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RRB Teacher General Science

Q1. Which of the following gland secretes insulin?
(a) Pancreas
(b) Gastric gland
(c) Salivary gland
(d) Thyroid gland

Q2. In leaves transpiration takes place through _____.
(a) Stomata
(b) Cork cell
(c) Epidermal cell
(d) Guard cells

Q3. Which of the following is NOT correct with regard to the properties of magnetic lines of force?
(a) Magnetic lines of force do not intersect each other
(b) Each line is a closed and continuous curve
(c) The direction of field lines outside the magnet is from the South pole to the North pole
(d) They are crowded near the poles, where the magnetic field is strong

Q4. Identify the metal which would melt when kept on your palm?
(a) Strontium
(b) Sodium
(c) Gallium
(d) Barium

Q5. Which of the following elements is a noble gas and has an atomic number 18?
(a) Argon
(b) Neon
(c) Helium
(d) Oxygen

Q6. The image of a star is obtained at F of a concave mirror when the incident ray is
(a) along the focal plane
(b) inclined to principal axis
(c) perpendicular to principal axis
(d) parallel to principal axis

Q7. Which of the following statements regarding amalgam is true?
Statement 1: It is an alloy of mercury.
Statement 2: It is an alloy of tin and lead.
(a) Only 1
(b) Only 2
(c) Both 1 and 2
(d) Neither 1 nor 2

Q8. Which permanent tissue makes a plant hard and stiff?
(a) Collenchyma
(b) Sclerenchyma
(c) Parenchyma
(d) Aerenchyma

Q9. Which of the following processes is used to convert a substance directly from the solid to the gaseous state?
(a) Distillation
(b) Sublimation
(c) Evaporation
(d) Chromatography

Q10. Compounds of which of the following metals is used in black and white photography?
(a) Al
(b) Ag
(c) Cu
(d) Au

Q11. Which gas is typically produced when metal reacts with acids?
(a) Carbon dioxide
(b) Oxygen
(c) Hydrogen
(d) Nitrogen

Q12. An object is placed on the principal axis of a convex lens of focal length 10 cm. If the distance of the object from the lens is 30 cm, what is the distance of the image formed?
(a) 20 cm
(b) 15 cm
(c) 10 cm
(d) 30 cm

Q13. Which of the following terms constitutes the female part of the flower.
(a) sepals, petal and stamen
(b) stigma, style and ovary
(c) ovary, stamen and stigma
(d) ovary, style and stamen

Q14. Which of the following is a dead tissue in a plant body?
(a) Collenchyma
(b) Chlorenchyma
(c) Parenchyma
(d) Sclerenchyma

Q15. Solid Carbon dioxide is known as _____.
(a) Gas ice
(b) Wet ice
(c) Solid ice
(d) Dry ice

Q16. The amount of work done in moving a charge of 4C across two points having a potential difference of 6V is _____.
(a) 48 J
(b) 12 J
(c) 36 J
(d) 24 J

Q17. A fuse wire is an alloy made up of which of the following materials?
(a) Tin – Silver
(b) Silver - Lead
(c) Tin - Lead
(d) Tin – Nickel

Q18. An object with a mass of 22 kg moving with a velocity of 5 m/s possesses kinetic energy of:
(a) 275 J
(b) 110 J
(c) 1100 J
(d) 2750 J

Q19. How does Amoeba reproduce?
(a) Binary fission
(b) Sexual Reproduction
(c) Fragmentation
(d) Budding

Q20. Which one among the following is responsible for formation of "Ozone Holes" in the atmosphere?
(a) Benzopyrene
(b) Hydrocarbons
(c) Chlorofluorocarbons
(d) UV radiation

Q21. If a box of mass 25 kg is pushed 15 m by a force of 'F' N and work done in the process is 480 J. Find F:
(a) 50
(b) 32
(c) 16
(d) 25

Q22. What is the repeated reflection of sound from the walls of a big hall that results in persistence of sound called?
(a) Music
(b) Pitch
(c) Note
(d) Reverberation

Q23. Identifying a way to reduce the pollution caused due to burning of fossil fuels
(a) By lowering the temperature of burning
(b) By increasing the efficiency of the combustion process
(c) By increasing the number of carbon molecules
(d) By decreasing the latent heat

Q24. Which of the following is NOT an application of third law of motion?
(a) A fielder pulls his hands gradually with the moving ball while holding a catch
(b) Colliding with player while kicking a football and feeling hurt
(c) As the sailor jumps in forward direction, the boat moves backwards
(d) A forward force on the bullet and recoil of the gun

Q25. Which of the following proteins is found in plasma?
(a) Leptin
(b) Keratin
(c) Albumin
(d) Insulin

Q26. Newton's first law of motion is known as
(a) Gravity
(b) Law of Inertia
(c) Law of conservation of momentum
(d) Vertical motion

Q27. Which type of reaction occurs when carbon burns in oxygen to give carbon dioxide?
(a) Addition reaction
(b) Combustion reaction
(c) Decomposition reaction
(d) Substitution reaction

Q28. Which of the following organelles shows similarity to a prokaryotic cell?
(a) Mitochondria only
(b) Chloroplast only
(c) Both chloroplast and mitochondria
(d) None of the above

Q29. A spherical mirror whose reflecting surface is curved inwards is called a _____ mirror.
(a) convex
(b) conflict
(c) concave
(d) plane

Q30. Which of the following is an electromagnetic wave?
(a) Infrared rays
(b) Ultrasonic wave
(c) Sound wave
(d) Cathode rays

Solutions

S1. Ans.(a)
Sol. The correct answer is Pancreas.
The pancreas is the gland that secretes insulin. The pancreas is an endocrine gland that releases insulin into the bloodstream.
Information Booster
- The pancreas is a large gland located behind the stomach.
- The pancreas secretes insulin and glucagon, which regulate blood sugar levels.
- The pancreas also secretes somatostatin, which prevents the release of insulin and glucagon.
- Beta cells in the islets of Langerhans in the pancreas produce insulin.
- Diabetes can occur when the pancreas doesn't produce enough insulin or when the body doesn't use insulin properly.

S2. Ans.(a)
Sol. The correct answer is Stomata.
In leaves, transpiration takes place through stomata. Stomata are tiny pores on the leaf surface, controlled by guard cells, which regulate the loss of water vapor through transpiration.
Information Booster
Stomata: Small openings on the leaf surface responsible for gas exchange and transpiration.
Guard cells: Specialized cells that surround the stomata and control their opening and closing.

S3. Ans.(c)
Sol. The correct answer is The direction of field lines outside the magnet is from the South pole to the North pole.
Magnetic field lines always originate from the North pole of a magnet and end at the South pole, meaning the direction outside the magnet is from North to South.
Key points about magnetic lines of force:
- They do not intersect each other.
- They form closed continuous curves.
- They are crowded near the poles where the magnetic field is strong.

S4. Ans.(c)

Sol. The correct answer is Gallium.

- The chemical element gallium has the atomic number 31 and the symbol Ga.
- Group 13 of the periodic table contains gallium.
- Gallium is an element that is soft and silvery at ordinary pressure and temperature.
- It turns silvery white when it's liquid.
- Gallium may fracture conchoidally if excessive force is used.
- Gallium has been commonly utilized to create alloys with low melting points.
- As a dopant on semiconductor substrates, it is also utilized in semiconductors.
- The temperature reference point is gallium's melting point.
- Most people are familiar with gallium and cesium as metals that melt when held in the palm.
- Because gallium has a relatively low melting point and is quickly melted by the heat from our palms, it essentially dissolves when held in the palm.

S5. Ans.(a)

Sol. The correct answer is Argon.

The noble gas having atomic number 18 is Argon (Ar).

Argon is a noble gas with the atomic number 18. It is a colorless, odorless, inert gas that makes up around 0.93% of the Earth's atmosphere. Argon is located in Group 18 of the periodic table, which is known as the noble gas group

S6. Ans.(d)

Sol. The correct answer is parallel to principal axis.

- There are numerous uses for concave mirrors.
- They create upright, magnified images, making them helpful for shaving and doing makeup.
- They are also employed in telescopes because they focus light to produce noticeably larger images, as well as spotlights and headlights since they project parallel light beams.
- As a result, when the incident ray is parallel to the primary axis, the image of a star can be obtained at F of a concave mirror.

Additional Information:

- A concave mirror is a sort of spherical mirror in which the reflecting surface is the inner curved surface of the sphere; hence, the reflecting surface seems to be farther away from the incident light source in this type of mirror.
- They are also known as converging mirrors because of how they are made, which causes the incident light to be reflected inward.
- They are used to focus light.
- At every location along the curved surface of the mirror, both rules of reflection hold true.
- By connecting the mirror's curvature's center to the point of incidence, the normal is drawn along the radius.
- Because the normal to the reflecting surface varies at each point on the mirror, the beams' convergence occurs after reflection.

S7. Ans.(a)

Sol. The correct answer is Only 1.

- An amalgam is an alloy of mercury with another metal.
- Depending upon the proportion of mercury, it may be a liquid, a soft paste or a solid.
- Nearly all metals can form amalgams with mercury.
- The well-known exceptions are iron, platinum, tungsten, and tantalum.
- Arquerite is a natural amalgam of silver and mercury.
- Sodium amalgam is formed as a byproduct of the chloralkali process.
- Tin amalgam was once used as a reflective mirror coating.

S8. Ans.(b)

Sol. The correct answer is Sclerenchyma.

Sclerenchyma is the permanent tissue that makes plants hard and stiff. It's a simple tissue that provides support to plants.

- Sclerenchyma cells are thick, narrow, and dead.
- They have thick, lignified secondary walls.
- Sclerenchyma cells are found throughout the plant, especially in woody parts like tree bark and branches.
- Sclerenchyma cells can occur as fibers or sclereids.
- Sclerenchyma is the most effective mechanical tissue in plants.

S9. Ans.(b)

Sol. The correct answer is Sublimation.

The process that converts a substance directly from a solid to a gaseous state is called sublimation.

Sublimation:

This is the phase transition where a solid directly changes into a gas without going through a liquid phase.

Additional Information

Distillation:

This process separates components of a liquid mixture by boiling and then condensing the vapors.

Evaporation:

This is the process where a liquid changes into a gas at its surface.

Chromatography:

This technique is used to separate components of a mixture based on their different affinities for a stationary phase.

S10. Ans.(b)

Sol. The correct answer is Ag.

Silver (Ag) compounds are used in black and white photography. Silver compounds are light-sensitive and break down when exposed to light. This process creates a latent image that can be developed into a photograph.

Information Booster

- Silver bromide ($AgBr$): A common silver halide compound used in black and white photography. When exposed to light, it forms silver ions, which create a black and white image.

- Silver chloride ($AgCl$): A silver halide compound used in black and white photography. It's not as sensitive to light as silver bromide, and is mainly used in medical imaging.
- Silver iodide (AgI): A silver halide compound used in black and white photography.
- Silver fluoride (AgF): A silver halide compound, but it's not commonly used in photography.

Photochemical reaction

When exposed to light, silver halide compounds undergo a photochemical reaction that creates a latent image. This image is then developed into a visible photograph.

S11. Ans.(c)

Sol. The correct answer is Hydrogen.

- The metal reacts with acids to form salt and hydrogen gas.
- Metals that are above in the reactivity series react with acid. The reactivity series in given in the tabular form below.

	Metal	**Symbol**
These metals are more reactive than hydrogen	Potassium	K
	Sodium	Na
	Calcium	Ca
	Magnesium	Mg
	Aluminium	Al
	Zinc	Zn
	Iron	Fe
	Tin	Sn
	Lead	Pb
	Hydrogen	**H**
These metals are less reactive than hydrogen	Copper	Cu
	Mercury	Hg
	Silver	Ag
	Gold	Au

S12. Ans.(b)

Sol. The correct answer is 15 cm.

Lens: The transparent curved surface which is used to refract the light and make an image of any object placed in front of it is called a lens.

Convex Lenses: A lens having two spherical surfaces, bulging outwards is called a double convex lens (or simply convex lens).

- It is thicker in the middle compared to the edges.
- Convex lenses converge light rays and hence, convex lenses are also called **converging lenses**.

- **The lens formula is:**
  - $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$
- **Magnification**
  - $m = \frac{v}{u}$

Where,

v= Distance of image,
u= Distance of object,
f= Focal length.

Calculation:

- **Given:**
- u=−30 cm, f=10 cm
- Using the lens formula:
  - Using, $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$
  - $\frac{1}{v} - \frac{1}{-30} = \frac{1}{10}$
  - v = 15 cm

S13. Ans.(b)

Sol. The correct answer is stigma, style and ovary.

- The **pistil** is the female reproductive unit of plants.
  - A pistil has the following **three major parts**:
    - **Stigma**: The stigma is at the top and is connected to the ovary by the style.
      - It receives the pollen grains.
    - **Style**: It is an elongated slender part beneath the stigma that connects the stigma with the ovary.
    - **Ovary**: It is the basal swollen part of the pistil.
      - The ovary is the ductless reproductive gland containing one or more ovules. It is the part of the plant where seed formation occurs.
- The **stamen** is the male reproductive unit of plants and consists of the following **two parts**:
  - **Filament**: A long and slender stalk called filament which may be joined or free.
  - **Anther**: A bilobed terminal structure called the anther.

Information Booster

- **As a plant's reproductive part**, a flower contains a **stamen** (male flower part) or **pistil** (female flower part).
- Flowers that contain **either only pistils or only stamens** are called **unisexual flowers**.
- Flowers that contain **both stamens and pistil** are called **bisexual flowers**.

S14. Ans.(d)

Sol. The correct answer is Sclerenchyma.

- **Mature Sclerenchyma cells** are usually dead cells.
- They have thickened secondary walls containing lignin.
- The cells are rigid and nonstretchable and are usually found in nongrowing regions of plant bodies, such as the bark or mature stems.

Information Booster

- The tissue is a group of cells that are similar in structure and work together to achieve a particular function.

- Under **Simple Permanent Tissue**, Plant tissue can be classified as **Parenchyma**, **Collenchyma**, and **Sclerenchyma**.

Parenchyma:
- Parenchyma tissue is composed of thin-walled cells and makes up the photosynthetic tissue in leaves, the pulp of fruits, and the endosperm of many seeds.

Collenchyma:
- Collenchyma tissue mainly forms supporting tissue and has irregular cell walls.
- They are found mainly in the cortex of stems and in leaves.

S15. Ans.(d)
Sol. The correct answer is Dry ice.
- **Solid Carbon dioxide** is known as **dry ice**.
- **Solid Carbon dioxide** has a lower temperature than that of water ice, which does not leave any residue.
- It is useful for preserving frozen foods when mechanical cooling is unavailable.
- **Carbon dioxide** turns to dry ice when the temperature drops to **-110° F**.
- It changes from solid dry ice to carbon dioxide gas.
- Thereafter, it never passes through the liquid phase, and hence it is called **dry ice**.

S16. Ans.(d)
Sol. The correct answer is 24 J.
Moving charge, Q = 4C
The potential difference, V = 6V
We know, Work W = QV
$W = 4 \times 6 = 24$ Joules

S17. Ans.(c)
Sol. The correct answer is Tin – Lead.
- An electric fuse is a **safety device** used to **limit the current** in an electric circuit.
- It **melts** and breaks the circuit whenever there is an **excess flow of current** through the circuit.
- It is made up of the alloy of **tin (Sn)** and **lead (Pb)**.
- It has a **low melting point** and **high resistance**.

Functions of fuse:
- It prevents the **device from failure**.
- It prevents **short circuits**.
- It prevents **overload and blackouts**.

S18. Ans.(a)
Sol. The correct answer is 275 J.
Kinetic energy: The energy needed to move the body of mass m from one point to another with stated velocity v is called kinetic energy.
The Kinetic energy is given as:

$K.E = 1/2 \times m \times V^2$

Where:

- K.E = Kinetic Energy
- m = mass of the object
- V = velocity of an object

Calculation:

Given that:

- m = 22 kg
- v = 5 m/s

$K.E = 1/2 \times 22 \times 5^2$

K.E = 275 J

Therefore, the kinetic energy of the object is **275 J**.

S19. Ans.(a)

Sol. The correct answer is Binary fission.

- An **Amoeba** reproduces by **binary fission**.
- An **amoeba** is a type of **unicellular organism** which has the ability to alter its shape, primarily by extending and retracting **pseudopods**.
- **Prokaryotes** (Bacteria), **Protists** (Amoeba, Paramecium, Euglena, etc.), and eukaryotic cell-organelles like mitochondria and chloroplasts perform **asexual reproduction** by **binary fission**.
- In this process, two similar daughter cells are formed by dividing parent cells.
- The axis of fission/division is different in different protists. Ex.: **Amoeba** divides in any plane due to lack of specific shape; hence it is called as '**simple binary fission**'.
- **Paramecium** divides by '**transverse binary fission**' whereas **Euglena** by '**longitudinal binary fission**'.
- **Binary fission** is usually performed by **living organisms** during favorable conditions, i.e., availability of abundant food material.

S20. Ans.(c)

Sol. The correct answer is Chlorofluorocarbons.

Ozone Hole:

- The **ozone layer**, found in the stratosphere (good ozone), acts as a **protective gas shield** that absorbs harmful ultraviolet (UV) radiation, safeguarding us from the adverse effects of excessive UV exposure.
- An **ozone hole** is a region of the stratosphere over **Antarctica** where the ozone layer is exceptionally depleted.
- The size of the ozone hole over Antarctica varies from year to year, typically opening in August and closing by November or December.
- **Chlorofluorocarbons (CFCs)** are gases used for various purposes including **solvents**, **refrigerants**, and **aerosol sprays**.
- They are organic chemicals and contain **carbon**, (sometimes **hydrogen**), **chlorine**, and **fluorine**.
- **Chlorofluorocarbons** have an **immediate effect** on the environment.
- When released into the air, **CFCs** rise to the stratosphere, where they interact with a few other gases, reducing the ozone layer that protects the Earth from the sun's harmful ultraviolet rays.

- **CFCs' atmospheric effects**, on the other hand, are **not restricted** to their role as ozone-depleting compounds.
- **Infrared absorption bands** prevent heat from exiting the Earth's atmosphere at that wavelength.

S21. Ans.(b)

Sol. The correct answer is 32.

- **Work**: Work is said to be done by a force when the body is displaced actually through some distance in the direction of the applied force.
- Since the body is being displaced in the direction of **F**, therefore work done by the force in displacing the body through a distance **s** is given by:

$W=F \cdot s$

Thus, work done by a force is equal to the scalar or dot product of the force and the displacement of the body.

Given that:

Mass (m) = 25 kg

Distance (s) = 15 m

Work (W) = 480 J

Using equation:

Work = Force × Distance

$\therefore$ **480 = F × 15**

$\mathbf{F = \frac{480}{15} = 32N}$

Force = 32 N

S22. Ans.(d)

Sol. The correct answer is Reverberation.

Reverberation:

- The persistence of sound in a closed enclosure, due to continuous reflections at the walls or the floor or the ceiling of the enclosure, even after the source has stopped producing sound is known as **'reverberation'**.
- **Reverberation** is related to a shorter reflection time, that is, the sound reflects from a big room or an object, there would be repeated reflections from walls all around.
- Examples of repeated reflection objects are **loudspeakers**, **horns**, **trumpets**, etc.

1. **Music**: The mixture of different frequencies resulting in an ordered sound is called music.
2. **Pitch**: The quality of sound based on the rate of vibrations that are produced is called pitch.
3. **Note**: A single tone of a specified pitch that is sustained for a given duration is called a note.
4. *For example, pressing a single key on the piano in a tune is a musical note.*
5. **Reverberation**: The repeated reflection that results in the persistence of sound is called reverberation. **So option d is correct.**

S23. Ans.(b)

Sol. The correct answer is By increasing the efficiency of the combustion process.

- **Increasing the efficiency of the combustion process** can indeed help reduce the pollution caused by burning fossil fuels. Here are a few ways in which efficiency improvements can be achieved:
    - **Advanced Combustion Technologies**: Utilizing advanced combustion technologies such as pre-combustion chambers, staged combustion, and optimized fuel-air mixing can enhance combustion efficiency. These methods ensure that fuel is burned more completely, reducing the production of pollutants.
    - **Fuel Quality**: Using higher-quality fuels with lower impurities and better combustion properties can improve combustion efficiency and reduce emissions. This includes using cleaner-burning fuels such as low-sulfur diesel or natural gas instead of coal or heavy oils.
    - **Cogeneration and Combined Heat and Power (CHP) Systems**: Cogeneration or CHP systems produce both electricity and useful heat from the same energy source. By capturing waste heat from power generation and utilizing it for heating or other industrial processes, these systems improve overall energy efficiency, reducing the need for separate fuel burning and associated emissions.
    - **Energy Efficiency Measures**: Implementing energy efficiency measures in industrial processes, buildings, and transportation can reduce the overall energy demand. By using energy more efficiently, the need for burning fossil fuels can be minimized, thereby lowering pollution levels.
    - **Carbon Capture and Storage (CCS)**: CCS technologies capture **carbon dioxide (CO2)** emissions from power plants and industrial facilities and store them underground or use them for other purposes. While not directly increasing combustion efficiency, CCS can help reduce greenhouse gas emissions and mitigate the environmental impact of burning fossil fuels.

- It is important to note that while increasing combustion efficiency can reduce pollution per unit of energy generated, it does not eliminate the fundamental environmental challenges associated with burning fossil fuels.
- Transitioning to cleaner and renewable energy sources remains crucial for achieving significant reductions in pollution and combating climate change.

S24. Ans.(a)

Sol. The correct answer is A fielder pulls his hands gradually with the moving ball while holding a catch.

- Newton's Third Law of Motion states that "To every action, there is an equal and opposite reaction."
- When the rocket is ignited, it releases gases from its thruster thereby creating a force that will push the rocket upwards, which provides a necessary force that helps it in moving ahead.

Additional Information:

- **Newton's First Law** states that every object remains in uniform motion in a straight line unless compelled to change its state by the action of an external force.
    - When a bus starts suddenly, the passengers receive a backward jerk, an application of **Newton's first law of motion**.
- **Newton's Second Law of motion** states that the rate of change of momentum of an object is proportional to the applied force in the direction of the force. i.e. F = ma, where F is the force applied, mmm is the mass of the body, and a is the acceleration produced.

- A fielder pulling his hand back while catching a ball is an application of **Newton's second law of motion**.

S25. Ans.(c)

Sol. The correct answer is Albumin.

- **Plasma's function** is to transport **nutrients**, **hormones**, and **proteins** throughout the body.
- It also transports **waste products of cell metabolism** from different tissues to the organs that detoxify and/or excrete them.
- Plasma is **90% water**, with the remaining **10%** consisting of ions, proteins, dissolved gases, nutritional molecules, and wastes.
- Plasma proteins are of **three different types**: albumin, globulins, and fibrinogen.

Albumin:

- Albumin aids in the maintenance of the **blood's colloid osmotic pressure**.
- It is the **smallest** of the plasma proteins, but it accounts for the **majority** of the total.
- The blood's colloid osmotic pressure is critical for maintaining a **balance between the water inside the blood** and the **water in the tissue fluid surrounding the cells**.
- When **plasma proteins are lacking**, the water in the plasma leaks into the area around the blood vessels, causing **interstitial edema**, which is a symptom of liver illness, kidney disease, and malnutrition, among other things.
- Albumin also aids in the **transfer of a variety of molecules**, including **medicines**, **hormones**, and **fatty acids**.

Additional Information:

- **Leptin:**
  - Leptin is a hormone released by **adipose tissue** (body fat) that helps your body maintain a healthy weight over time.
  - This is accomplished by providing the **sensation of satiety**, which regulates appetite (feeling full).
  - **Insulin stimulates leptin secretion** via a **posttranscriptional process** including the PI3K-PKBmTOR pathway, as well as other unidentified mechanisms.
- **Keratin:**
  - It is a **protein** that can be found in your **hair, skin, and nails**.
  - Keratin is also found in the **organs** and **glands** of the body.
  - Keratin protects **epithelial cells**, strengthens the skin, strengthens internal organs, controls the growth of **epithelial cells**, and maintains **elasticity** in the skin. It also holds cells together and helps them combat mechanical stress.
- **Insulin:**
  - Insulin is a hormone created by your **pancreas** that controls the **amount of glucose** in your bloodstream at any given moment.
  - It also helps **store glucose** in your liver, fat, and muscles.
  - It regulates your **body's metabolism** of carbohydrates, fats, and proteins.

S26. Ans.(b)

Sol. The correct answer is Law of Inertia.

Newton's first law of motion is known as the **Law of Inertia**.

Newton's first law states that if a body is at rest or moving at a constant speed in a straight line:

- **It will remain at rest or keep moving in a straight line at constant speed** unless it is acted upon by a force.

There are **two conditions** on which the 1st law of motion is dependent:

- **Objects at rest:**
  - When an object is at rest, velocity v = 0 and acceleration a = 0 are zero.
  - Therefore, the object continues to be at rest.
- **Objects in motion:**
  - When an object is in motion, velocity is not equal to zero (v≠0) while acceleration (a = 0) is equal to zero.
  - Therefore, the object will continue to be in motion with constant velocity and in the same direction.

Hence, **option b is correct**.

Additional Information

Newton's First Law of Motion Examples in Daily Life:

- Wearing a seat belt in a car while driving is an example of Newton's 1st law of motion.
  - If an accident occurs, or if brakes are applied to the car suddenly, the body will tend to continue its inertia and move forward, probably proving fatal.
  - To prevent such accidents, seat belts are used, which stop your body from moving forward in inertia, avoiding danger.

S27. Ans.(b)

Sol. The correct answer is Combustion reaction.

A combustion reaction occur when carbon (C) burns in oxygen (O_2) to give Carbon dioxide (CO_2).

Type of Reaction	Definition
Addition Reaction	It is a chemical reaction where two or more reactants come together to form a single compound.
Combustion Reaction	Burning of any substance in the presence of Air/Oxygen is called Combustion Reaction.
Decomposition Reaction	It is a type of Reaction in which under a suitable condition, compound divides into many simpler compounds or elements.
Substitution Reaction	It is a chemical reaction in which one element/compound will replace another element or compound.

S28. Ans.(c)

Sol. The correct answer is Both chloroplast and mitochondria.

Similarities between Prokaryotic cells, Mitochondria, and Chloroplast:

- **Mitochondria** and **chloroplast** are of the **same size** as prokaryotic cells.
- Mitochondria and prokaryotic cells both have their own **circular DNA**.
- The ribosome of bacteria, mitochondria, and chloroplasts have a **70S type of ribosome**.
- Divides by **binary fission**.

S29. Ans.(c)

Sol. The correct answer is concave.

- If a hollow sphere is cut into parts and the outer surface of the cut part is painted, then it becomes a mirror with its inner surface as the reflecting surface. This kind of mirror is known as a **concave mirror**.
- **Uses of the concave mirror:**
  - They are often used as **shaving mirrors** to see a larger image of the face.
  - Concave mirrors are commonly used in **torches**, **search lights**, and **vehicle headlights** to get powerful parallel beams of light.
  - The **dentists** use concave mirrors to see large images of the teeth of patients.
  - Large concave mirrors are used to **concentrate sunlight** to produce heat in **solar furnaces**.

Additional Information:

- A **convex mirror** is a spherical reflecting surface (or any reflecting surface fashioned into a portion of a sphere) in which its bulging side faces the source of light.
- **Convex mirrors** are commonly used as rear-view (wing) mirrors in vehicles.
- A **plane mirror** is a mirror with a flat reflective surface. For light rays striking a plane mirror, the angle of reflection equals the angle of incidence.

S30. Ans.(a)

Sol. The correct answer is Infrared rays.

Waves that consist of vibrating electric and magnetic fields are called **electromagnetic waves**.

The examples of electromagnetic waves are:

1. Radio waves.
2. Microwaves.
3. **Infrared waves**.
4. Visible light.
5. Ultraviolet.
6. X-rays.
7. Gamma rays.

Radio waves are electromagnetic waves with maximum wavelength.

Infrared ray was discovered by **William Herschell**.

- The heat of the sunlight is due to **infrared waves**.
- **Infrared waves** are used in **TV remotes**.

Sound waves are **longitudinal waves**.

- It can not travel through a vacuum.
- The study of sound is called acoustics.
- Sound travels faster in solids.
- Sound waves higher than 20 kHz are called Ultrasonics sounds.

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