|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S. NO | MCQ | Instructions |  |  |
|  |  | What is the molecular structure of water? |  |  |
|  | Linear |  |  |
|  | Tetrahedral | YES |  |
|  | Octahedral |  |  |
|  | Hexagonal |  |  |
|  |  | What is the concept of water potential? |  |  |
|  | The pressure exerted by water against the cell wall |  |  |
|  | The concentration of water in a solution |  |  |
|  | The ability of water to dissolve solutes |  |  |
|  | The potential energy of water to move | YES |  |
|  |  | Which of the following methods is commonly used to determine soil water potential? |  |  |
|  | Tensiometer |  |  |
|  | Gravimetric method |  |  |
|  | Electrical resistance method |  |  |
|  |  All of the above | YES |  |
|  |  | What is the driving force behind osmosis? |  |  |
|  | Gravity |  |  |
|  | Pressure |  |  |
|  | Temperature |  |  |
|  | Concentration gradient | YES |  |
|  |  | What is the concept of field capacity (FC) in soil moisture? |  |  |
|  |  The maximum water-holding capacity of the soil |  |  |
|  |  The point at which all soil pores are filled with water |  |  |
|  | The amount of water remaining after gravitational drainage | YES |  |
|  | The water content at permanent wilting point |  |  |
|  |  | What is the function of root hairs in water absorption? |  |  |
|  | Nutrient uptake |  |  |
|  | Water storage |  |  |
|  | Anchoring the plant |  |  |
|  | Increasing surface area for absorption | YES |  |
|  |  | What is the main theory explaining water absorption in plants? |  |  |
|  | Cohesion-tension theory | YES |  |
|  | Pressure-flow hypothesis |  |  |
|  | Transpiration-pull theory |  |  |
|  | Osmosis-diffusion theory |  |  |
|  |  | What are aquaporins? |  |  |
|  | Plant hormones regulating water absorption |  |  |
|  | Specialized cells involved in root water uptake |  |  |
|  | Proteins facilitating water movement across membranes | YES |  |
|  | Root modifications for efficient water mining |  |  |
|  |  | What is the relevance of root architecture in water mining? |  |  |
|  | It influences the uptake of minerals from the soil |  |  |
|  | It affects the formation of mycorrhizal associations |  |  |
|  | It determines the rate of transpiration in plants |  |  |
|  | It influences the availability of water in the soil | YES |  |
|  |  | Which type of mycorrhizal association forms an extensive network of fungal hyphae outside the root cells? |  |  |
|  |  Endomycorrhizae |  |  |
|  |  Ectomycorrhizae | YES |  |
|  | Arbuscular mycorrhizae |  |  |
|  | Ericoid mycorrhizae |  |  |
|  |  | Which of the following factors regulates transpiration in plants? |  |  |
|  | Light intensity | YES |  |
|  | Soil pH |  |  |
|  | Root architecture |  |  |
|  | Leaf color |  |  |
|  |  | What is the concept of CCATD (Crop Coefficient for Actual Transpiration and Evaporation)? |  |  |
|  | The ratio of actual transpiration to potential transpiration | YES |  |
|  | The ratio of actual evaporation to potential evaporation |  |  |
|  | The ratio of transpiration in crops to transpiration in natural vegetation |  |  |
|  |  The ratio of evaporation in crops to evaporation in natural vegetation |  |  |
|  |  | Which of the following osmolytes plays a role in regulating guard cell turgidity? |  |  |
|  | Glucose |  |  |
|  | Sucrose |  |  |
|  | Potassium (K) | YES |  |
|  | Calcium (Ca) |  |  |
|  |  | What is the role of abscisic acid (ABA) in stomatal closure? |  |  |
|  | Promoting stomatal opening |  |  |
|  | Inhibiting stomatal opening |  |  |
|  | Promoting stomatal closure | YES |  |
|  | Inhibiting stomatal closure |  |  |
|  |  | What is the relevance of antitranspirants in agriculture?  |  |  |
|  | They increase crop yield  |  |  |
|  | They improve nutrient uptake  |  |  |
|  | They reduce water requirements  | YES |  |
|  | They enhance soil fertility |  |  |
|  |  | Passioura's yield model emphasizes which aspect of water use efficiency?  |  |  |
|  | Stomatal regulation  |  |  |
|  | Mesophyll activity  |  |  |
|  | Crop yield per unit of water transpired  | YES |  |
|  | Water distribution in soil |  |  |
|  |  | What is the role of mesophyll in regulating water use efficiency?  |  |  |
|  | It controls transpiration rates |  |  |
|  | It regulates leaf temperature |  |  |
|  | It facilitates carbon assimilation | YES |  |
|  | It supports water transport in plants |  |  |
|  |  | How is water use efficiency measured ? |  |  |
|  | Through stomatal conductance |  |  |
|  | Through leaf area index |  |  |
|  | Through carbon isotope discrimination | YES |  |
|  | Through soil moisture content |  |  |
|  |  | What does WUE stand for in the context of water productivity?  |  |  |
|  | Water Utilization Efficiency |  |  |
|  | Water Use Evaluation |  |  |
|  | Water Use Efficiency | YES |  |
|  | Water Yield Enhancement |  |  |
|  |  | Why is WUE relevant in the context of water productivity?  |  |  |
|  | It determines crop yield per unit of water used | YES |  |
|  | It measures the efficiency of water distribution systems |  |  |
|  | It assesses the quality of irrigation water |  |  |
|  | It quantifies the total water availability in an area |  |  |
|  |  | At the molecular level, what is one of the key responses of plants to moisture stress? |  |  |
|  |  Increased production of growth hormones |  |  |
|  | Enhanced synthesis of chlorophyll |  |  |
|  | Activation of stress-responsive genes | YES |  |
|  | Accelerated cell division |  |  |
|  |  | Which traits are associated with drought tolerance in plants? |  |  |
|  | Large leaf surface area |  |  |
|  | High transpiration rate |  |  |
|  |  Deep root system | YES |  |
|  |  Rapid growth rate |  |  |
|  |  | Which level of organization in plants is affected by moisture stress? |  |  |
|  | Molecular level |  |  |
|  | Organ level |  |  |
|  | Cellular level |  |  |
|  | All of the above | YES |  |
|  |  | Which of the following is a physiological response of plants to moisture stress? |  |  |
|  | Increased water uptake |  |  |
|  | Enhanced growth and development |  |  |
|  | Reduced photosynthesis | YES |  |
|  | Increased nutrient absorption |  |  |
|  |  | At the molecular level, how do plants respond to moisture stress? |  |  |
|  | Increased production of growth hormones |  |  |
|  | Enhanced synthesis of chlorophyll |  |  |
|  | Activation of stress-responsive genes | YES |  |
|  | Inhibition of root growth |  |  |
|  |  | What is the primary function of calcium (Ca) in plants? |  |  |
|  | Energy storage |  |  |
|  | Cell division and growth | YES |  |
|  | Nitrogen fixation |  |  |
|  | Photosynthetic pigment synthesis |  |  |
|  |  | Which of the following is NOT an essential nutrient for plants? |  |  |
|  | Nitrogen (N) |  |  |
|  | Phosphorus (P) |  |  |
|  | Iron (Fe) |  |  |
|  | Sodium (Na) | YES |  |
|  |  | Critical levels of nutrients refer to: |  |  |
|  | The minimum amount of nutrients required for plant growth |  |  |
|  | The maximum amount of nutrients plants can tolerate |  |  |
|  | The nutrient concentrations that provide optimal plant performance | YES |  |
|  | The nutrient levels that cause toxic effects in plants |  |  |
|  |  | What factors influence the availability of nutrients to plants? |  |  |
|  | Soil pH and temperature | YES |  |
|  | Rainfall and wind patterns |  |  |
|  | Plant age and height |  |  |
|  | Soil organic matter and clay content |  |  |
|  |  | Which of the following elements is considered beneficial for plant growth? |  |  |
|  | Carbon (C) |  |  |
|  | Hydrogen (H) |  |  |
|  | Calcium (Ca) |  |  |
|  | Nickel (Ni) | YES |  |
|  |  | Which of the following is responsible for the transport of minerals from roots to shoots in plants? |  |  |
|  | Xylem | YES |  |
|  | Phloem |  |  |
|  | Root hairs |  |  |
|  | Epidermis |  |  |
|  |  | Which of the following is involved in acquiring and transporting minerals under deficient levels? |  |  |
|  | Mycorrhiza |  |  |
|  | Root exudates |  |  |
|  | PGPRs |  |  |
|  | All of the above | YES |  |
|  |  | Which of the following releases organic compounds to enhance nutrient availability in the rhizosphere? |  |  |
|  | Mycorrhiza |  |  |
|  | Root exudates | YES |  |
|  | PGPRs |  |  |
|  | Nutrient transporters |  |  |
|  |  | Which component is responsible for the mobility of nutrients in the xylem and phloem? |  |  |
|  | Ion transporters |  |  |
|  | Root hairs |  |  |
|  | Translocation proteins |  |  |
|  | Vascular tissues | YES |  |
|  |  | What is the role of mycorrhiza in plant nutrient acquisition? |  |  |
|  | Production of root exudates |  |  |
|  | Enhancing nutrient uptake and transport | YES |  |
|  | Synthesis of ion transporters |  |  |
|  | Phloem mobility of nutrients |  |  |
|  |  | Which of the following is a factor that can affect the total uptake of minerals through foliar nutrition? |  |  |
|  | Soil pH |  |  |
|  | Root development |  |  |
|  | Leaf stomatal density | YES |  |
|  | Microbial activity |  |  |
|  |  | Wetting agents are used in foliar nutrition to: |  |  |
|  | Increase droplet size |  |  |
|  | Reduce nutrient absorption |  |  |
|  | Improve nutrient entry into leaves | YES |  |
|  | Prevent leaf stomatal closure |  |  |
|  |  | Which of the following factors can influence the effectiveness of foliar nutrition? |  |  |
|  | Soil fertility |  |  |
|  | Air temperature | YES |  |
|  | Water availability |  |  |
|  |  Root structure |  |  |
|  |  | Foliar nutrition is especially useful when: |  |  |
|  | Soil nutrients are abundant |  |  |
|  | Root development is impaired | YES |  |
|  | Water availability is high |  |  |
|  | Plants are in the vegetative stage |  |  |
|  |  | The primary mode of entry for nutrients in foliar nutrition is through: |  |  |
|  | Cuticles |  |  |
|  | Stomata | YES |  |
|  | Epidermal cells |  |  |
|  | Xylem vessels |  |  |