

Comprehensive Assessment Feed back

Pre Board Examination (Morning Session) - 2024

Class X

Subject : SCIENCE

Section A

| Q.No. | Select and write the most appropriate option out of the four options given for each of the questions 1-20. There is no negative mark for incorrect response. | Marks |
|-------|--|-------|
| 1 | <p>Which of the following is an exothermic reaction ?</p> <p>a) Cooking of food b) Sublimation of dry ice c) Respiration in human beings d) Dissolution of ammonium chloride in water</p> <p>Correct Response: c) Respiration in human beings – Respiration releases energy as heat during the breakdown of glucose, making it an exothermic reaction.</p> <p>option a) Cooking of food-Requires heat input, making it an endothermic process. option b) Sublimation of dry ice-Absorbs heat for phase change, hence endothermic. option d) Dissolution of ammonium chloride in water-Absorbs heat from the surroundings, making it endothermic.</p> <p>Suggestive Measures Relate exothermic and endothermic reactions to everyday examples for better understanding.</p> | 1 |
| 2 | <p>When 3 mL of sodium sulphate solution is added to 3 mL solution of barium chloride then an insoluble substance get formed. This is an example of :</p> <p>a) Combination reaction b) Decomposition reaction c) Displacement reaction d) Precipitation reaction</p> <p>Correct Response:d) Precipitation reaction – The reaction forms an insoluble substance (barium sulphate) as a precipitate, characteristic of a precipitation reaction.</p> <p>option a) Combination reaction: Involves two or more reactants forming a single product, which does not happen here. option b) Decomposition reaction: A single compound breaks down into simpler substances, which is not the case. option c) Displacement reaction: One element replaces another in a compound, but no such exchange occurs here.</p> <p>Suggestive Measures Familiarize with key reaction types through examples and visual demonstrations.</p> | 1 |
| 3 | <p>Identify 'p', 'q' and 'r' in the following balanced reaction :</p> <p>$p \text{ CO}_2 (\text{aq}) + q \text{ H}_2\text{O} (\text{l}) \longrightarrow \text{C}_6\text{H}_{12}\text{O}_6 (\text{aq}) + r \text{ O}_2 (\text{aq}) + 6\text{H}_2\text{O} (\text{l})$</p> <p>a) 6,7,5 b) 6,12,6 c) 5,6,7 d) 6,8,6</p> <p>Correct Response:b) 6, 12, 6 – The balanced equation follows the stoichiometry of photosynthesis, where $6 \text{ CO}_2 + 12 \text{ H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{ O}_2 + 6 \text{ H}_2\text{O}$.</p> <p>option a) 6, 7, 5: Incorrect water and oxygen stoichiometry; doesn't balance the equation. option c) 5, 6, 7: Incorrect carbon dioxide and water ratios; unbalanced reactants. option d) 6, 8, 6: Insufficient water molecules to balance hydrogen on both sides.</p> <p>Suggestive Measures Practice balancing equations step-by-step, focusing on atom conservation.</p> | 1 |

| 4 | <p>Bleaching powder is produced by action of :</p> <p>(a) Sodium chloride with water (b) Chlorine on dry slaked lime (c) Calcium sulphate with water (d) Copper sulphate with ammonia</p> <p>Correct Response: b) Chlorine on dry slaked lime – Bleaching powder (CaOCl_2) is formed by the reaction of chlorine gas with dry slaked lime (Ca(OH)_2).</p> <p>option a) Sodium chloride with water: Produces brine, not bleaching powder. option c) Calcium sulphate with water: Produces gypsum, unrelated to bleaching powder. option d) Copper sulphate with ammonia: Forms complex salts, not bleaching powder.</p> <p>Suggestive Measures Focus on reactants and products specific to common chemical preparations.</p> | 1 | | | | | | | | | | |
|--|--|----------|-----------|----------------------------------|-------|--|--------|--|--------|--|--------|---|
| 5 | <p>When electricity is passed through brine solution, the products</p> <p>a) Sodium and Chlorine b) Hydrogen, Chlorine and Oxygen c) Hydrogen, Chlorine and Sodium Hydroxide d) Sodium Hydroxide, Chlorine and Oxygen</p> <p>Correct Response: c) Hydrogen, Chlorine, and Sodium Hydroxide – Electrolysis of brine (sodium chloride solution) produces hydrogen at the cathode, chlorine at the anode, and sodium hydroxide in the solution.</p> <p>option a) Sodium and Chlorine: Sodium metal is not formed as it reacts with water during electrolysis. option b) Hydrogen, Chlorine, and Oxygen: Oxygen is not a product; chlorine and hydrogen are produced instead. option d) Sodium Hydroxide, Chlorine, and Oxygen: Oxygen is not formed in this reaction setup.</p> <p>Suggestive Measures Use diagrams to visualize electrode reactions during electrolysis.</p> | 1 | | | | | | | | | | |
| 6 | <p>Match column I with column II and select the correct option using the given codes.</p> <table style="width: 100%; border: none;"> <thead> <tr> <th style="text-align: center; width: 50%;">Column I</th> <th style="text-align: center; width: 50%;">Column II</th> </tr> </thead> <tbody> <tr> <td>A. A non metal which is lustrous</td> <td>i) Pb</td> </tr> <tr> <td>B. A metal which is poor conductor of heat</td> <td>ii) Cs</td> </tr> <tr> <td>C. A non metal which is liquid at room temperature</td> <td>iii) I</td> </tr> <tr> <td>D. A metal which melts when kept on our palm</td> <td>iv) Br</td> </tr> </tbody> </table> <p>a) A-(ii), B-(i), C-(iii), D-(iv) b) A-(iii), B-(i), C-(iv), D-(ii) c) A-(iv), B-(ii), C-(iii), D-(i) d) A-(iii), B-(ii), C-(i), D-(iv)</p> <p>Correct Response: b) A-(iii), B-(i), C-(iv), D-(ii)</p> <p>option a) A-(ii): Cesium is not a lustrous non-metal. option c) A-(iv): Bromine is liquid but not lustrous. option d) D-(iv): Bromine is not a metal.</p> <p>Suggestive Measures Memorize unique characteristics of common elements for quick matching.</p> | Column I | Column II | A. A non metal which is lustrous | i) Pb | B. A metal which is poor conductor of heat | ii) Cs | C. A non metal which is liquid at room temperature | iii) I | D. A metal which melts when kept on our palm | iv) Br | 1 |
| Column I | Column II | | | | | | | | | | | |
| A. A non metal which is lustrous | i) Pb | | | | | | | | | | | |
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| D. A metal which melts when kept on our palm | iv) Br | | | | | | | | | | | |
| 7 | <p>Some metals do not react either with cold or hot water. But they react with steam to form metal oxide and hydrogen. Identify them:</p> <p>a) K and Na b) Ca and Mg c) K and Mg d) Al and Fe</p> <p>Correct Response: d) Al and Fe – Aluminium and iron do not react with cold or hot water but react with steam to form their respective metal oxides and hydrogen gas.</p> <p>option a) K and Na: React vigorously with cold water, producing metal hydroxides and hydrogen, not oxides. option b) Ca and Mg: React with cold or hot water to form hydroxides and hydrogen gas. option c) K and Mg: Potassium reacts with cold water, while magnesium reacts with hot water, not steam specifically.</p> <p>Suggestive Measures Understand reactivity series and categorize metals based on their reactions with cold water, hot water, and steam.</p> | 1 | | | | | | | | | | |

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| 8 | <p>A student noticed that a fish was breathing faster than usual. Which of the following could be a reason for this observation?</p> <p>a) Increased light intensity b) Higher concentration of oxygen in the water c) Decreased oxygen availability in the water d) The fish is digesting food</p> <p>Correct Response:c) Decreased oxygen availability in the water – Fish breathe faster to compensate for the reduced oxygen concentration in the water, increasing oxygen uptake for survival.</p> <p>option a) Increased light intensity: Does not directly affect breathing rate unless it influences water temperature or oxygen levels. option b) Higher concentration of oxygen in the water: Would reduce, not increase, the breathing rate as oxygen availability is sufficient. option d) The fish is digesting food: Digestion may slightly increase metabolic rate, but it is not a primary cause of faster breathing.</p> <p>Suggestive Measures Study how environmental factors like oxygen levels and temperature affect respiration. Observe aquatic organisms in different conditions to relate theory to practice.</p> | 1 |
| 9 | <p>After a long run, an athlete experiences muscle fatigue. This fatigue is primarily due to which process occurs?</p> <p>a) Aerobic respiration b) Anaerobic respiration c) Fermentation d) Digestion</p> <p>Correct Response:b) Anaerobic respiration – Muscle fatigue occurs when oxygen supply is insufficient, causing the body to switch to anaerobic respiration.</p> <p>option a) Aerobic respiration: Produces energy efficiently without lactic acid buildup, so it doesn't cause fatigue. option c) Fermentation: Occurs in microorganisms, not in human muscles, and is not directly linked to muscle activity. option d) Digestion: Irrelevant to muscle activity or fatigue during physical exertion.</p> <p>Suggestive Measures Understand the difference between aerobic and anaerobic respiration through examples and flowcharts. Relate physiological processes like fatigue to real-life scenarios, such as exercise. Practice labeling diagrams of cellular respiration pathways for conceptual clarity.</p> | 1 |
| 10 | <p>In an experiment, if a plant is deprived of water, which life process will be most directly affected and what would be a visible symptom?</p> <p>a) Photosynthesis; leaves will wilt b) Respiration; growth will stop c) Excretion; the plant will produce more waste d) Nutrition; the plant will grow faster</p> <p>Correct response a) Photosynthesis; leaves will wilt – Water is a critical reactant in photosynthesis, and its absence reduces the plant's ability to produce food, causing leaves to wilt due to loss of turgor pressure.</p> <p>Option b) Respiration; growth will stop: Respiration uses stored food and can continue temporarily without water; growth cessation is a secondary effect. Option c) Excretion; the plant will produce more waste: Excretion is not directly affected, and water shortage limits, not increases, waste removal. Option d) Nutrition; the plant will grow faster: Lack of water impedes nutrient absorption and halts growth, contradicting faster growth.</p> <p>Suggestive Measures Understand the interdependence of water and photosynthesis through experiments like observing wilted and watered plants. Use visual aids like photosynthesis equations to highlight water's role. Practice identifying visible symptoms of water deprivation in plants and connecting them to affected processes.</p> | 1 |

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| 11 | <p>Which part of the brain is primarily responsible for coordinating voluntary movements and balance? a) Cerebrum b) Cerebellum c) Medulla d) Hypothalamus</p> <p>Correct Response: b) Cerebellum because it is primarily responsible for coordinating voluntary movements and maintaining balance.</p> <p>option a) Cerebrum: Incorrect, as it is mainly involved in higher cognitive functions like thinking, memory, and voluntary actions. option c) Medulla: Incorrect, as it controls involuntary functions like breathing and heart rate. option d) Hypothalamus: Incorrect, as it regulates homeostasis, emotions, and hormonal functions.</p> <p>Suggestive Measures Students should use diagrams and flowcharts to understand brain functions, engage in activities like labeling brain parts, and practice application-based questions for better conceptual clarity.</p> | 1 | | | | | | | | | | |
| 12 | <p>Match column I with column II and select the correct option using the given codes.</p> <table border="0" style="width: 100%;"> <tr> <td style="width: 50%;">Column I (Ways of Reproduction)</td> <td style="width: 50%;">Column II (Examples)</td> </tr> <tr> <td>A. Fragmentation</td> <td>i) Plasmodium</td> </tr> <tr> <td>B. Multiple Fission</td> <td>ii) Yeast</td> </tr> <tr> <td>C. Budding</td> <td>iii) Rhizopus</td> </tr> <tr> <td>D. Spore Formation</td> <td>iv) Spirogyra</td> </tr> </table> <p>a) A-(iv), B-(i), C-(iii), D-(ii) b) A-(iii), B-(i), C-(iv), D-(ii) c) A-(ii), B-(iii), C-(i), D-(iv) d) A-(iv), B-(i), C-(ii), D-(iii)</p> <p>Correct Response: d) A-(iv), B-(i), C-(ii), D-(iii) because:</p> <p>A. Fragmentation - Spirogyra (iv): Spirogyra reproduces by breaking into fragments, each growing into a new organism. B. Multiple Fission - Plasmodium (i): Plasmodium divides into multiple daughter cells simultaneously during unfavorable conditions. C. Budding - Yeast (ii): Yeast forms buds that detach to grow into new individuals. D. Spore Formation - Rhizopus (iii): Rhizopus produces spores in sporangia for reproduction.</p> <p>Suggestive Measures Encourage students to create charts showing organisms and their reproduction methods, conduct microscopic observations where possible, and practice matching questions to strengthen recall.</p> | Column I (Ways of Reproduction) | Column II (Examples) | A. Fragmentation | i) Plasmodium | B. Multiple Fission | ii) Yeast | C. Budding | iii) Rhizopus | D. Spore Formation | iv) Spirogyra | 1 |
| Column I (Ways of Reproduction) | Column II (Examples) | | | | | | | | | | | |
| A. Fragmentation | i) Plasmodium | | | | | | | | | | | |
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| C. Budding | iii) Rhizopus | | | | | | | | | | | |
| D. Spore Formation | iv) Spirogyra | | | | | | | | | | | |
| 13 | <p>The least distance of distinct vision for a young adult with normal vision is: a) 25 m b) 20 m c) 20 cm d) 25 cm</p> <p>Correct Response: d) 25 cm because the least distance of distinct vision for a young adult with normal vision is approximately 25 cm, the closest point where the eye can focus without strain.</p> <p>option a) 25 m: Incorrect, as this refers to a far distance, not the least distance of distinct vision. option b) 20 m: Incorrect, as this is also a far distance, beyond the normal near point of vision. option c) 20 cm: Incorrect, as it is closer than the standard least distance of distinct vision and may cause eye strain for normal vision.</p> <p>Suggestive Measures Encourage students to experiment by measuring their own near point of vision, use diagrams to understand eye focusing mechanisms, and practice numerical problems related to visual optics.</p> | 1 | | | | | | | | | | |

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| 14 | <p>During a classroom demonstration, a white beam of light passes through a glass prism, and the students observe a spectrum of colors. What principle explains this observation?</p> <p>a) Reflection b) Diffraction c) Refraction and dispersion d) Total internal reflection</p> <p>Correct Response:c) Refraction and dispersion because when white light passes through a prism, it bends (refraction) and splits into its constituent colors due to varying refractive indices for different wavelengths (dispersion).</p> <p>option a) Reflection: Incorrect, as reflection involves light bouncing off a surface, not splitting into colors. option b) Diffraction: Incorrect, as diffraction is the bending of light around obstacles, not the separation of colors. option d) Total internal reflection: Incorrect, as this occurs when light is completely reflected within a medium, not split into colors.</p> <p>Suggestive Measures Conduct hands-on prism experiments, use ray diagrams to explain refraction and dispersion, and relate the concept to natural phenomena like rainbows for better understanding.</p> | 1 |
| 15 | <p>In a typical food chain, what is the order of trophic levels starting from the sun?</p> <p>a) Producers → Primary consumers → Secondary consumers → Tertiary consumers b) Primary consumers → Producers → Tertiary consumers → Secondary consumers c) Tertiary consumers → Secondary consumers → Primary consumers → Producers d) Producers → Tertiary consumers → Secondary consumers → Primary consumers</p> <p>Correct Response: a) Producers → Primary consumers → Secondary consumers → Tertiary consumers because producers (plants) convert solar energy into food, primary consumers (herbivores) feed on producers, secondary consumers (carnivores) eat herbivores, and tertiary consumers (top predators) feed on secondary consumers.</p> <p>option b) Incorrect, as the sequence misplaces producers, which are the foundation of the food chain. option c) Incorrect, as it reverses the correct order, starting with tertiary consumers. option d) Incorrect, as it disrupts the natural hierarchy by placing tertiary consumers after producers.</p> <p>Suggestive Measures Students to be encouraged to draw food chain diagrams, analyze real-life ecosystems, and solve flowchart-based exercises to reinforce the concept of trophic levels.</p> | 1 |
| 16 | <p>Which of the following is an example of a biological magnification effect?</p> <p>a) Increased biodiversity in a habitat b) Elevated mercury levels in fish consumed by humans c) Decreased temperatures in a coastal region d) Increased carbon fixation by plants</p> <p>Correct Response:b) Elevated mercury levels in fish consumed by humans because biological magnification refers to the accumulation and increase in concentration of toxic substances like mercury as they move up the food chain.</p> <p>option a) Incorrect, as increased biodiversity reflects ecological richness, not toxic accumulation. option c) Incorrect, as decreased temperatures in a coastal region are unrelated to toxic buildup. option d) Incorrect, as increased carbon fixation by plants involves photosynthesis, not the transfer of toxins.</p> <p>Suggestive Measures Use case studies (e.g., mercury in fish), diagrammatically illustrate toxin accumulation across trophic levels, and encourage students to analyze environmental impacts of pollutants for better understanding.</p> | 1 |
| <p>Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:</p> <p>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.</p> | | |

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| 17 | <p>Assertion (A): Baking soda is used in fire extinguishers. Reason (R): Baking soda releases carbon dioxide when heated, which helps to smother flames.</p> <p>Correct Response: a) Both A and R are true, and R is the correct explanation of A because baking soda (sodium bicarbonate) decomposes upon heating to produce carbon dioxide, which displaces oxygen around the fire and helps extinguish it.</p> <p>option b) Incorrect, as the reason provided directly explains why baking soda is used in fire extinguishers. option c) Incorrect, as the reason (baking soda releasing CO₂) is true and supports the assertion. option d) Incorrect, as both the assertion and reason are true, making this option invalid.</p> <p>Suggestive Measures Students should perform small, supervised experiments to observe baking soda releasing CO₂, relate this concept to real-life scenarios, and use flowcharts to connect chemical reactions with practical applications.</p> | 1 |
| 18 | <p>Assertion (A): Traits such as eye color and height are examples of inherited traits. Reason (R): These traits are influenced solely by environmental factors.</p> <p>Correct Response: c) A is true but R is false because traits like eye color and height are inherited traits influenced by genetic factors, not solely by environmental factors.</p> <p>option a) Incorrect, as the reason is false and does not correctly explain the assertion. option b) Incorrect, as both the assertion and reason cannot be true simultaneously because the reason contradicts the definition of inherited traits. option d) Incorrect, as the assertion is true, and the reason is not.</p> <p>Suggestive Measures Encourage students to create charts distinguishing inherited and environmental traits, discuss examples from genetics, and use Punnett squares to visualize inheritance patterns for a clear understanding.</p> | 1 |
| 19 | <p>Assertion (A): Magnification of a lens has no unit. Reason (R): The ratio of height of the image to the height of the object is the magnification produced by the lens.</p> <p>Correct Response: a) Both A and R are true, and R is the correct explanation of A because magnification is a ratio of two similar quantities (heights of the image and object), making it dimensionless and hence unitless.</p> <p>option b) Incorrect, as the reason directly explains why magnification has no unit, making this explanation relevant. option c) Incorrect, as the reason is true and explains the assertion correctly. option d) Incorrect, as the assertion is true, and the reason supports it.</p> <p>Suggestive Measures Students should solve numerical problems involving magnification, practice drawing ray diagrams to understand image formation, and reinforce the concept with real-life examples like magnifying lenses.</p> | 1 |
| 20 | <p>Assertion (A): Human activities can significantly impact ecosystems. Reason (R): Activities such as deforestation and pollution can lead to habitat destruction and loss of biodiversity.</p> <p>Correct Response: a) Both A and R are true, and R is the correct explanation of A because human activities like deforestation and pollution directly lead to habitat destruction and biodiversity loss, significantly impacting ecosystems.</p> <p>option b) Incorrect, as the reason directly explains the assertion, making this option invalid. option c) Incorrect, as the reason is true and supports the assertion. option d) Incorrect, as the assertion is true, and the reason provides the correct explanation for it.</p> <p>Suggestive Measures Encourage students to study real-world examples of human impact on ecosystems, analyze case studies on conservation efforts, and use flowcharts to connect human activities to ecosystem changes for better comprehension.</p> | 1 |
| <p>Section B Question No. 21 to 26 are very short answer questions.</p> | | |

| 21 | <p>A student notices that some butter left out at room temperature develops an unpleasant odour over time. Explain the cause of this phenomenon.</p> <p>Answer The unpleasant odor in butter at room temperature is caused by rancidity, a process where fats and oils undergo oxidation, producing foul-smelling compounds. This occurs due to exposure to air, light, or microbes.</p> <p>Suggestive Measures The students should learn through practical experiments about rancidity, emphasize the importance of proper food storage, and use real-life examples to connect oxidation processes with everyday observations.</p> | 2 | | | | | | | | | | | | |
|-------|---|-----------|----------|-------|-------|---|-------------|---------|----------|---|----------|-----------|----------|-------|
| 22 | <p>Differentiate between Blood and Lymph in humans on the basis of the following points:</p> <table border="1" data-bbox="228 483 852 568"> <thead> <tr> <th>S. No</th> <th>Feature</th> <th>Blood</th> <th>Lymph</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Composition</td> <td>i).....</td> <td>ii).....</td> </tr> <tr> <td>2</td> <td>Function</td> <td>iii).....</td> <td>iv).....</td> </tr> </tbody> </table> <p>Answer 1. i) Blood is composed of red blood cells, white blood cells, platelets and a fluid called plasma. ii) Lymph composed of white blood cells, proteins, salts, glucose, fats, and water. 2. iii) connects all systems of the body and transports oxygen, nutrients, and wastes. iv) It transports antibodies and lymphocytes to the blood.(any other relevant point)</p> <p>Suggestive Measures Encourage students to create comparative tables, observe microscopic slides of blood and lymph, and connect functions to their physiological roles for better retention.</p> | S. No | Feature | Blood | Lymph | 1 | Composition | i)..... | ii)..... | 2 | Function | iii)..... | iv)..... | 0.5x4 |
| S. No | Feature | Blood | Lymph | | | | | | | | | | | |
| 1 | Composition | i)..... | ii)..... | | | | | | | | | | | |
| 2 | Function | iii)..... | iv)..... | | | | | | | | | | | |
| 23 | <p>Attempt either option A or B.</p> <p>A. How do stomata help in the process of photosynthesis and transpiration? Explain.</p> <p style="text-align: center;">OR</p> <p>B. Explain the role of chlorophyll in photosynthesis and List two other components necessary for photosynthesis.</p> <p>Answer A. Stomata are small pores on leaf surfaces that regulate gas exchange. During photosynthesis, they allow carbon dioxide to enter and oxygen to exit. In transpiration, they facilitate water vapor loss, helping in nutrient transport and cooling the plant.</p> <p>Suggestive Measures Use labeled diagrams of stomata, conduct experiments like observing stomata under a microscope, and explain their dual role in maintaining plant functions for clarity.</p> <p style="text-align: center;">OR</p> <p>B. Chlorophyll absorbs sunlight, converting light energy into chemical energy during photosynthesis. This energy drives the synthesis of glucose from carbon dioxide and water. Two other essential components are water (H₂O) and carbon dioxide (CO₂).</p> <p>Suggestive Measures Use diagrams to explain photosynthesis, conduct experiments like testing for starch in leaves, and relate concepts to plant life for practical understanding.</p> | 2 | | | | | | | | | | | | |
| 24 | <p>An object is placed at a distance of 30 cm in front of a convex mirror of focal length 15 cm. Write four characteristics of the image formed by the mirror.</p> <p>AnswerThe image formed by a convex mirror is:</p> <p>Virtual: It cannot be projected onto a screen. Erect: The image is upright relative to the object. Diminished: The image is smaller than the object. Located behind the mirror: It appears as if formed inside the mirror.</p> <p>Suggestive Measures Encourage students to practice ray diagram construction, use mirror equation calculations, and observe image formation with convex mirrors to solidify their understanding.</p> | 2 | | | | | | | | | | | | |

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| 25 | <p>Attempt either option I or II.</p> <p>(I) A bulb connected to a battery is rated for 80 W at 120 V. a) What is the resistance of the bulb? b) How much current does the bulb draw when it is connected to the battery?</p> <p style="text-align: center;">OR</p> <p>(II) A wire of resistance R carries a current I. a) Write the formula to calculate the heat produced in the wire after a time t. b) What effect would doubling the current have on the heat produced?</p> <p>Answer I. a) $R = V/P$, Thus $R = 120 \times 120/80 = 180$ ohm b) $I = P/V$ Thus $I = 80/120 = 0.67$ A</p> <p>Suggestive Measures Teach students to apply Ohm's law and power formulas through real-world problems and encourage practice with different ratings to strengthen their problem-solving skills.</p> <p style="text-align: center;">OR</p> <p>II. a) $H = I^2Rt$ where H is the heat, I is the current, R is the resistance and t is the time. b) Doubling the current will increase the heat produced by a factor of four, as heat is proportional to the square of the current.</p> <p>Suggestive Measures Encourage students to conduct experiments to observe the relationship between current, resistance, and heat, and practice solving problems using the formula $H = I^2Rt$.</p> | 2 |
| 26 | <p>In an ecosystem, the removal of herbivores is noted. a) How would this affect the producers in the ecosystem? b) What potential impact could this have on secondary consumers?</p> <p>Answer a) The removal of herbivores would lead to an increase in the producer population, as herbivores no longer consume plants, allowing them to grow and multiply and consequently may die due to competition for space and nutrients. b) Secondary consumers(carnivores) will starve and die in absence of herbivores, potentially disrupting food chain.</p> <p>Suggestive Measures Have students explore real-life case studies of ecosystem imbalances, and encourage them to diagram food webs to understand the interdependence of species.</p> | 2 |
| <p>Section C Question No. 27 to 33 are short answer questions.</p> | | |
| 27 | <p>During a class discussion on the properties of acids, a student mentions that acids can be classified based on their strength. a) What is the difference between a strong acid and a weak acid? b) Provide one example of each. c) What is the pH range of acids and bases.</p> <p>Answer a) A strong acid completely dissociates in water, releasing a large number of hydrogen ions (H^+), while a weak acid only partially dissociates. b) An example of a strong acid is hydrochloric acid (HCl), and a weak acid is acetic acid (CH_3COOH). c) The pH range of acids is from 0 to 7, while the pH range of bases is from 7 to 14.</p> <p>Suggestive Measures Encourage students to conduct pH tests using indicators, demonstrate dissociation with simple experiments, and emphasize the importance of understanding pH in daily life.</p> | 3 |

| 28 | <p>Attempt either option I or II.</p> <p>I. Compare the listed properties between Ionic & Covalent compounds and complete the following table.</p> <table border="0" style="width: 100%;"> <thead> <tr> <th style="text-align: left;">Properties</th> <th style="text-align: center;">Ionic Compounds</th> <th style="text-align: center;">Covalent compounds</th> </tr> </thead> <tbody> <tr> <td>a) Melting and Boiling point</td> <td style="text-align: center;">i).....</td> <td style="text-align: center;">iv).....</td> </tr> <tr> <td>b) Conduction of electricity</td> <td style="text-align: center;">ii).....</td> <td style="text-align: center;">v).....</td> </tr> <tr> <td>c) Physical Nature</td> <td style="text-align: center;">iii).....</td> <td style="text-align: center;">vi).....</td> </tr> </tbody> </table> <p style="text-align: center;">OR</p> <p>II. A metal 'D' combines with a non metal 'E' by the transfer of electrons to form a compound 'G'.</p> <p>(i) Identify the type of bond in compound 'G'.</p> <p>(ii) Will this compound dissolve in kerosene or petrol ?</p> <p>(iii) Comment on the melting point and boiling point of compound 'G'.</p> <p>Answer</p> <p>I. a) i) High melting and boiling point iv) Low melting and boiling point b) ii) Good conductors v) Bad conductors c) iii) Solid state vi) Exist in all three states- solid,liquid,gases</p> <p>Suggestive Measures Use models and diagrams to visualize the bonding, conduct experiments to demonstrate conductivity, and compare physical properties in real-world examples to enhance understanding.</p> <p style="text-align: center;">OR</p> <p>II. (i) Ionic Bond (ii) Insoluble nature (iii) It has high melting and boiling point.</p> <p>Suggestive Measures Encourage students to explore real-life ionic compound examples, conduct experiments on solubility, and compare the physical properties of ionic and covalent compounds.</p> | Properties | Ionic Compounds | Covalent compounds | a) Melting and Boiling point | i)..... | iv)..... | b) Conduction of electricity | ii)..... | v)..... | c) Physical Nature | iii)..... | vi)..... | 3 |
|------------------------------|--|--------------------|-----------------|--------------------|------------------------------|---------|----------|------------------------------|----------|---------|--------------------|-----------|----------|---|
| Properties | Ionic Compounds | Covalent compounds | | | | | | | | | | | | |
| a) Melting and Boiling point | i)..... | iv)..... | | | | | | | | | | | | |
| b) Conduction of electricity | ii)..... | v)..... | | | | | | | | | | | | |
| c) Physical Nature | iii)..... | vi)..... | | | | | | | | | | | | |
| 29 | <p>What are the three components of gastric juices present in the stomach for digestion of food. Write one function of each.</p> <p>Answer</p> <p>The three components of gastric juices and one function of each are: Hydrochloric Acid (HCl): It creates an acidic environment, helping in the activation of digestive enzymes and killing harmful microorganisms. Pepsin: It is an enzyme that breaks down proteins into smaller peptides. Mucus: It protects the stomach lining from the harsh effects of hydrochloric acid and digestive enzymes.</p> <p>Suggestive Measures Use diagrams of the digestive system, conduct simple experiments on enzyme activity and relate the functions of digestive components to real-life food digestion for better understanding.</p> | 3 | | | | | | | | | | | | |
| 30 | <p>(a) Write a difference between inherited and acquired traits giving one example of each. (b) Name the information source for protein synthesis in the cells.</p> <p>Answer</p> <p>a) Acquired traits are acquired by an organism during their lifetime which is not passed to the next generation whereas inherited traits are traits that can be controlled by genes and inherited to the next generation from parents. With correct example of each. b) DNA in the cell's nucleus provides the information needed for protein synthesis. It carries genetic instructions that are transcribed into mRNA, which then directs the assembly of proteins in the ribosomes.</p> <p>Suggestive Measures Use genetic diagrams to explain inheritance, illustrate protein synthesis processes through animations or models, and encourage hands-on activities like experiments to observe traits.</p> | 3 | | | | | | | | | | | | |
| 31 | <p>A person has difficulty with near vision tasks like reading or working on computer but can see objects at a distance clearly.</p> <p>(i) Name the defect and describe the type of corrective lens used in above defect. (ii) State two causes for such a defect.</p> <p>Answer</p> <p>(i) The defect is Hypermetropia or farsightedness, where a person can see distant objects clearly but struggles with near vision. The corrective lens used is a convex lens, which helps focus the image on the retina for nearby objects.</p> <p>(ii) Two causes for hypermetropia are: Focal length of eye lens is too long and Eyeball has become too small.</p> <p>Suggestive Measures Encourage students to explore real-life applications of corrective lenses, understand the role of the eye's anatomy, and conduct experiments to observe image formation with different lenses.</p> | 3 | | | | | | | | | | | | |

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| 32 | <p>(a) State Ohm's law. Write formula for the equivalent resistance R_s of the series & R_p parallel combination of three resistors of values R_1, R_2 and R_3.</p> <p>(b) Convert 1kWh into joule.</p> <p>Answer</p> <p>a) Ohm's law states that the voltage across a conductor is directly proportional to the current flowing through it, provided all physical conditions and temperatures remain constant.</p> <p>Series – $R_s = R_1 + R_2 + R_3$</p> <p>Parallel – $1/R_p = 1/R_1 + 1/R_2 + 1/R_3$</p> <p>b) Energy (kWh) = Power (kW) × time (h)</p> <p>1 kWh = 1,000 J/s × 3,600 s</p> <p>1 kWh = 3,600,000 J</p> <p>1 kWh = 3.6×10^6 J</p> <p>Suggestive Measures</p> <p>Conduct practical experiments on Ohm's law, compare series and parallel circuits using multimeters, and practice unit conversions to strengthen understanding.</p> | 3 |
| 33 | <p>(a) Name and state the rule to determine the direction of a magnetic field produced around a current carrying straight conductor.</p> <p>(b) Write one use of the strong magnetic field inside a current carrying solenoid.</p> <p>Answer</p> <p>(a) The Right-Hand Thumb Rule is used to determine the direction of the magnetic field around a current-carrying straight conductor. It states that if the right-hand thumb points in the direction of the current, the curled fingers show the direction of the magnetic field.</p> <p>(b) A strong magnetic field inside a current-carrying solenoid is used in electromagnets, which are applied in devices like electric motors, magnetic cranes, and MRI machines.</p> <p>Suggestive Measures</p> <p>Encourage hands-on experiments with solenoids and magnetic fields, use models to visualize the Right-Hand Thumb Rule, and relate applications to everyday technological devices.</p> | 3 |
| <p>Section D</p> <p>Question no. 34 to 36 are long answer type questions.</p> | | |

Attempt either option I or II.

I.(a) Write the structures of the following compounds :

(i) Propanoic acid

(ii) Benzene

(b) What is a homologous series of carbon compounds ?

Construct a homologous series of alkenes.

(c) What happens when ethanol heated in the presence of alkaline KMnO_4 ? Name the reaction and write its chemical equation.

OR

II. (a) Name the compound formed when ethanol is heated at 443 K in the presence of conc. H_2SO_4 and draw its electron dot structure. State the role of conc. H_2SO_4 in this reaction.

(b) A compound 'X' with a molecular formula of $\text{C}_2\text{H}_6\text{O}$ reacts with Na to give base 'Y' and a gas that burns with pop sound. Identify 'X' & 'Y'. Write the name of the functional group compound 'X' possesses. Write chemical equation for the reaction involved.

Answer

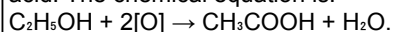
I. a) (i) Propanoic acid: The structure is $\text{CH}_3\text{CH}_2\text{COOH}$.

(ii) Benzene: The structure is a six-membered carbon ring with alternating single and double bonds: C_6H_6 .

b) A homologous series is a collection of compounds with the same general formula that differ only in the carbon chain length.

34 Homologous series of alkenes: Examples include ethene (C_2H_4), propene (C_3H_6), butene (C_4H_8), etc., where each successive compound differs by one $-\text{CH}_2$ group.

(c) When ethanol is heated in the presence of alkaline KMnO_4 , it undergoes oxidation to form acetic acid. The chemical equation is:



Suggestive Measures

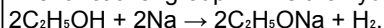
Use molecular models to demonstrate compound structures, explain functional groups through examples, and conduct experiments to observe oxidation reactions.

OR

II. (a) When ethanol is heated at 443 K in the presence of concentrated H_2SO_4 , ethyl ethanoate (an ester) is formed. The reaction is a dehydration reaction. The electron dot structure of ethyl ethanoate ($\text{CH}_3\text{COOCH}_2\text{CH}_3$) shows the bond between carbon, oxygen, and hydrogen atoms. The concentrated H_2SO_4 acts as a catalyst and also helps remove water molecules from the ethanol during the reaction.

b) X- Ethanol, Y- Sodium ethoxide

The functional group in X is the hydroxyl group ($-\text{OH}$). The reaction is:



Suggestive Measures

Encourage students to build models for ethanol and sodium ethoxide, illustrate reactions with functional groups, and practice balancing chemical equations.

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| 35 | <p>Attempt either option I or II.</p> <p>I. (i) What happens when :</p> <p>(a) Leaves of Bryophyllum fall on the soil ?</p> <p>(b) Hydra is cut into many pieces ?</p> <p>(c) Sporangia of bread mould on maturation liberate spores ? Mention the modes of reproduction in each of the above three cases.</p> <p>(ii) What happens with ovules and ovary after fertilisation in a flower?</p> <p style="text-align: center;">OR</p> <p>II. Write one function of the following parts in the human reproductive system :</p> <p>(i) Ovary</p> <p>(ii) Testes</p> <p>(iii) Fallopian tube</p> <p>(iv) Uterus</p> <p>(v) Vas deferens</p> <p>Answer</p> <p>I. i) a) When Bryophyllum leaf falls on the wet soil the buds that are produced in the notches along the leaf will develop into new plants by the process known as vegetative propagation.</p> <p>b) If the body of a Hydra gets cut into a number of pieces, then each body piece of the Hydra can grow into a complete Hydra. Mode- Regeneration</p> <p>c) When the sporangia of Rhizopus burst upon maturation, the spores spread out. So, with the help of different agents, the spores are transferred to various places and when they land on a particular surface, a new organism (mycelium) starts growing. Mode- Spore formation.</p> <p>ii) the ovules develop into the seed and the ovary develops into the fruit.</p> <p>Suggestive Measures</p> <p>Help students perform experiments on regeneration in Hydra and Bryophyllum, and use models to visualize fertilization and seed formation.</p> <p style="text-align: center;">OR</p> <p>II. i) Ovary- produce eggs for fertilisation and they produce the reproductive hormones, oestrogen and progesterone</p> <p>ii) Testes- sperm production and testosterone secretion.</p> <p>iii) Fallopian tube- to transport sperm towards the egg, which is released by the ovary.</p> <p>iv) Uterus- nurturing the fertilized ovum that develops into the fetus and holding it till the baby is mature enough for birth.</p> <p>v) Vas deferens- transports the mature sperm to the urethra.</p> <p>Suggestive Measures</p> <p>Use diagrams and models to illustrate the human reproductive system and engage students in group discussions to better understand the functions of each part.</p> | 5 |
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| 36 | <p>Attempt either option I or II.</p> <p>I. A. An electric heater has a rating of 1500 W; 220 V. Calculate:</p> <p>(i) The current required (ii) The resistance of its heating element (iii) Energy consumed by the heater in 3 hours.</p> <p>B. (i) Explain the use of an electric fuse in a electric circuit. (ii) Name any two electric devices based on heating effect of electric current.</p> <p style="text-align: center;">OR</p> <p>II. (a) Define resistance of a conductor. State the factors on which resistance of a conductor depends. (b) Name the device which is often used to change the resistance without changing the voltage source in an electric circuit. (c) Calculate the resistance of 50 cm length of wire of cross sectional area 0.01 square mm and of resistivity $5 \times 10^{-8} \Omega \text{ m}$.</p> <p>Answer I. A. Given: Power (P) = 1500 W, Voltage (V) = 220 V, Time (t) = 3 hours = 10800 seconds.</p> <p>(i) Current required (I): Using the formula $P = VI$, $I = P / V = 1500 / 220 = 6.82 \text{ A}$.</p> <p>(ii) Resistance of heating element (R): Using $P = V^2 / R$, $R = V^2 / P = (220)^2 / 1500 = 32.27 \Omega$.</p> <p>(iii) Energy consumed in 3 hours: Energy (E) = Power \times Time = 1500 W \times 3 hours = 4500 Wh = 4.5 kWh.</p> <p>Suggestive Measures Students should practice calculating current, resistance, and energy using formulas and solving real-life problems to enhance their understanding. B. i) Fuse is an electrical safety device that operates to provide overcurrent protection of an electrical circuit. Its essential component is a metal wire or strip that melts when too much current flows through it, thereby stopping or interrupting the current. ii) Electric heater, gyser, iron etc (any two)</p> <p style="text-align: center;">OR</p> <p>II .a) Resistance is defined as the property of a conductor to resist the flow of charges through it. It depends on: Length (L): Resistance increases with length. Cross-sectional area (A): Resistance decreases with the increase in area. Material: Different materials have different resistivities. Temperature: Resistance increases with temperature in most conductors. (b) A rheostat is a device used to change the resistance in a circuit without altering the voltage source.</p> <p>(c) Using the formula $R = \rho(L/A)$, $R = (5 \times 10^{-8} \Omega \cdot \text{m}) \times (0.50 \text{ m}) / (0.01 \times 10^{-6} \text{ m}^2) = 2.5 \Omega$.</p> <p>Suggestive Measures Students should practice using the formula for resistance and experiment with different materials to understand how resistance changes with various factors.</p> | 5 |
| <p>Section E Question no. 37 to 39 are source based/case based/data based questions. Internal choice is provided in one of these sub-parts.</p> | | |

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| 37 | <p>Salts play a very important role in our daily life. Sodium chloride which is known as common salt is used almost in every kitchen. Bleaching powder is also a salt used as an oxidising agent in many chemical industries. The family of salts is classified on the basis of cations and anions present in them.</p> <p>(a) Identify the acid and base from which sodium chloride is formed. (b) Find the cation and the anion present in Sodium hydroxide.</p> <p>Attempt either subpart (c) or (d). (c) Write one use of each Baking soda and Washing soda.</p> <p>OR (d) Define the term water of crystallisation. How many water of crystallisation present in Gypsum and Washing soda ?</p> <p>Answer a) Hydrochloric acid is the acid and Sodium Hydroxide is the base. b) The cation in sodium hydroxide (NaOH) is Na⁺ (sodium ion), and the anion is OH⁻ (hydroxide ion). c) Washing Soda is used as cleansing agent for domestic purposes and Baking soda is making baking powder/ soda acid fire extinguishers. (or any other correct use)</p> <p>OR d) The number of water molecules present in one formula unit of a salt is known as the water of crystallization. Water of crystallisation in Gypsum – 2 , Washing soda- 10</p> <p>Suggestive Measures Encourage students to perform experiments with salts to observe their properties and applications, and reinforce the concept of water of crystallization with real-life examples.</p> | 4 (1,1,2) |
| 38 | <p>Hormones are chemical informational molecules that are required in minute amounts and are directly poured into the blood stream. The animal hormones are secreted in the desired amounts by the endocrine glands. Each hormone is responsible for carrying out specific actions in the body. The deficiency or excess of hormones has a harmful effect on our body. Hence, the timing and the amount of hormones secreted by glands are controlled by the feedback mechanism.</p> <p>(a) Name the hormones secreted by ovary and testes. (b) Write the function of insulin.</p> <p>Attempt either subpart (c) or (d). (c) Write the name and function of a hormone secreted by- (i) Pituitary gland and (ii) Thyroid gland.</p> <p>OR (d) What is the meaning of feedback mechanism ?</p> <p>Answer b) The function of insulin hormone is to lower the blood sugar level. Insulin controls the metabolism of sugar. c) i) Pituitary gland makes: growth hormone — which regulates growth. ii) Thyroid gland : Thyroxine hormone -Regulates body metabolism.</p> <p>OR d) Feedback mechanism is a mechanism that tends to initiate (accelerate) or to inhibit (slow down) a process. Feedback mechanisms help regulate biochemical pathways.</p> <p>Suggestive Measures Emphasize the role of hormones in maintaining bodily functions and health, and encourage students to explore examples of hormonal imbalances in diseases.</p> | 4 (1,1,2) |

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| <p>39</p> | <p>Many optical instruments consist of a number of lenses. They are combined to increase the magnification and sharpness of the image. The net power (P) of the lenses placed in contact is given by the algebraic sum of the powers of the individual lenses P₁, P₂, P₃ :-</p> $P = P_1 + P_2 + P_3$ <p>This is also termed as the simple additive property of the power of lens, widely used to design lens systems of cameras, microscopes and telescopes. These lens systems can have a combination of convex lenses and also concave lenses.</p> <p>(a) What is the nature (convergent / divergent) of the combination of a convex lens of power 5 D and a concave lens of power 2 D ?</p> <p>(b) Calculate the focal length of a lens of power (-)2.5 D.</p> <p>Attempt either subpart (c) or (d).</p> <p>(c) Draw a ray diagram to show the nature and position of an image formed by a convex lens of power +0.1 D, when an object is placed at a distance of 20 cm from its optical centre.</p> <p>OR</p> <p>(d) How is a virtual image formed by a convex lens different from that formed by a concave lens ? Under what conditions do a convex and a concave lens form virtual images?</p> <p>Answer</p> <p>(a) The combination of a convex lens (power 5 D) and a concave lens (power -2 D) is divergent because the net power of the lenses is</p> $P = 5D + (-2)D = 3D$ <p>which is positive, meaning the combination will still have a converging effect. However, a divergent effect occurs due to the concave lens.</p> <p>(b) The focal length f of a lens is related to its power by</p> $P = 1/f$ <p>For</p> $P = -2.5D:$ $f = 1/P = 1/-2.5$ $= -0.4m = -40cm$ <p>So, the focal length of the lens is -40 cm.</p> <p>(c) The ray diagram for a convex lens with a power of +0.1 D and an object at 20 cm from its optical center will show that the image is formed at a distance greater than the focal length, indicating a real and inverted image. The image would be diminished in size because of the weak power of the lens.</p> <p>OR</p> <p>(d) A virtual image formed by a convex lens is produced when the object is placed within its focal length (closer than the focal point), and the rays diverge after passing through the lens, appearing to meet behind the lens. A concave lens always forms a virtual image because it diverges light rays, and the image appears to be behind the lens, regardless of the object's position.</p> <p>Suggestive Measures</p> <p>Focus on understanding how the power of a lens relates to its focal length, and practice ray diagrams to visualize image formation.</p> | <p>4 (1,1,2)</p> |
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