Comprehensive Assessment Feedback

Pre board Examination (Morning Session) -2025

Class :X

Subject : SCIENCE (086)

SECTION A

Select and write the most appropriate option out of the four options given for each of the questions 1-9.

Q1. A growing plant is kept in a dark room. Only a small window was kept open near it for a few days. The top part of the plant bends towards the window. This is an example of –

(a) Chemotropism
(b) Hydrotropism
(c) Phototropism
(d) Geotropism

Correct Response:(c) Phototropism

Explaination:
The top part of the plant bends towards the window because it is responding to light, showing phototropism (growth movement of a plant part towards light).

Why other options are incorrect:

- (a) Chemotropism: It is a growth response to chemicals, not to light.
- (b) Hydrotropism: It is a response to water**,** usually shown by roots, not shoots.
- (d) Geotropism: It is a response to gravity, where roots grow downward and shoots upward, not towards light.

Suggestive Measures:

To strengthen understanding, students should observe simple plant experiments at home or school to relate different types of tropic movements with real-life examples.

Q2. Which of the following part of the brain helps in maintaining posture and balance of human body ?

(a) Cerebellum
(b) Cerebrum
(c) Medulla
(d) Pons

Correct Response:(a) Cerebellum

Explanation:

The cerebellum controls coordination of muscles and helps in maintaining posture and balance of the human body.

Why other options are incorrect:

- (b) Cerebrum: It is responsible for thinking, memory, intelligence, and voluntary actions, not balance.
- (c) Medulla: It controls involuntary activities like breathing and heartbeat, not posture.
- (d) Pons: It acts as a relay center and helps in regulating respiration, not balance.

Suggestive Measures:

Students should revise brain diagrams and link each brain part with its main function using flowcharts or mind maps to strengthen conceptual clarity

Q3. The process of obtaining food by Amoeba is done through:

(a) Dialysis
(b) Cytokinesis
(c) Pseudopodia
(d) Amoebiasis

Correct Response: (c) Pseudopodia

Explanation:

Amoeba obtains food by forming pseudopodia (false feet) which surround and engulf the food particle.

Why other options are incorrect :

- (a) Dialysis: It is a method of diffusion used in separation of substances, not a feeding process.
- (b) Cytokinesis: It is the division of cytoplasm during cell division, not related to nutrition.
- (d) Amoebiasis: It is a **disease** caused by Amoeba, not a method of obtaining food.

Suggestive Measures:

Students can strengthen learning by practicing labeled diagrams showing pseudopodia and food

vacuole formation.

Q4. When carrying out the starch test on a leaf, why is it important to boil the leaf in alcohol?

(a) To dissolve the waxy cuticle.
(b) To make cells more permeable to iodine solution.
(c) To remove the chlorophyll.
(d) To stop chemical reactions in the cells.

Correct Response: (c) To remove the chlorophyll.

Explanation:
Boiling the leaf in alcohol removes chlorophyll**,** so the blue-black colour formed by iodine with starch can be seen clearly.

Why other options are incorrect :

- (a) To dissolve the waxy cuticle: The waxy cuticle is softened by boiling in water, not removed by alcohol.
- (b) To make cells more permeable to iodine solution: Cell permeability is increased by boiling in water, not alcohol.
- (d) To stop chemical reactions in the cells: This is achieved by boiling in water, not specifically by alcohol.

Suggestive Measures:
Students should remember the starch test steps in sequence (boiling in water → alcohol → iodine) and understand the purpose of each step instead of mere rote memorisation.

Q5 . Which of the following is the correct sequence of events during binary fission in Amoeba?

a) Nuclear division → Cytoplasmic division → Formation of two daughter cells
b) Cytoplasmic division → Nuclear division → Formation of two daughter cells
c) Formation of pseudopodia → Nuclear division → Cytoplasmic division
d) Cell wall formation → Nuclear division → Cytoplasmic division

Correct Response: (a) Nuclear division → Cytoplasmic division → Formation of two daughter cells

Explanation:

In binary fission of Amoeba, the nucleus divides first , followed by division of cytoplasm, resulting in two daughter cells.

Why other options are incorrect:

- (b) Cytoplasmic division → Nuclear division → Formation of two daughter cells: Nuclear division always occurs before cytoplasmic division.
- (c) Formation of pseudopodia → Nuclear division → Cytoplasmic division: Pseudopodia are for movement and feeding, not for reproduction.
- (d) Cell wall formation → Nuclear division → Cytoplasmic division: Amoeba does not have a cell wall.

Suggestive Measures:

Students can strengthen understanding by drawing stepwise diagrams of binary fission and using flowcharts to remember the correct biological sequence.

Q6. Which of the following is an artificial ecosystem?

(a) Pond
(b) Crop field
(c) Lake
(d) Forest

Correct Response:(b) Crop field

Explanation:

A crop field is an artificial ecosystem because it is created and maintained by humans and depends on human care.

Why other options are incorrect :

- **(a) Pond:** It is a natural ecosystem formed without human intervention.
- **(c) Lake:** It is a naturally occurring ecosystem with self-sustaining life forms.
- **(d) Forest:** It is a natural ecosystem that develops and maintains itself.

Suggestive Measures:

Students should compare natural and artificial ecosystems using real-life examples and make a two-column chart to clearly distinguish between them.

Q7 . Accumulation of non biodegradable pesticides in the food chain in increasing amount at each higher tropic level is known as :

(a) Eutrophication
(b) Pollution
(c) Biomagnification
(d) Accumulation

Correct Response: (c) Biomagnification

Explanation:
Biomagnification refers to the increase in concentration of non-biodegradable pesticides at each higher trophic level of the food chain.

Why other options are incorrect :

- (a) Eutrophication: It is nutrient enrichment of water bodies leading to algal bloom, not pesticide accumulation.
- (b) Pollution: It is a general term for environmental contamination, not a specific food-chain process.
- (d) Accumulation: It is a vague term and does not describe increase across trophic levels.

Suggestive Measures:

Students should learn this concept using food-chain diagrams with arrows showing increasing pesticide concentration from producers to top consumers.

Q8. **Assertion(A)-** When tall plants with dominant traits are crossed with short plants with recessive traits, all the plants in F1 progeny are tall. When the tall plants of F1 progeny are crossed, short plants reappear in F2 progeny.

Reason (R)- Traits are independently inherited.

(a) Both A and R are true, and R is the correct explanation of A.

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

(c) A is true but R is false.

(d) A is false but R is true.

Correct Response: (b) Both A and R are true, and R is not the correct explanation

of A.

Why other options are incorrect:

- (a) Both A and R are true, and R is the correct explanation of A:
  Incorrect because although both A and R are true, the Assertion is explained by the Law of Segregation, not by independent inheritance.
- (c) A is true but R is false:
  Incorrect because the Reason is true as a general Mendelian principle, though it does not apply to this situation.
- (d) A is false but R is true:
  Incorrect because the Assertion correctly describes Mendel's monohybrid cross outcome.

Suggestive Measures:

Students should first check the truth value of A and R separately, then identify whether the Reason actually explains the Assertion before selecting the option.

Q9. **Assertion (A)** – The number of trophic levels in a food chain is limited.

Reason (R) – There is a loss of energy as we go from one trophic level to the next.

(a) Both A and R are true, and R is the correct explanation of A.

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

(c) A is true but R is false.

(d) A is false but R is true.

Correct Response:(a) Both A and R are true, and R is the correct explanation of A.

Explanation:

- Assertion (A) is true: A food chain cannot have many trophic levels.
- Reason (R) is true: Energy is lost as heat at each trophic transfer.
- R correctly explains A because limited energy availability restricts higher trophic levels.

Why other options are incorrect:

- (b) Both A and R are true, and R is not the correct explanation of A:
  Incorrect because energy loss is the direct reason for limiting trophic levels.
- (c) A is true but R is false:
  Incorrect since energy loss between trophic levels does occur**.**
- (d) A is false but R is true:
  Incorrect because the number of trophic levels is indeed limited**.**

Suggestive Measures:

Students should draw and label energy pyramids and apply the 10% law to understand the limitation of trophic levels clearly.

Q10**. Students to attempt either option (A) or (B).**

(A) Name the final product/products obtained in the anaerobic respiration, if it takes place –

(a) In a fungi (like yeast).
(b) In an animal tissue (like muscles).

OR

(B) Define excretion. Name any one method used by plants to get rid of excretory products.

Value Points:

(A) - In a fungi (yeast) : Anaerobic respiration produces ethanol and CO_2

- in animal tissue (muscles) : Anaerobic respiration produces lactic acid

OR

(B) - Excretion is the process of removing metabolic wastes, from the organism
- Transpiratioin/diffusion of gases/excretion into soil/secretion
(any one)

Suggestive Measures:

For Question (A) – Anaerobic Respiration:
Students should prepare a comparison table of anaerobic respiration in yeast and muscles, including reactants, products, and conditions, to strengthen understanding.

For Question (B) – Excretion in Plants:
Students should observe real-life examples like leaf fall and resin secretion and revise the concept using labeled diagrams of plant excretory methods.

Q11**. Students to attempt either option (A) or (B)**

A) List the role of the following in our digestive system:

(a) Hydrochloric acid

(b) Trypsin

OR

B) Write two ways by which plants obtain Carbon dioxide. What causes the opening and closing of stomata?

Value Points:

(A) - Hydrochloric acid Activates enzymes and destroys microbes

- Trypsin Breaks proteins into peptides

OR

(B) - Plants obtain CO_2 through stomatal opening and diffusion, the opening and closing of stomata are regulated by guard cells

Suggestive Measures:

For Question (A) – Digestive system (HCl and Trypsin):

Students should learn digestive enzymes and secretions using flowcharts showing the organ, substance released, and its specific function.

For Question (B) – Carbon dioxide intake and stomata:

Students should use labeled diagrams of stomata and relate gas exchange to day–night plant activities to strengthen conceptual clarity.

Q12. What is ten percent law in a food chain? Explain with an example.

Value Points:

The ten percent law states that only about 10% of the energy from one trophic level is transferred to the next.

- Example: If plants capture 1000 joules, only about 100 joules are passed on to herbivores.

Suggestive Measures:

Students should draw energy pyramid diagrams and practice numerical examples showing energy transfer at each trophic level to clearly understand the 10% law.

Q13. “The sex of the children is determined by what they inherit from their father and not their mother.” Justify.

Value Points:
The sex of a child is determined by the father because his sperm carries either an X or Ychromosome, while the egg contributes only an X.

Suggestive Measures:

Students should revise sex determination using clear diagrams of XX–XY chromosomes to strengthen conceptual understanding.

Q 14 . A person walks across a room in barefoot and puts his foot on a drawing pin lying on the floor. He lets out a cry. Explain what happens in his nervous system in bringing about this response, in the form of a flowchart.

Value Points:
A flowchart outlining the reflex action pathway showing:
1. Stimulus (drawing pin pricks the foot)
2. Activation of sensory receptors in the foot
3.Transmission of nerve impulse via sensory neurans to the spinal cord
4. Integration by interneurons in the spinal cord

5. Transmission by motor neurons

6.Muscle contraction to withdraw the foot

Suggestive Measures:

Students should practice drawing and revising reflex arc flowcharts (receptor → sensory neuron → spinal cord → motor neuron → effector) to strengthen understanding of nervous coordination.

Q15. Ankit's father has to undergo dialysis after every fortnight as his father's kidneys are not working. If he does not undergo the procedure of dialysis, poisonous waste gets accumulated in the body and that may lead to the death of a person.

(a) Name the basic filtration unit present in the kidneys of human beings.

(b) How do unicellular organisms remove harmful metabolic waste from their bodies?

Attempt either (c) or (d).

(c) What happens to the glucose which enters the glomerulus along with filtrate?

OR

(d)Name the two waste products of human body which are produced in body cells.

Value Points:

(a) Basic filtration unit: Nephron.

(b) Unicellular organisms remove excess waste by diffusion across the cell membrane.

(c) Glucose entering the glomerulus is reabsorbed in the proximal convoluted tubule.

OR

(d)Waste products formed in body cells: CO_2 and urea.

Suggestive Measures:

Students should revise kidney structure and excretion using labeled nephron diagrams and step-wise flowcharts linking filtration, reabsorption, and waste removal to real-life cases like dialysis.

Q16. **Students to attempt either option (A) or (B**).

A) (a) How does binary fission in Amoeba differ from budding in Hydra in terms of the development of offspring?

(b) In what ways can environmental factors influence the mode of reproduction adopted by an organism? Explain with reference to any specific example.

OR

B) (a)What is vegetative reproduction? List two advantages of using this technique.

(b)Name the two types of germ-cells present in human beings. How do they structurally differ from each other? Give two differences.

Value Points:

(A) (a) Binary fission in Amoeba produces two nearly equal daughter cells, whereas budding in Hydra produces an outgrowth that develops into a new individual.

(b) Environmental factors (like temperature or nutrient availability) may favour

asexual reproduction; for example, some protozoa reproduce asexually under favourable conditions

OR

(B) (a) Vegetative reproduction is a form of asexual propagation, advantages include rapid multiplication and uniformity.
(b) Germ cells in humans are Sperm (small, motile) and Ovum (large, nutrient rich),differing in size, structure, and function.

Suggestive Measures:

For Question (A) – Modes of reproduction & environmental influence:

Students should use comparison tables and labeled diagrams (Amoeba vs Hydra) and relate reproduction modes to environmental conditions to strengthen conceptual clarity.

For Question (B) – Vegetative reproduction & human germ cells:

Students should revise reproduction concepts using flowcharts and comparative diagrams (sperm vs ovum) highlighting structure, function, and advantages.

SECTION B

Q 17. Which of the following does not involve a chemical reaction?

(a) Digestion of food in our body.
(b) Process of respiration.
(c) Burning of candle wax when heated.
(d) Melting of candle wax on heating.

Correct Response: (d) Melting of candle wax on heating.

Why other options are incorrect:

- (a) Digestion of food in our body: It involves chemical reactions where complex food molecules are broken into simpler substances.
- (b) Process of respiration: It involves chemical oxidation of food to release energy.
- (c) Burning of candle wax when heated: It is a chemical reaction producing new substances like carbon dioxide and water.

Suggestive Measures:

Students should compare physical and chemical changes using everyday examples and focus on whether a new substance is formed to strengthen conceptual understanding.

Q18. Which of the following represents a combination reaction?

(a) $2NaCl \longrightarrow 2Na+Cl_2$

(b) $C+O_2 \longrightarrow CO_2$

(c) $2H_2O \longrightarrow 2H_2+O_2$

(d) $2HCl \longrightarrow H_2+Cl_2$

Correct Response:(b) $C+O_2 \longrightarrow CO_2$

Explanation:

A combination reaction is one in which two or more substances combine to form a single product**.**

Why other options are incorrect:

- (a) $2NaCl \rightarrow 2Na + Cl_2$: It is a decomposition reaction, not a combination reaction.
- (c) $2H_2O \rightarrow 2H_2 + O_2$: It is a decomposition reaction where one compound breaks into simpler substances.
- (d) $2HCl \rightarrow H_2 + Cl_2$: It is also a decomposition reaction**.**

Suggestive Measures:

Students should classify reactions by counting reactants and products and practice writing balanced equations to clearly identify combination reactions.

Q19. When writing a chemical equation, which element is considered when balancing a reaction?

(a) Only metals

(b) Only non-metals

(c) Every element present in the reaction

(d) Only the elements forming bond

Correct Response: (c) Every element present in the reaction

Explanation:

While balancing a chemical equation, the number of atoms of every element must be equal on both sides of the equation.

Why other options are incorrect:

- (a) Only metals: Balancing applies to all elements, not just metals.
- (b) Only non-metals: Non-metals alone are not considered; every element must be balanced.
- (d) Only the elements forming bonds: Even elements not directly forming visible bonds must be balanced.

Suggestive Measures:

Students should balance equations step-by-step by listing all elements on both sides and matching their atom counts systematically.

Q20. Which of the following is a characteristic property of acids?

(a) Bitter taste and slippery feel

(b) Sour taste and ability to change the color of blue litmus paper to red

(c) No reaction with metals

(d) Turn red litmus paper blue

Correct Response: (b) Sour taste and ability to change the color of blue litmus paper to red

Explanation:

Acids are characterized by a sour taste and their ability to turn blue litmus paper red**.**

Why other options are incorrect :

- (a) Bitter taste and slippery feel: These are properties of bases, not acids.
- (c) No reaction with metals**:** Most acids do react with metals to produce hydrogen gas.
- (d) Turn red litmus paper blue: This is a property of bases**,** not acids.

Suggestive Measures:

Students should revise acid–base properties using a comparison table and perform simple litmus tests in the lab to reinforce understanding.

Q21. When an acid reacts with a metal, the reaction typically produces:

(a) Salt and water

(b) Hydrogen gas and a salt

(c) Oxygen gas and a salt

(d) Carbon dioxide and water

Correct Response:(b) Hydrogen gas and a salt

Explanation:

When an acid reacts with a metal**,** it produces a salt and releases hydrogen gas.

Why other options are incorrect :

- (a) Salt and water: This is the result of an acid–base (neutralisation) reaction, not acid–metal reaction.
- (c) Oxygen gas and a salt: Oxygen is not released in acid–metal reactions.
- (d) Carbon dioxide and water: This occurs when an acid reacts with a carbonate or bicarbonate, not with a metal.

Suggestive Measures:

Students should remember standard reaction patterns (acid + metal, acid + base, acid + carbonate) using formula charts and practice writing example equations.

Q22. When an acid reacts with a carbonate, the main products formed are:

(a) Salt, water and Hydrogen gas

(b) Salt, water and Carbon dioxide

(c) Salt, water and Oxygen

(d) Salt and water only

Correct Response:(b) Salt, water and Carbon dioxide

Explanation:

When an acid reacts with a carbonate, it produces a salt, water and carbon dioxide gas**.**

Why other options are incorrect :

- (a) Salt, water and Hydrogen gas**:** Hydrogen gas is released when acids react with metals, not carbonates.
- (c) Salt, water and Oxygen**:** Oxygen is not produced in acid–carbonate reactions.
- (d) Salt and water only**:** Carbon dioxide is always produced in reactions involving carbonates.

Suggestive Measures:

Students should memorise common reaction patterns with word equations and perform lab demonstrations like acid–carbonate reactions to reinforce the concept.

Q23. Which of the following group of metals react with steam but not with cold or hot water?

(a) K,Na,Ca
(b) Al ,Fe, Zn
(c) Cu, Pb, Au
(d) K,Al, Cu

Correct Response:(b) Al ,Fe, Zn

Explanation:

Aluminium, iron, and zinc react with steam to form metal oxides and hydrogen, but do not react with cold or hot water.

Why other options are incorrect:

- (a) K, Na, Ca: These metals react violently with cold water, not only with steam.
- (c) Cu, Pb, Au: These metals do not react with water or steam**.**
- (d) K, Al, Cu: Potassium reacts with cold water, while copper does not react with steam**,** making the group incorrect.

Suggestive Measures:

Students should remember the reactivity of metals using a reactivity series chart and group metals based on their reaction with water, steam, and acids.

Q24. Assertion (A): Carbon exhibits catenation (the ability to form long chains or rings) because it can form strong covalent bonds with other carbon atoms.
Reason(R) : Carbon's small atomic size and moderate electro negativity allow it to form extremely strong bonds with itself, leading to a vast variety of organic compounds.

(a) Both A and R are true, and R is the correct explanation of A
(b) Both A and R are true, and R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.

Correct Response: (a) Both A and R are true, and R is the correct explanation of A

Explanation:

- Assertion (A) is true**:** Carbon shows catenation because it forms strong covalent C–C bonds.
- Reason (R) is true**:** Carbon's small atomic size and moderate electro negativity result in very strong self-linking bonds.
- R correctly explains A by stating *why* carbon can form long chains and rings.

Why other options are incorrect :

- (b) Both A and R are true, and R is not the correct explanation of A:
  Incorrect because R directly explains the reason for carbon's catenation.
- (c) A is true but R is false:
  Incorrect since the Reason correctly states the properties responsible for catenation.
- (d) A is false but R is true:
  Incorrect because carbon does exhibit catenation.

Suggestive Measures:

Students should link carbon's atomic properties (size, electronegativity, bond energy) with structural features using molecular models and diagrams for better conceptual clarity.

Q25. Why is Sodium kept immersed in kerosene oil?

Value Points:

Sodium is kept immersed in kerosene oil to prevent its reaction with moisture or oxygen from the air.

Suggestive Measures:

Students should link metal reactivity with storage methods by revising the reactivity series and noting real-life safety precautions for highly reactive metals like sodium.

Q26**. Students to attempt either option (A) or (B).**

A) (a) Name a metal which is so soft that it can be cut with a knife.

(b) Name the metal which is the best conductor of heat and electricity.

(c) Name one metal which displaces Silver from silver nitrate solution.

OR

B) Describe how sodium and chlorine atoms are changed into ions when they react with each other to form Sodium chloride, NaCl. What is the name given to this type of bonding?

Value Points:

(A) (a) Potassium - a very soft metal that can be cut with a knife.
(or Na, Li)

(b) Copper - an excellent conductor of heat and electricity

(c) Zinc - displaces silver from silver nitrate solution.

OR

(B) When sodium and chlorine react, sodium loses an electron to form a cation and chlorine gains an electron to form an anion, resulting in ionic bonding in sodium chloride (NaCl)

Suggestive Measures:

For Question (A) – Properties and reactivity of metals:
Students should memorize key metal properties using the reactivity series and practice displacement reactions with examples to strengthen understanding.

For Question (B) – Formation of NaCl and bonding:
Students should use electron-dot structures and stepwise diagrams showing electron transfer to clearly understand ionic bond formation.

Q27. (a) Why corrosion of iron a serious problem?

(b) How can we prevent corrosion of iron? Write any two suggestions.

Value Points:
(a) Corrosion of iron is a serious problem because it weakens the metal structure.
(b) Corrosion can be prevented by painting, galvanizing, or using corrosion inhibitors.

Suggestive Measures:
Students should strengthen this concept by connecting corrosion with everyday examples (rusting of gates, bridges, vehicles) and revising causes and prevention methods using short tables or flowcharts.

Q28. Anjali was investigating the reactions of acids with carbonates in her science lab. She mixed a sample of Calcium carbonate with a dilute acid. The reaction produced effervescence with the release of gas and eventually, a salt was formed.

a) Identify the gas released during the reaction between calcium carbonate and an acid.
b) What is the salt formed when Calcium carbonate reacts with dilute HCl?

Attempt either (c) or (d).

c) Briefly describe the reaction between an acid and a carbonate, including the role of carbon dioxide in the process.

OR

d) Give one example each to understand how acid-carbonate reaction is important in everyday life and industrial processes.

Value Points:

(a) The gas released is CO_2

(b) Salt formed Calcium chloride

(c) Description : Acid + carbonate reaction produces CO_2, H_2O and a salt; CO_2 evolves as effevescence.

OR

(d)$CaCO_3 + 2HCl \rightarrow CaCl_2 + CO_2 + H_2O$ (or any other)

Suggestive Measures:

Students can strengthen understanding of acid–carbonate reactions by performing simple lab experiments (like marble chips with acid), writing word equations, and linking the observed effervescence to carbon dioxide release.

Q29 . **Students to attempt either option (A) or (B).**

(A) Two compounds X and Y have the same molecular formula C_3H_6O.

(a) Give the names of X and Y.

(b) Write the structural formulae of X and Y.

(c) Name the functional groups present in them.

OR

(B) (a)What are hydrocarbons? How many different hydrocarbons can be obtained by joining two carbon atoms? Write their structural formula.

(b) Classify the above hydrocarbons into saturated and unsaturated hydrocarbons. Which of these is/ are more reactive?

Value Points:

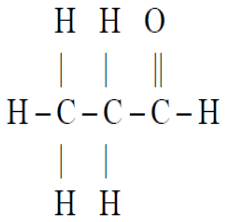
(A) (a) Two compounds with formula C_3H_6O

X : Propanal

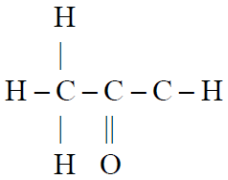
Y : Acetone

Or vice versa

(b) Prepanal – CH_3CH_2CHO /



Acetone – CH_3COCH_3 /



Suggestive Measures:

For Question (A) – Isomerism (same molecular formula, different structures):
Students should practice drawing and comparing structural formulae and functional groups side-by-side to clearly understand isomerism.

For Question (B) – Hydrocarbons and their classification:
Students should revise hydrocarbon types using carbon–carbon bond diagrams (single, double, triple) and link bond type with reactivity for better retention.

SECTION C

Q30. In which of the following is a concave mirror used?

(a) A solar cooker.
(b) A rearview mirror in vehicles.
(c) A safety mirror in shopping malls.
(d) In viewing full size image of distant tall buildings.

Correct Response: (a) A solar cooker.

Explanation:
A concave mirror converges parallel rays of sunlight to a focus, producing high temperature, which is used in a solar cooker.

Why other options are incorrect :

- (b) A rearview mirror in vehicles**:** Rearview mirrors are convex mirrors to provide a wider field of view.
- (c) A safety mirror in shopping malls: Safety mirrors are convex to observe a large area.
- (d) In viewing full size image of distant tall buildings: A concave mirror forms a real, diminished image of distant objects, not a full-size image.

Suggestive Measures:

Students should draw ray diagrams for concave and convex mirrors and relate image properties to their everyday applications.

Q31. The sky on the moon appear dark to an astronaut because :

(a) There is no light on the moon.
(b) There is no atmosphere on the surface of the moon.
(c) Moon is non-luminous object.
(d) The surface of the moon absorbs all the sunlight falling on it.

Correct Response: (b) There is no atmosphere on the surface of the moon.

Explanation:
The sky appears dark on the Moon because there is no atmosphere to scatter sunlight.

Why other options are incorrect :

- (a) There is no light on the moon: Sunlight does reach the Moon; hence light is present.
- (c) Moon is non-luminous object: Though true, this does not explain the dark sky.
- (d) The surface of the moon absorbs all the sunlight falling on it**:** The Moon reflects some sunlight; it does not absorb all of it.

Suggestive Measures:

Students should link sky colour and brightness with atmospheric scattering by comparing Earth and Moon conditions using diagrams or simulations.

Q32. Assertion (A) – The SI unit of power of lens is ‘dioptre’.
Reason (R) – The power of concave lens is positive and that of convex

lens is negative.

(a) Both A and R are true, and R is the correct explanation of A

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

(c) A is true but R is false.

(d) A is false but R is true.

Correct Response: (c) A is true but R is false.

Explanation:

- Assertion (A) is true**:** The SI unit of power of a lens is dioptre (D)**.**
- Reason (R) is false: The power of a convex lens is positive and that of a concave lens is negative, not the other way round.

Why other options are incorrect :

- (a) Both A and R are true, and R is the correct explanation of A:
  Incorrect because R is false.
- (b) Both A and R are true, and R is not the correct explanation of A:
  Incorrect since R is not true**.**
- (d) A is false but R is true:
  Incorrect because the Assertion is correct and the Reason is incorrect**.**

Suggestive Measures:

Students should revise sign conventions for lenses and practice numerical problems relating focal length and power to avoid conceptual errors.

Q33. A divergent lens has a focal length 20cm. At what distance should an object of height 4cm from the optical centre of the lens be placed so that its image is formed 10cm away from the lens.

Value Points:

For a divergent lens with f = -20 cm:

Given: Image distance, v = – 10 cm (image formed on the same side as the object), object height is provided, but here we focus on distance. Use the lens formula:

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

Substitute: $\frac{1}{u} = -\frac{1}{10} + \frac{1}{20} = -\frac{1}{20}$

Thus, u = -20 cm (object placed 20 cm from the lens)

Suggestive Measures:

Students should strengthen this concept by regularly practicing numerical problems using the lens formula with correct sign convention and by drawing neat ray diagrams to visualize image formation.

Q 34. **Students to attempt either option (A) or (B).**

(A) List the factors on which the resistance of a conductor in the shape of a wire depends.

OR

(B) Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.

Value Points:

(A) List of factors affecting the resistance in a wire: length, cross-sectional area, resistivity (material), and temperature.

OR

(B) Metals are good conductors due to free electrons, while glass lacks free electrons making it a poor conductor.

Suggestive Measures:

For Question (A) – Resistance of a conductor:
Students should revise the factors affecting resistance by linking them with the formula $R=\rho\, l/A$ and solving simple numerical problems.

For Question (B) – Electrical conductivity of metals and glass:
Students should strengthen understanding by relating conductivity to the availability of free electrons using diagrams and real-life examples.

Q35. (a) What is fuse? What is its function?

(b) Which material is used to make fuse wires?

(c) How is a fuse connected in an electric circuit?

Value Points:

(a) A fuse is a safety device that protects an electrical circuit by melting (and thereby interrupting the circuit) when excessive current flows.

(b) Fuse wires are typically made of alloys (such as tin-lead) and are connected in series with the electrical circuit.

Suggestive Measures:

Students should strengthen this concept by studying simple circuit diagrams showing fuse connection, understanding properties of fuse wire materials, and relating fuse action to real-life safety devices at home.

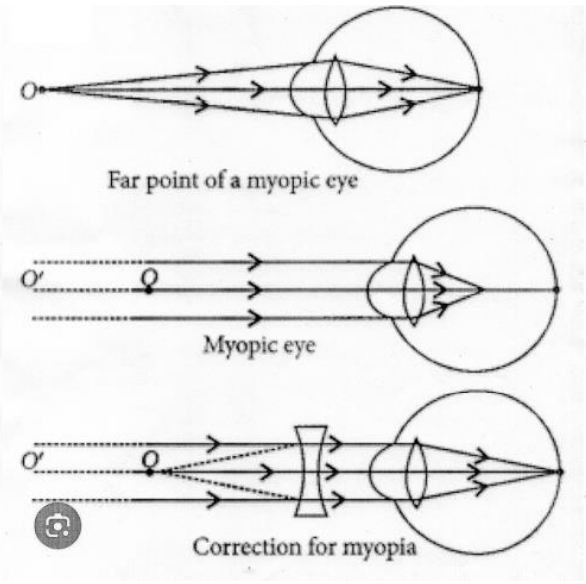
Q 36. A student is suffering from myopia is not able to see distinctly the object placed beyond 5m.

(a) With the help of ray diagram show why the student is unable to see distinctly the objects placed beyond 5m from his eyes.

(b) How is this defect corrected by using which lens?

Value Points: In myopia, the eye lens focuses images in front of the retina.

(a) The ray diagram shows diverging rays that, when extrapolated backward, intersect before the retina. Diagram attached.



(b)Correction is achieved using a concave (diverging) lens which spreads light rays so that the image is formed on the retina (correction diagram above).

Suggestive Measures:

Students should practice drawing neat ray diagrams for eye defects (myopia and hypermetropia) and relate image formation with corrective lenses to strengthen conceptual understanding.

Q37. How is the direction of magnetic field at a point determined using the field lines? Why do two magnetic field lines not cross each other?

Value Points:

- The direction of the magnetic field at a point is determined by the tangent to the field line at that point.
- Magnetic field lines never cross because the field has a unique direction at every point.

Suggestive Measures:

Students should strengthen this concept by drawing magnetic field line diagrams, marking tangents to show direction, and visualising field patterns using iron filings or simulations.

Q 38. Riya is examining the behavior of light when it passes from air into water in her school laboratory. She shines a light beam at the surface of a water tank and observes that the light changes direction upon entering the water. Riya records both the angle of incidence and the angle of refraction and notices that the light bends toward the normal.

a) What is the term for the bending of light as it passes from one medium to another?
b) When light enters water from air, why does it bend toward the normal?

Attempt either (c) or (d).

c) Briefly explain the relationship between the speed of light, the index of refraction, and the change in light's direction when it passes from air to water.

OR

d) Describe a real-life situation where the refraction of light is observed or used, and explain the significance of this phenomenon in that context.

Value Points:
(a) Refraction
(b) When light enters water from air, it slows down (due to the higher index of refraction in water) and bends toward the normal

(c) Relationship: Light speed decreases in water, and this change in speed (with $n = c/v$) causes the light to bend
OR
(d) A straw appearing bent in water
Significance of refraction
It helps us understand why objects under water do not appear at their actual position.

Suggestive Measures:

Students can strengthen their understanding of refraction by practicing ray diagrams for different media, applying Snell's law numerically, and relating speed change of light to everyday examples like a pencil appearing bent in water

Q39. **Students to attempt either option (A) or (B).**

(A) (a) Calculate the total cost of running the following electrical devices in the month of September, if the rate of 1 unit of electricity is Rs. 6.00 :

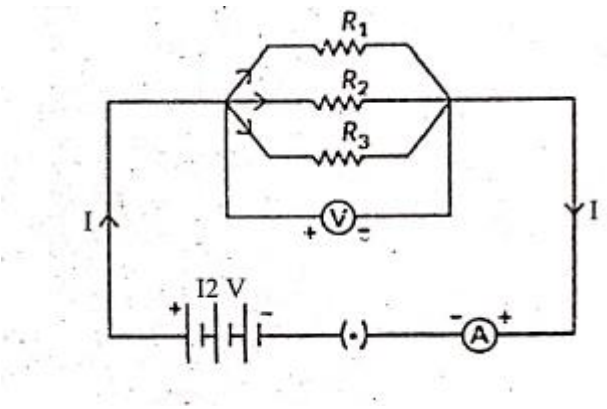
(i) Electric heater of 1000W for 5hours daily.
(ii) Electric refrigerator of 400 W for 10 hours daily.

(b) State Ohm's law. Write the necessary conditions for its validity.

OR

B) In the circuit given below, the resistors R1, R2 and R3 have the values 10Ω, 20Ω, and 30 Ω respectively, which have been connected to a battery of 12V.Calculate :

(a) The current through each resistor
(b) The total circuit resistance and
(c) The total current in the circuit.



Value Points: (A) (a) Calculate cost of electricity usage:
(i) Electric heater (1000 W)
Daily energy = 1 kW × 5 hours = 5 kWh;
For 30 days-
energy =5 × 30 = 150, kWh;
Cost 150 × 6 = Rs.900

(ii) Refrigerator (400 W)

Daily energy = 0.4 kW × 10 hours = 4 kWh;
For 30 days-
energy =4 × 30 = 420 kWh;
Cost = 120 × 6 = Rs. 720.

Total cost = Rs. 900 + Rs. 720 = Rs. 1620

(b) Ohm's law: V = IR with the condition that the conductor's temperature remains constant and it exhibits a linear relationship between voltage and current.

OR

(B) (a) Through R_1 (applying Ohm's law, V= IR)

$$I_1 = \frac{12}{10} = 1.2A$$

$$\text{Through } R_2 = I_2 = \frac{12}{20} = 0.6A$$

$$\text{Through } R_3 = I_3 = \frac{12}{30} = 0.4A$$

(b) Total circuit resistance

$$\frac{1}{Req} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$$

$$= \frac{1}{10} + \frac{1}{20} + \frac{1}{30} = \frac{11}{60} = R_{eq} = \frac{60}{11} = 5.45\Omega$$

(c) Total current in the circuit

$$I_{total} = \frac{V}{R_{eq}} = \frac{12}{5.45} = 2.2A$$

Suggestive Measures:

For Question (A) – Electric energy, power, and Ohm's law:
Students should practice daily-life electricity numericals with proper unit conversion (W to kW, hours to units) and revise Ohm's law conditions using simple graphs.

For Question (B) – Parallel combination of resistors:
Students should strengthen understanding by solving step-wise numerical problems on parallel circuits and verifying results using circuit diagrams and formulas.

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