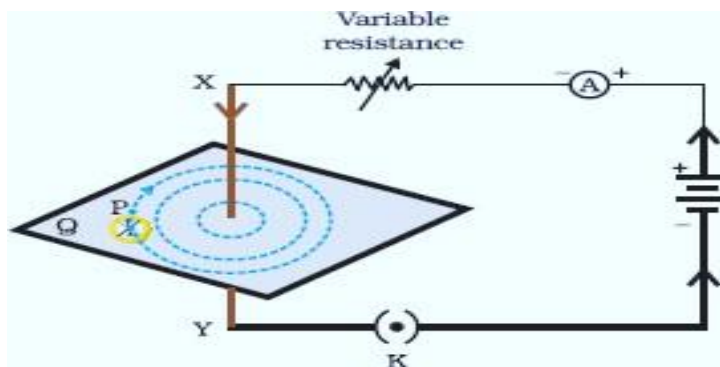


KEY ANSWERS
STATE LEVEL SSLC PREPARATORY EXAMINATION-2025

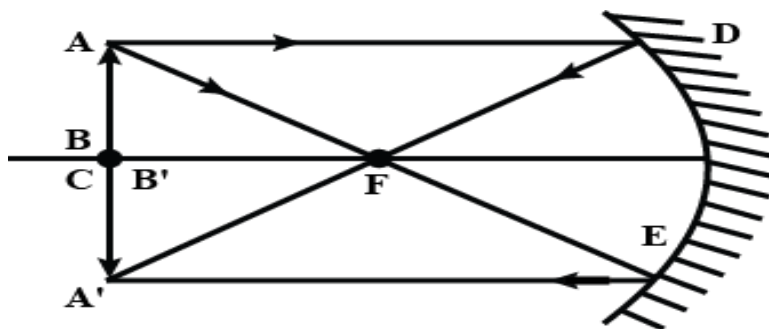
PART-A
PHYSICS

1. (B) infinite distance.
2. (A) inside the magnet, the direction of magnetic field lines is from its south pole to north pole.
3. (B) virtual and erect
4. The sky appears black to a person in a space station because there is no atmosphere to scatter sunlight.
5. Ammeter **P** indicates more flow of current. Because circuit X is shorter is compared to circuit Y ($I=V/R$)
6. The light ray bends away from the normal.

7.



8.



9.

a) **Laws of reflection of light:**

The angle of incidence is equal to the angle of reflection.

The incident ray, the reflected ray, and the normal to the reflecting surface at the point of incidence, all lie in the same plane.

b) **Aperture of a spherical lens:**

The diameter of the reflecting surface of the spherical lens is called its aperture.

OR

a) **Laws of refraction of light:**

The incident ray, the refracted ray, and the normal to the interface of two media at the point of incidence all lie in the same plane.

The ratio of the sine of the angle of incidence to the sine of the angle of refraction is a constant for the light of a given colour and for the given pair of media. This is also known as Snell's Law.

b) **Power of a lens:**

The power of a lens is the degree to which it converges or diverges light rays. It is also defined as the reciprocal of its focal length (in meters).

10. a) The magnetic pole represented by end X of the magnet is the North pole. The rule that helps to determine the direction of the magnetic pole in this setup is *Fleming's Left-Hand Rule*.

b) **Reasons for overloading in an electric circuit:**

- When too many appliances are connected to a single socket.
- A live wire and a neutral wire coming into direct contact.

11. a) In domestic electric circuits, connecting electric devices in parallel is preferred over series connections because:

Voltage Distribution: In a parallel circuit, each device receives the same voltage from the power source, ensuring they operate correctly. In a series circuit, the voltage is divided among the devices, which can cause them to function improperly.

Independent Operation: If one device fails in a parallel circuit, the other devices continue to work. In a series circuit, the failure of one device breaks the entire circuit, causing all devices to stop working.

b) Alloys generally have higher electrical resistance than pure metals. This property is crucial for heating elements because it allows them to generate heat efficiently when current passes through them.

Alloys can withstand high temperatures without melting or deforming. This is essential for the safe and reliable operation of heating appliances.

Some alloys are resistant to oxidation, which prevents them from corroding or burning out when exposed to high temperatures and air.

12. a) Near-sightedness (myopia) is a common vision condition in which a person can see objects near to them clearly, but objects farther away appear blurry.

Myopia occurs when the eyeball is too long **or** the cornea is too curved. As a result, light entering the eye is not focused correctly on the retina, causing distant objects to appear blurred.

b) Rainbow formation is a meteorological phenomenon caused by reflection, refraction, and dispersion of light in water droplets resulting in a spectrum of light appearing in the sky. Sunlight strikes a raindrop and slows down and bends (refracts) when moving from the air to the denser water. The light reflects off the inside of the raindrop and as it exits the drop, it refracts again.

13. Power of the washing machine:

Power (P) = Voltage (V) x Current (I)

$$P = 220 \text{ V} \times 10 \text{ A} \\ = 2200 \text{ W or } 2.2 \text{ kW}$$

Energy consumption per day:

Energy (E) = Power (P) x Time (t)

$$E = 2.2 \text{ kW} \times 6 \text{ hours} \\ = 13.2 \text{ kWh}$$

Energy consumption for 30 days:

$$\text{Total energy} = 13.2 \text{ kWh/day} \times 30 \text{ days} \\ = 396 \text{ kWh}$$

Total cost of energy:

$$\text{Total cost} = 396 \text{ kWh} \times \text{Rs. } 5/\text{kWh} \\ = \text{Rs. } 1980$$

OR

a) i) Current drawn by the electric bulb:

Current (I) = Voltage (V) / Resistance (R)

$$I = 220 \text{ V} / 880 \Omega$$

$$I = 0.25 \text{ A}$$

Current drawn by the electric heater:

$$I = 220 \text{ V} / 1100 \Omega$$

$$I = 0.2 \text{ A}$$

ii) The electric bulb draws more current (0.25 A) than the electric heater (0.2 A).

b) Work done in moving the charge:

Work (W) = Charge (Q) x Potential difference (V)

$$W = 5 \text{ C} \times 25 \text{ V}$$

$$W = 125 \text{ J}$$

PART-B
CHEMISTRY

14. (C) Decomposition reaction

15. (D) 3

16. (D) Zn

17. The sodium compound used for softening hard water is sodium carbonate (Na_2CO_3)

18. Barium ions (Ba^{2+}): and sulfate ions (SO_4^{2-}) produce a white precipitate of barium sulfate (BaSO_4) when solutions of sodium sulfate and barium chloride are mixed.

19. The concentration of hydroxide ions (OH^-) increases when excess base is dissolved in a solution of potassium hydroxide.

20. *Structural isomers*: Molecules with the same molecular formula but different arrangements of atoms.

Hydrogenation: A chemical reaction where hydrogen is added to a molecule, typically to an unsaturated compound.

Or

Functional groups: Specific groups of atoms within molecules that are responsible for the characteristic chemical reactions of those molecules.

Propanal contains an aldehyde group ($-\text{CHO}$), and

propanol contains a hydroxyl group ($-\text{OH}$).

21. *Four properties of ionic compounds*:

i. High melting and boiling points

ii. Solid at room temperature

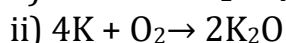
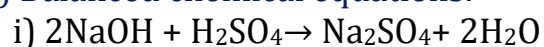
iii. Conduct electricity when dissolved in water or molten

iv. Brittle and hard

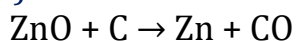
22. Sodium hydroxide (NaOH) solution is formed after the electrolysis of brine solution.

To determine its nature, use litmus papers: **red litmus** paper will turn **blue**, and **blue** litmus paper will remain **blue**, indicating the solution is basic.

23. a) **Balanced chemical equations**:



b) **Reactants oxidized and reduced**:



Carbon (C) is oxidized.

Zinc oxide (ZnO) is reduced.

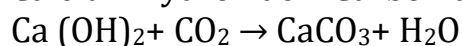
OR

a) Changes during chemical reactions:

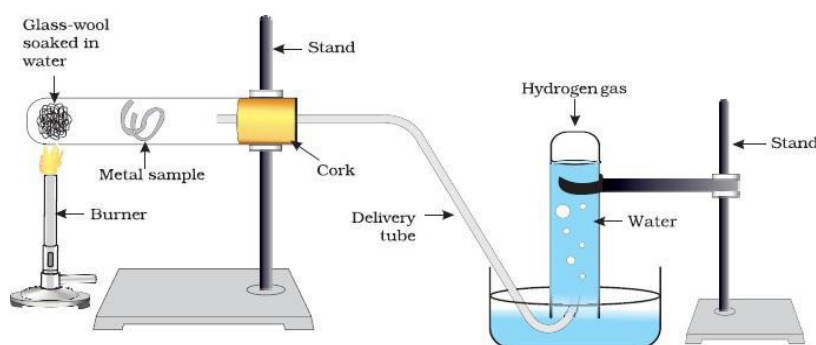
- i. Change in state
- ii. Change in color
- iii. Evolution of gas
- iv. Change in temperature
- v. Formation of a precipitate

b) Balanced chemical equation:

Calcium hydroxide + Carbon dioxide → Calcium carbonate + Water



24.



25. *Reasons:*

- i. Plaster of Paris is stored in a dry place because it readily absorbs water and sets into a hard mass.
- ii. Glucose solution does not exhibit acidic properties because it does not dissociate to produce H^+ ions in solution.
- iii. Milk mixed with baking soda takes longer to set as curd because baking soda is a base and neutralizes the acid produced by bacteria, which is necessary for curdling.

26. a) i) Benzene: C_6H_6

ii) Ethyne: C_2H_2 ($\text{H}-\text{C}\equiv\text{C}-\text{H}$)

b) The cleaning action of soaps is based on their ability to form micelles, which can emulsify oily or greasy dirt, allowing it to be washed away with water.

Soaps are sodium or potassium salts of long-chain fatty acids. They have a polar (hydrophilic) head and a nonpolar (hydrophobic) tail.

When soap is added to water containing dirt or grease, the hydrophobic tails of the soap molecules cluster together, surrounding the oil or grease particle.

The hydrophilic heads face outward, interacting with the water.

This arrangement forms a spherical structure called a micelle, with the oil or grease trapped inside.

The micelles are then dispersed in the water, preventing the oil or grease from re-depositing on the surface.

Finally, the micelles, along with the trapped dirt, are washed away with water, effectively cleaning the surface.

PART-C BIOLOGY

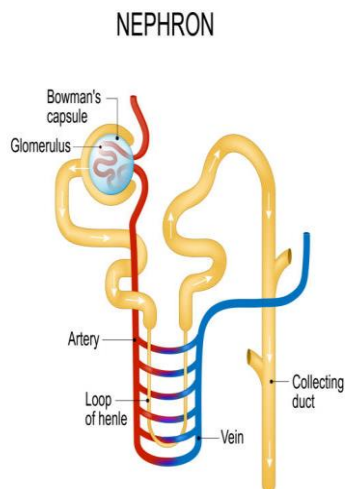
27 (B) DDT

28. (A) Bb

29. Two viral infections transmitted through unprotected sexual contact are:

- i) HIV (Human Immunodeficiency Virus)
- ii) HSV-2 (Herpes Simplex Virus type 2, genital herpes)

30.



32. a) Trophic levels are the different levels of an ecosystem that describe the position of an organism in a food chain or food web.

b) A grassland food chain with three trophic levels:

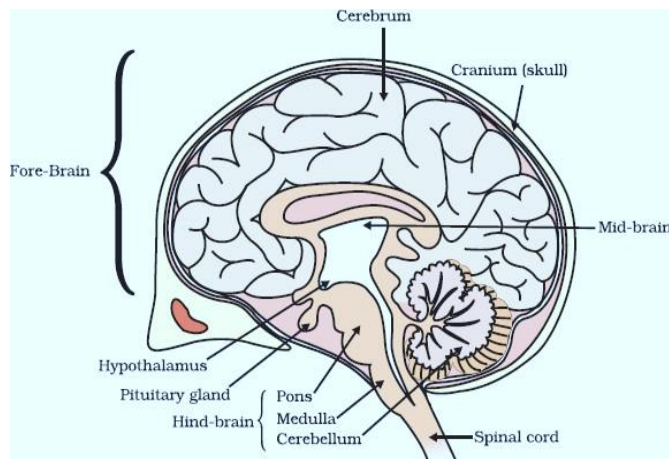
Grass (producer) → Grasshopper (primary consumer) → Frog (secondary consumer)

33. Double circulation is a circulatory system where blood passes through the heart twice in one complete circuit.

Two advantages are:

- i) Efficient separation of oxygenated and deoxygenated blood, ensuring better oxygen supply to the body.
- ii) Higher blood pressure and flow rate, supporting the high energy demands of mammals and birds.

34.



35. The major events during photosynthesis are:

- i) Absorption of light energy by chlorophyll.
- ii) Conversion of light energy to chemical energy and splitting of water into hydrogen and oxygen.
- iii) Reduction of carbon dioxide to form glucose.

a) The product produced by the breakdown of a glucose molecule in the cytoplasm is **pyruvate** through a process called glycolysis.

b) The type of respiration that takes place in mitochondria is **aerobic respiration**,
In mitochondria, the products are carbon dioxide, water, and a large amount of ATP.

while in yeast cells, it can be both aerobic and **anaerobic respiration**.

In yeast cells, the products of fermentation are ethanol (alcohol), carbon dioxide, and a small amount of ATP.

36.

Thyroid gland: **Thyroxine (T4) and Triiodothyronine (T3):**

These hormones regulate metabolism, influencing heart rate, digestion, muscle control, brain development, and bone maintenance. They increase the metabolism of almost all body tissues and are essential for maintaining body temperature.

Adrenal gland: **Adrenaline (epinephrine) and Noradrenaline (norepinephrine):**

These hormones prepare the body for "fight or flight" responses in stressful situations, increasing heart rate, blood pressure, and expanding air passages.

Pancreas: Insulin & Glucagon:

Regulates blood sugar levels by allowing cells to absorb glucose from the blood for energy or storage.

Glucagon: Increases blood sugar levels by signaling the liver to release stored glucose.

Examples of tropic movements in plants:

a) i) *Geotropism*: Roots growing downwards into the soil due to gravity, and shoots growing upwards against gravity.

ii) *Hydrotropism*: Roots growing towards a water source in the soil.

Phototropism: Shoots bending towards sunlight, and sunflowers tracking the sun's movement.

iii) *Chemotropism*: Pollen tube growth towards the ovules during fertilization, or roots growing towards beneficial minerals and away from harmful acids.

b) The part of the central nervous system that controls reflex actions is the spinal cord.

37.

$\begin{array}{c} \text{Q} \searrow \\ \text{Q}_x \end{array}$	Y	y
Y	Yy	yy
y	Yy	yy

Phenotypic ratio: 3:1

Genotypic Ratio: 1:2:1

b) In humans, the sex of a child is determined by the father because males have XY chromosomes, while females have XX chromosomes. During fertilization, the sperm cell from the father contributes either an X or a Y chromosome, while the egg cell from the mother always contributes an X chromosome.

If the sperm cell contributes an X chromosome, the resulting zygote will have XX chromosomes, and the child will be female.

If the sperm cell contributes a Y chromosome, the resulting zygote will have XY chromosomes, and the child will be male.

Therefore, it is the father's sperm that determines the sex of the child.

38. a) Various contraceptive methods followed in humans include:

Hormonal methods:

Barrier methods:

Sterilization:

Other methods:

b) *Fragmentation* is a method of asexual reproduction where an organism reproduces by the process of splitting into fragments and each fragment grows into an individual organism.

Regeneration, on the other hand, happens when an organism regrows certain parts or limbs which is lost due to predation.

c) After fertilization, several changes occur in a flower:

The sepals, petals, stamens, style, and stigma usually dry up and fall off.

The ovary develops into a fruit.

The ovules develop into seeds.

The zygote develops into an embryo.

The outer integument of the ovule becomes the testa, and the inner integument becomes the tegmen (seed coat).

The funiculus becomes the stalk of the seed.

The endosperm nucleus forms the endosperm, which provides nutrition to the developing embryo.

The antipodals and synergids degenerate.