CUET-UG Agriculture Sample Paper-20

Duration: 1 Hour **Maximum Marks: 250**

Instructions

- This paper contains a total of 50 Multiple Choice Questions.
- Each correct answer carries **+5 marks**.
- Each incorrect answer carries **-1 mark**.
- No negative marking for unattempted questions.

Q1. In a backcross, the F_1 hybrid is crossed with:

(A) Any of its parents

(B) Only the dominant parent

(C) Only the recessive parent

(D) An unrelated individual

Q2. The distance between two genes on a chromosome is measured in units called 'centiMorgans' (cM), which are based on the frequency of:

(A) Mutation

(B) Recombination (Crossing over)

(C) Transcription

(D) Translation

Q3. Which enzyme is responsible for unwinding the DNA double helix during the process of replication?

(A) DNA Polymerase

(B) Ligase

(C) Helicase

(D) Primase

Q4. The term 'Heterosis' or 'Hybrid Vigour' refers to the superiority of the F_1 hybrid over:

(A) The better parent only

(B) The average of its parents

(C) The recessive parent only

(D) The environment

Q5. In tissue culture, which plant growth regulator is primarily added to the medium to induce 'Root' formation?

(A) Cytokinin

(B) Auxin

(C) Gibberellin

(D) Ethylene

Q6. Which breeding method is most suitable for developing a disease-resistant variety when the resistance gene is present in a low-yielding wild relative?

(A) Mass Selection

(B) Pedigree Method

(C) Backcross Method

(D) Pure Line Selection

Q7. Which of the following is a 'Disaccharide' composed of one molecule of Glucose and one molecule of Fructose?

(A) Maltose

(B) Lactose

(C) Sucrose

(D) Starch

Q8. The 'Lock and Key' hypothesis of enzyme action explains that:

(A) Enzymes are destroyed after the reaction

(B) The active site is flexible

(C) The active site has a specific shape complementary to the substrate

(D) One enzyme can catalyze all types of reactions

Q9. Which organelle in a bacterial cell serves as the primary site for protein synthesis?

(A) Mitochondria

(B) Mesosome

(C) Ribosome

(D) Nucleus

Q10. Free-living, aerobic nitrogen-fixing bacteria commonly found in neutral to alkaline soils are:

(A) Rhizobium

(B) Azotobacter

(C) Clostridium

(D) Nitrosomonas

Q11. The 'Mesosomes' in bacterial cells are invaginations of the plasma membrane that primarily function in:

(A) Photosynthesis

(B) Locomotion

(C) Cell wall formation and Respiration

(D) Protein storage

Q12. The 'Isobars' on a weather map are lines connecting points of equal:

(A) Temperature

(B) Rainfall

(C) Atmospheric Pressure

(D) Wind Speed

Q13. Short-range weather forecasting is generally valid for a period of:

(A) Up to 48 hours

(B) 1 month

(C) 6 months

(D) 1 year

Q14. Which Indian cattle breed is specifically known as the 'Lola' breed due to its very loose skin and is primarily found in the Montgomery district?

(A) Gir

(B) Sahiwal

(C) Red Sindhi

(D) Tharparkar

Q15. Among exotic cattle, which breed is recognized for having the longest lactation period and the highest milk yield per lactation?

(A) Brown Swiss

(B) Jersey

(C) Holstein Friesian

(D) Guernsey

Q16. The 'Karaknath' breed of poultry, famous for its black-colored meat (melanism), is native to which Indian state?

(A) Punjab

(B) Madhya Pradesh

(C) Tamil Nadu

(D) West Bengal

Q17. In dairy cattle management, 'Challenge Feeding' refers to the practice of:

(A) Feeding only dry fodder to reduce costs

(B) Feeding concentrated mix to a cow before calving to prepare her for high production

(C) Restricting feed during the peak lactation period

(D) Feeding only when the animal shows signs of illness

Q18. The 'Tail-to-Tail' system of housing is often preferred over the 'Head-to-Head' system because:

(A) It requires less space

(B) It is easier to clean and reduces the spread of respiratory diseases

(C) The animals can see each other's faces

(D) It is cheaper to construct

Q19. Which component of a balanced ration is essential for maintaining the rumen health and microbial fermentation in ruminants?

(A) Crude Protein

(B) Soluble sugars

(C) Crude Fibre (Roughage)

(D) Vitamins

Q20. The primary clinical symptom of Foot and Mouth Disease (FMD) that leads to a significant drop in milk production and weight loss is:

(A) High fever and vesicles (blisters) on the tongue and hooves

(B) Sudden death with blood oozing from natural orifices

(C) Continuous coughing and sneezing

(D) Paralysis of the hind limbs

Q21. Which of the following is a characteristic symptom of 'Coccidiosis' in poultry chicks?

(A) Twisting of the neck (Torticolis)

(B) Drooping wings and bloody diarrhea

(C) Swelling of the comb and wattles

(D) Respiratory gasping

Q22. The 'Rinderpest' disease, which caused massive livestock losses historically, was primarily transmitted through:

(A) Direct contact and contaminated feed/water

(B) Mosquito bites

(C) Fungal spores in the air

(D) Soil-borne bacteria

Q23. The 'Ranikhet' disease in poultry is caused by a virus belonging to which group?

(A) Poxvirus

(B) Paramyxovirus

(C) Herpesvirus

(D) Retrovirus

Q24. The 'Recto-vaginal' method is the most commonly used technique for which of the following operations in cattle?

(A) Milking

(B) Artificial Insemination

(C) Grooming

(D) Dehorning

Q25. The process of 'Homogenization' in milk processing is primarily done to:

(A) Kill all bacteria

(B) Increase the fat percentage

(C) Break down fat globules to prevent cream separation

(D) Remove sediment and dirt

Q26. Which of the following soil particles has the smallest diameter (less than 0.002 mm) and is responsible for high cation exchange capacity?

(A) Fine Sand

(B) Silt

(C) Clay

(D) Coarse Sand

Q27. The phenomenon of 'Phosphorus fixation' is most prevalent in soils belonging to which pH range?

(A) Neutral (pH 7.0)

(B) Highly Acidic (pH < 5.5)

(C) Slightly Alkaline (pH 7.5)

(D) Saline soils

Q28. Which fertilizer is known as 'Kisan Khad' and is chemically neutral in nature, making it safe for long-term use?

(A) Urea

(B) Calcium Ammonium Nitrate (CAN)

(C) Ammonium Sulphate

(D) Anhydrous Ammonia

Q29. A nutrient deficiency that causes 'Interveinal Chlorosis' in younger leaves, where the veins remain green while the rest of the leaf turns yellow, is typically:

(A) Nitrogen

(B) Phosphorus

(C) Iron

(D) Potassium

Q30. The 'Wilting Point' is defined as the soil moisture content at which:

(A) Plants can easily absorb water

(B) Gravitational water is maximum

(C) Plants can no longer extract water and suffer permanent damage

(D) The soil is completely saturated

Q31. Which irrigation method is best suited for undulating or hilly topography where leveling is not economically feasible?

(A) Basin irrigation

(B) Sprinkler irrigation

(C) Furrow irrigation

(D) Flood irrigation

Q32. The depth of water required by a crop during its entire stay in the field is technically referred to as:

(A) Delta

(B) Duty

(C) Base period

(D) Field capacity

Q33. What is a 'Non-selective' herbicide, meaning it kills all green plant tissue it comes into contact with, regardless of the species?

(A) 2,4-D

(B) Isoproturon

(C) Glyphosate

(D) Atrazine

Q34. The use of 'Bio-herbicides' like *Collego* or *Devine* represents which component of Integrated Weed Management?

(A) Chemical Control

(B) Cultural Control

(C) Biological Control

(D) Mechanical Control

Q35. The 'SRI' (System of Rice Intensification) technique is primarily known for:

(A) Continuous flooding of fields

(B) High seed rate and close spacing

(C) Reducing water use and transplanting young single seedlings

(D) Using heavy doses of chemical fertilizers

Q36. In Sugarcane, the removal of lower dry and senescent leaves to improve aeration and reduce pest incidence is known as:

(A) Propping

(B) Detrashment

(C) Topping

(D) Nipper

Q37. Which physiological disorder in Wheat is caused by the deficiency of Boron, leading to poor grain setting?

(A) Tip burn

(B) Sterility

(C) Dead heart

(D) Yellowing

Q38. Among millets, which crop is highly drought-tolerant and often referred to as the 'Camel of the Desert'?

(A) Bajra (Pearl Millet)

(B) Jowar (Sorghum)

(C) Foxtail Millet

(D) Barnyard Millet

Q39. The use of 'Green Manuring' and 'Crop Rotation' are fundamental practices in Organic Farming primarily to:

(A) Maximize use of synthetic hormones

(B) Maintain soil fertility and break pest cycles

(C) Increase the reliance on heavy machinery

(D) Eradicate all insects from the field

Q40. In Precision Agriculture, the 'Normalized Difference Vegetation Index' (NDVI) is used to monitor:

(A) Soil moisture at 1-meter depth

(B) Crop health and biomass using spectral reflectance

(C) The exact price of crops in the market

(D) The concentration of pesticide in groundwater

Q41. According to the principles of Natural Farming, 'Bijamruta' is a treatment used for:

(A) Inducing flowering in fruit trees

(B) Coating and protecting seeds from soil-borne diseases

(C) Increasing the shelf life of harvested vegetables

(D) Controlling weeds in the fallow period

Q42. The 'Spongy Tissue' disorder, which significantly reduces the export value of Alphonso mangoes, is caused by:

(A) Viral infection

(B) High heat desiccation and convective heat from soil

(C) Nutrient toxicity

(D) Heavy rainfall during ripening

Q43. 'Degreening' is a process performed in Citrus fruits using ethylene gas primarily to:

(A) Increase the sourness of the fruit

(B) Remove the green chlorophyll pigment from the peel

(C) Increase the size of the fruit

(D) Toughen the skin for long-distance transport

Q44. Which physiological disorder in Tomato is characterized by water-soaked spots at the blossom end, usually caused by Calcium deficiency?

(A) Fruit Cracking

(B) Blossom End Rot (BER)

(C) Catface

(D) Sunscald

Q45. The 'Potato Tuber Moth' (PTM) is a major pest that attacks potato plants in:

(A) Only the standing field crop

(B) Only the storage (Godowns)

(C) Both the field and the storage

(D) Only during the nursery stage

Q46. In 'Tongue Grafting', a notch or 'tongue' is made on both the scion and rootstock to:

(A) Increase the surface area for better cambial contact

(B) Allow air to circulate within the joint

(C) Prevent the flow of sap

(D) Make the plant grow taller

Q47. Which propagation method involves bending a branch to the ground and covering it with soil while it is still attached to the parent plant?

(A) Shield Budding

(B) Simple Layering

(C) Softwood Cuttings

(D) Inarching

Q48. Pectin is a crucial ingredient for the setting of Jellies. Which fruit is naturally the richest source of pectin?

(A) Guava

(B) Banana

(C) Pineapple

(D) Grapes

Q49. What is the primary chemical preservative used in the commercial production of Tomato Ketchup to prevent microbial spoilage?

(A) Potassium Metabisulphite (KMS)

(B) Sodium Benzoate

(C) Citric Acid

(D) Acetic Acid (Vinegar) only

Q50. The phenomenon of 'Syneresis' or 'Weeping of Jelly' occurs due to:

(A) Excess of sugar

(B) Excess of acid or lack of pectin

(C) Under-cooking the product

(D) Using over-ripe fruits

Detailed Solutions

Q1.

Solution

Concept: Backcrossing is a plant breeding method used to transfer a specific gene or trait from one parent into another desirable genetic background by repeatedly crossing the hybrid with one of its parents.

Solution: In a backcross, the F_1 hybrid is crossed with either of its parents, depending on the breeding objective. The main purpose is usually to transfer a specific trait from one parent into the genetic background of the other parent while maintaining most of its desirable characteristics. If the trait of interest comes from the recessive parent, repeated backcrossing with the dominant parent helps recover the desired genotype. Conversely, if improvement is needed in the recessive line, it may also be used. Therefore, backcross involves crossing the F_1 with any of its parents.

Final Answer: Any of its parents

Answer: (A)

Q2.

Solution

Concept: Genetic linkage and recombination are fundamental principles in genetics used to map genes on chromosomes and understand inheritance patterns.

Solution: The distance between two genes on a chromosome is measured in centiMorgans (cM), which is based on the frequency of recombination (crossing over) between them during meiosis. One centiMorgan represents a 1% recombination frequency. Higher recombination frequency indicates that genes are farther apart, while lower frequency suggests closer linkage. Mutation, transcription, and translation are unrelated to gene mapping distances. Therefore, recombination is the correct basis.

Final Answer: Recombination (Crossing over)

Answer: (B)

Q3.

Solution

Concept: DNA replication is a highly coordinated enzymatic process involving multiple enzymes, each performing a specific role to ensure accurate duplication of genetic material.

Solution: Helicase is the enzyme responsible for unwinding the DNA double helix during replication by breaking hydrogen bonds between complementary base pairs. This separation creates replication forks where DNA synthesis occurs. DNA polymerase adds nucleotides to the growing strand, ligase joins DNA fragments (Okazaki fragments), and primase synthesizes RNA primers. Therefore, helicase is the correct enzyme for unwinding DNA.

Final Answer: Helicase

Answer: (C)

Q4.

Solution

Concept: Heterosis or hybrid vigor is an important concept in plant and animal breeding, describing the phenomenon where hybrid offspring show superior traits compared to their parents.
Solution: Heterosis refers to the superiority of the F_1 hybrid over the average performance of its parents. This improved performance may be in terms of yield, growth rate, fertility, disease resistance, or overall vigor. It is widely exploited in crop improvement programs to enhance productivity. The comparison is not limited to the better or recessive parent alone, but rather to the mean performance of both parents. Therefore, heterosis is defined relative to the parental average.
Final Answer: The average of its parents

Answer: (B)

Q5.

Solution

Concept: Plant tissue culture involves the use of specific plant growth regulators to control differentiation and organ formation in in vitro conditions. Auxins and cytokinins regulate root and shoot development. Auxins generally promote root initiation by stimulating cell elongation and differentiation at the base of explants. The balance between auxin and cytokinin determines morphogenesis. Higher auxin concentration relative to cytokinin favors root formation, while the reverse promotes shoot formation in cultured plant tissues.
Solution: In plant tissue culture, morphogenesis is highly dependent on the type and concentration of growth regulators added to the nutrient medium. Auxins such as IAA, IBA, and NAA play a crucial role in inducing root initiation. They activate genes responsible for cell division and elongation at the basal region of the explant. When auxin concentration is relatively higher than cytokinin, root primordia develop efficiently. Cytokinins, in contrast, promote shoot formation. Gibberellins mainly regulate stem elongation, while ethylene is involved in senescence and stress responses. Therefore, for root induction, auxin is the most effective regulator in tissue culture systems, ensuring proper differentiation and establishment of root structures.
Final Answer: Auxin

Answer: (B)

Q6.

Solution

Concept: Plant breeding methods are used to transfer desirable traits such as disease resistance from one plant to another. When a resistance gene is present in a wild but low-yielding relative, breeders aim to transfer only the useful gene into an elite high-yielding variety. Backcross breeding is a method where the hybrid is repeatedly crossed with the superior parent to recover its genetic background while retaining the desired trait.

Solution: When disease resistance is found in a wild relative with poor agronomic traits, the main objective is to transfer only the resistance gene into a high-yielding cultivar. Backcross breeding is most suitable for this purpose. In this method, the hybrid offspring obtained from crossing donor and recurrent parent is repeatedly crossed back with the recurrent high-yielding parent. This helps retain most of the elite parent's genome while introducing the resistance gene from the wild donor. Other methods like mass selection and pure line selection do not allow precise gene transfer, while pedigree method is more suitable for combining multiple traits. Hence, backcrossing ensures targeted improvement without compromising yield.

Final Answer: Backcross Method

Answer: (C)

Q7.

Solution

Concept: Carbohydrates are classified based on the number of sugar units they contain. Monosaccharides are single units, disaccharides contain two monosaccharide units, and polysaccharides contain many units. Disaccharides are formed through glycosidic linkage between monosaccharides. Common examples include maltose, lactose, and sucrose. Sucrose is a non-reducing sugar composed of glucose and fructose, widely found in plants and commonly known as table sugar.

Solution: Disaccharides are carbohydrates formed when two monosaccharide molecules join through a glycosidic bond. Sucrose is specifically formed by the condensation of one glucose molecule and one fructose molecule. It is a non-reducing sugar because both anomeric carbons are involved in bond formation. Maltose consists of two glucose units, lactose is made of glucose and galactose, while starch is a polysaccharide composed of many glucose units. Sucrose is the most common transport sugar in plants and is widely used as table sugar in daily life. Therefore, the correct identification of glucose-fructose disaccharide is sucrose.

Final Answer: Sucrose

Answer: (C)

Q8.

Solution

Concept: Enzymes are biological catalysts that work on specific substrates through highly specific active sites. The lock and key model explains enzyme specificity by stating that the active site of an enzyme has a fixed shape complementary to its substrate. This model was proposed by Emil Fischer and emphasizes structural complementarity. It explains how enzymes form enzyme-substrate complexes without altering their structure permanently during the reaction.

Solution: The lock and key hypothesis describes enzyme specificity based on structural compatibility. According to this model, each enzyme has an active site with a unique, rigid shape that exactly fits a specific substrate, similar to how a key fits into a lock. This ensures high specificity in biochemical reactions. The substrate binds to the active site forming an enzyme-substrate complex, which then undergoes conversion into products. After the reaction, the enzyme remains unchanged and can be reused. Other options are incorrect because enzymes are not destroyed during reactions, the active site flexibility is explained by the induced fit model, and enzymes are not universal catalysts. Thus, specificity is the key principle.

Final Answer: The active site has a specific shape complementary to the substrate

Answer: (C)

Q9.

Solution

Concept: Prokaryotic cells such as bacteria lack membrane-bound organelles like nucleus and mitochondria. Protein synthesis in all living cells occurs on ribosomes, which are composed of rRNA and proteins. In bacteria, ribosomes are freely present in the cytoplasm and are responsible for translating mRNA into proteins. Mesosomes are membrane infoldings involved in respiration and DNA replication, but not protein synthesis.

Solution: In bacterial cells, which are prokaryotic in nature, there is no true nucleus or membrane-bound organelles such as mitochondria. Protein synthesis occurs on ribosomes, which are small spherical structures present freely in the cytoplasm. These ribosomes read messenger RNA and assemble amino acids into polypeptide chains. Mesosomes are only associated with cellular respiration and division processes, while mitochondria and nucleus are absent in bacteria. Therefore, ribosomes serve as the primary site of protein synthesis in bacterial cells, ensuring proper translation of genetic information into functional proteins necessary for survival and growth.

Final Answer: Ribosome

Answer: (C)

Q10.

Solution

Concept: Biological nitrogen fixation is carried out by certain microorganisms that convert atmospheric nitrogen into usable forms like ammonia. Free-living nitrogen-fixing bacteria can exist independently in soil. Some are aerobic, requiring oxygen, while others are anaerobic. Azotobacter is a well-known free-living aerobic nitrogen-fixing bacterium found in neutral to alkaline soils, playing an important role in soil fertility and nitrogen enrichment.

Solution: Nitrogen fixation is the biological process of converting atmospheric nitrogen into ammonia, which plants can utilize. Among free-living bacteria, Azotobacter is an aerobic nitrogen-fixing organism commonly found in neutral to alkaline soils. It requires oxygen for its metabolic activities and contributes significantly to soil fertility by enriching nitrogen content. Rhizobium is symbiotic and lives in root nodules of legumes, Clostridium is anaerobic, and Nitrosomonas is involved in nitrification rather than nitrogen fixation. Therefore, Azotobacter is the correct example of a free-living aerobic nitrogen fixer in soil ecosystems.

Final Answer: (zotobacter

Answer: (B)

Q11.

Solution

Concept: Mesosomes are membrane-bound structures found in bacterial cells that result from the invagination of the plasma membrane. They are often associated with processes like cell division, respiration, and cell wall synthesis. Their presence is debated, and though they were once thought to be involved in photosynthesis, modern research suggests they might play a role in cellular respiration and the formation of the cell wall by increasing the surface area of the plasma membrane.

Solution: Mesosomes were once considered essential for photosynthesis in prokaryotic cells, but the most widely accepted function now involves their participation in cellular processes such as respiration and cell wall formation. In bacteria, the plasma membrane's invaginations, forming mesosomes, increase surface area and likely assist in respiration by housing the electron transport chain. They may also be involved in processes such as DNA replication and segregation during cell division. Therefore, mesosomes facilitate functions necessary for the bacterial cell's growth and survival, especially respiration and the maintenance of the cell wall, which are critical for cell structure and energy production.

Final Answer: Cell wall formation and Respiration

Answer: (C)

Q12.

Solution

Concept: Isobars are lines on a weather map that connect points of equal atmospheric pressure. These lines help meteorologists analyze and predict weather patterns. By observing the spacing and direction of isobars, one can infer the intensity and movement of weather systems, such as high and low-pressure areas, and even forecast wind speed and direction.

Solution: Isobars represent equal pressure, and their patterns on a weather map can show the structure of pressure systems in a region. When isobars are close together, they indicate strong pressure gradients, which lead to strong winds. When they are spaced farther apart, the wind tends to be light. The direction of the wind is always perpendicular to the isobars and blows from high-pressure areas towards low-pressure areas. By monitoring these lines, meteorologists can predict upcoming weather, including storms, calm conditions, and other weather-related phenomena.

Final Answer: Atmospheric Pressure

Answer: (C)

Q13.

Solution

Concept: Short-range weather forecasting typically refers to predictions that are valid for a short period, usually up to a few days. This type of forecasting is based on immediate atmospheric data and models that can provide accurate predictions for the next 24-48 hours.

Solution: Short-range weather forecasts focus on conditions within the next 48 hours. These forecasts rely heavily on the latest satellite imagery, weather stations, and atmospheric models to predict temperature, precipitation, cloud cover, and wind patterns. The accuracy of these forecasts is relatively high, as they are based on current weather data and short-term atmospheric trends. Meteorologists use advanced computing systems to simulate weather conditions and refine predictions within this short period. The most common weather information covered includes temperature, precipitation, and severe weather warnings, making it a crucial tool for everyday planning.

Final Answer: Up to 48 hours

Answer: (A)

Q14.

Solution

Concept: The Lola breed is a specific type of Indian cattle known for its loose skin, which is often found in the Montgomery district. This breed is known for its adaptability to the harsh climate and is an important part of the livestock economy in this region.

Solution: The Lola breed of cattle, also known for its distinctive loose skin, is primarily found in the Montgomery district of India. This breed is valued for its ability to withstand high temperatures and rough conditions. It is particularly suited to the semi-arid climate of the region. The skin of the Lola breed is one of its most notable features, providing a cooling effect during hot weather. While the breed is not as well known as some of India's larger dairy breeds, it still plays an important role in local farming practices, especially in terms of milk and meat production. The breed's resistance to heat stress makes it an important genetic resource in areas where other breeds might struggle.

Final Answer: Gir

Answer: (A)

Q15.

Solution

Concept: Exotic cattle breeds are often sought after for their high milk yield and long lactation periods. Among these, some breeds are particularly recognized for their impressive productivity, particularly in commercial dairy farming.

Solution: Among exotic cattle, the Holstein Friesian is particularly renowned for having the longest lactation period and the highest milk yield per lactation. This breed is widely used in dairy farming worldwide due to its exceptional milk production capabilities. The Holstein Friesian's ability to maintain a long lactation period helps optimize milk production efficiency over the course of the cow's reproductive cycle. These cows are also known for their large size and good feeding efficiency, making them ideal for large-scale commercial dairy farms. While other breeds like Brown Swiss and Jersey also produce substantial milk, the Holstein Friesian remains the top choice for maximum yield per lactation.

Final Answer: Holstein Friesian

Answer: (C)

Q16.

Solution

Concept: The Karaknath breed of poultry is a unique breed native to India, known for its black-colored meat due to a condition called melanism. It is native to Madhya Pradesh and is valued for both its distinctive appearance and its high-quality meat.

Solution: The Karaknath breed of poultry, native to Madhya Pradesh, is famous for its black-colored meat. The condition responsible for this unique color is melanism, which results in a higher level of pigmentation in the bird's tissues. This breed is highly prized for its meat, which is considered to have a special flavor and is thought to have medicinal properties in traditional Indian medicine. The birds are also known for being hardy and well-adapted to the rural farming systems of Madhya Pradesh. Their meat is considered a delicacy, and the breed is often raised for local consumption and trade. The Karaknath's distinctive color and flavor make it stand out among other poultry breeds in India.

Final Answer: Madhya Pradesh

Answer: (B)

Q17.

Solution

Concept: Challenge feeding is a management practice in dairy cattle farming where concentrated feed is provided to cows before calving. This practice is designed to help the cows prepare for the higher nutritional demands that will come with milk production after calving.

Solution: In dairy cattle management, 'Challenge Feeding' refers to the practice of feeding concentrated feed to cows before calving to prepare them for high milk production during lactation. The concentrated feed boosts the cow's nutritional intake and prepares the digestive system to handle the increased energy and protein requirements during lactation. By feeding the cow a higher energy diet, it helps prevent health problems like ketosis and ensures that the cow has the proper nutrients to produce high-quality milk. This practice is particularly important in high-producing dairy breeds, as they have a higher energy demand during lactation.

Final Answer: Feeding concentrated mix to cows before calving boosts production

Answer: (B)

Q18.

Solution

Concept: The 'Tail-to-Tail' system of housing in dairy cattle management is a common system that is favored over the 'Head-to-Head' system for several reasons, including better hygiene and reduced disease transmission.

Solution: The 'Tail-to-Tail' system of housing for dairy cattle is preferred because it allows for better airflow, reduces the spread of respiratory diseases, and makes cleaning easier. In this system, cows are housed with their tails facing each other, which minimizes the chances of direct contact between the animals' heads and reduces the transmission of diseases that spread through nasal secretions, such as bovine respiratory disease. Additionally, the tail-to-tail system provides more space for the animals and helps to reduce stress, as cows are less likely to engage in confrontational behavior. The system also facilitates easier cleaning, as manure and waste are directed away from the animals' faces.

Final Answer: It is easier to clean and reduces the spread of respiratory diseases

Answer: (B)

Q19.

Solution

Concept: In ruminants, a balanced ration must support rumen microbial activity for proper digestion and nutrient absorption. Roughage or crude fibre is essential because it stimulates chewing, saliva production, and maintains rumen pH. This environment supports microbial fermentation, which helps in breaking down cellulose and producing volatile fatty acids, the main energy source for ruminants. Without sufficient fibre, rumen function becomes unstable leading to digestive disorders.

Solution: Crude fibre, commonly known as roughage, plays a crucial role in maintaining rumen health in cattle, buffalo, and other ruminants. It provides the necessary bulk that stimulates rumination or cud chewing, which increases saliva secretion. Saliva acts as a natural buffer that helps maintain optimal rumen pH, preventing acidosis. The rumen contains billions of microorganisms that ferment fibrous feed materials and convert them into volatile fatty acids, which are the primary energy source for the animal. If fibre is deficient, microbial activity decreases, digestion becomes inefficient, and metabolic disorders may occur. Therefore, inclusion of adequate roughage ensures proper fermentation, improves feed utilization, and maintains overall digestive health and productivity in ruminants.

Final Answer: Crude Fibre (Roughage)

Answer: (C)

Q20.

Solution

Concept: Foot and Mouth Disease (FMD) is a highly contagious viral disease of livestock characterized by fever and vesicular lesions. It mainly affects cloven-hoofed animals and leads to severe economic losses due to reduced milk yield, weight loss, and decreased productivity. The disease spreads rapidly through direct contact and contaminated materials.

Solution: The primary clinical symptoms of Foot and Mouth Disease include sudden onset of high fever followed by the appearance of vesicles or blisters on the tongue, mouth, teats, and hooves. These painful lesions cause excessive salivation, lameness, and difficulty in feeding, resulting in a sharp decline in milk production and significant weight loss. The affected animals become weak and less productive due to reduced feed intake. FMD spreads rapidly among livestock, making early detection and vaccination essential for control. The presence of vesicular lesions is the most characteristic and diagnostic feature of the disease, distinguishing it from other infections affecting cattle and buffalo.

Final Answer: High fever and vesicles (blisters) on the tongue and hooves

Answer: (A)

Q21.

Solution

Concept: Coccidiosis is a protozoan parasitic disease in poultry, especially affecting young chicks. It damages the intestinal lining, leading to poor nutrient absorption. The disease is commonly associated with poor hygiene and overcrowded conditions, and its symptoms are mainly digestive in nature, including diarrhea and weakness.

Solution: Coccidiosis in poultry chicks is caused by Eimeria species, which infect the intestinal tract and cause severe damage to the gut lining. The most common symptoms include drooping wings, weakness, loss of appetite, and bloody diarrhea due to intestinal bleeding. This leads to dehydration, poor growth, and high mortality if not treated promptly. The disease spreads rapidly in contaminated litter and is more severe in young birds with weak immunity. Prevention includes maintaining proper sanitation, using anticoccidial drugs, and ensuring clean drinking water. Among the given options, bloody diarrhea with drooping wings is the most characteristic clinical sign of coccidiosis in chicks.

Final Answer: Drooping wings and bloody diarrhea

Answer: (B)

Q22.

Solution

Concept: Rinderpest was a highly fatal viral disease of cattle transmitted mainly through direct contact and contaminated materials. It spread rapidly among livestock populations and caused severe outbreaks historically. The virus primarily infected susceptible animals through oral and nasal routes via contaminated feed, water, and secretions.

Solution: Rinderpest, also known as cattle plague, was historically one of the most devastating diseases affecting livestock. The disease spread mainly through direct contact between infected and healthy animals, as well as through contaminated feed and water sources. The virus was present in bodily secretions such as saliva, nasal discharge, and feces, which facilitated rapid transmission in herds. Unlike vector-borne or soil-borne diseases, rinderpest did not require insects or environmental spores for spread. Its rapid transmission led to massive livestock losses until it was globally eradicated. Proper isolation, sanitation, and control measures played a key role in limiting outbreaks before eradication.

Final Answer: Direct contact and contaminated feed/water

Answer: (A)

Q23.

Solution

Concept: Ranikhet disease, also known as Newcastle disease, is a highly contagious viral infection in poultry. It is caused by a virus belonging to the Paramyxoviridae family. The disease affects the respiratory, nervous, and digestive systems, leading to high mortality in infected flocks.

Solution: Ranikhet disease is a severe viral disease of poultry caused by the Newcastle disease virus, which belongs to the Paramyxovirus group. It spreads rapidly through direct contact, contaminated feed, water, and droppings. The disease affects multiple body systems, including respiratory distress, nervous signs such as twisting of the neck, and digestive disturbances. Vaccination is the most effective preventive measure. The virus is highly contagious and can cause heavy economic losses in poultry farming due to high mortality rates and reduced productivity. Among the given options, Paramyxovirus is the correct viral group responsible for Ranikhet disease.

Final Answer: Paramyxovirus

Answer: (B)

Q24.

Solution

Concept: The recto-vaginal method is a widely used reproductive technique in cattle management, especially for artificial insemination. It involves manual rectal palpation to guide reproductive organs while insemination is performed in the reproductive tract. This method ensures accurate placement of semen and improves conception rates.

Solution: The recto-vaginal method is primarily used in cattle for artificial insemination. In this technique, the veterinarian or technician inserts a hand into the rectum to locate and control the reproductive tract while simultaneously inserting the insemination device into the vagina. This allows accurate deposition of semen directly into the cervix or uterus, increasing the chances of successful fertilization. The method is widely adopted due to its precision, efficiency, and improved conception rates compared to natural mating. It also helps in reproductive examination of the animal at the same time, making it an essential practice in modern dairy management systems.

Final Answer: Artificial Insemination

Answer: (B)

Q25.

Solution

Concept: Homogenization is a physical process used in milk processing to improve stability and texture. It involves breaking large fat globules into smaller ones so that they remain evenly distributed in milk. This prevents cream separation and improves the quality and appearance of milk.

Solution: Homogenization is an important dairy processing technique used to prevent the separation of cream from milk. During this process, milk is forced through narrow openings under high pressure, breaking large fat globules into much smaller droplets. These smaller fat particles remain evenly dispersed throughout the milk, giving it a uniform texture and appearance. This improves the stability, taste, and shelf life of milk products. Homogenized milk does not form a cream layer on top, making it more acceptable for commercial use. It does not kill bacteria or increase fat content but solely modifies fat distribution for better quality.

Final Answer: Break down fat globules to prevent cream separation

Answer: (C)

Q26.

Solution

Concept: Soil is composed of sand, silt, and clay particles. Among these, clay has the smallest particle size and the highest surface area, which allows it to hold nutrients effectively. This property is known as cation exchange capacity (CEC), which is highest in clay due to its negative charge and fine texture. It plays a crucial role in soil fertility, water retention, and nutrient availability for plant growth.

Solution: Clay particles are the smallest among all soil fractions, with a diameter less than 0.002 mm. Because of their extremely fine size and large surface area, clay particles carry a high negative charge on their surface. This enables them to attract and hold positively charged nutrient ions such as calcium, potassium, and magnesium, a property known as cation exchange capacity (CEC). High CEC makes clay soils more fertile as they can retain nutrients and release them gradually to plants. In contrast, sand particles are large and have very low nutrient-holding capacity. Therefore, clay is the most important soil fraction for nutrient retention and soil fertility management.

Final Answer: Clay

Answer: (C)

Q27.

Solution

Concept: Phosphorus fixation in soil refers to the conversion of available phosphorus into insoluble forms, making it unavailable to plants. This process is highly influenced by soil pH, especially in acidic and alkaline conditions where phosphorus reacts with iron, aluminum, or calcium compounds, reducing its availability for plant uptake.

Solution: Phosphorus fixation is most severe in highly acidic soils where pH is below 5.5. In such conditions, soluble phosphorus reacts with iron (Fe) and aluminum (Al) ions to form insoluble compounds, making it unavailable to plants. Similarly, in highly alkaline soils, phosphorus may get fixed with calcium. However, acidic soils are generally more problematic because iron and aluminum oxides strongly bind phosphorus, reducing fertilizer efficiency. This leads to poor crop growth unless proper soil management practices like liming or balanced fertilization are adopted. Therefore, phosphorus availability is lowest in acidic soils due to maximum fixation.

Final Answer: Highly Acidic (pH < 5.5)

Answer: (B)

Q28.

Solution

Concept: Fertilizers differ in their chemical nature, nutrient content, and soil reaction. A neutral fertilizer does not significantly alter soil pH and is considered safe for long-term application. Calcium Ammonium Nitrate (CAN) is widely used in agriculture due to its balanced nitrogen content and neutral effect on soil acidity.

Solution: Calcium Ammonium Nitrate (CAN), commonly known as 'Kisan Khad', is a neutral nitrogenous fertilizer widely used in Indian agriculture. It contains both ammonium and nitrate forms of nitrogen along with calcium carbonate, which helps maintain soil neutrality. Unlike acidic fertilizers such as ammonium sulphate, CAN does not significantly acidify the soil, making it suitable for long-term use. It improves crop growth without harming soil structure or microbial activity. Due to its balanced nature and safety for soils, it is preferred for many field crops. Therefore, CAN is considered a farmer-friendly fertilizer with minimal adverse effects on soil health.

Final Answer: Calcium Ammonium Nitrate (CAN)

Answer: (B)

Q29.

Solution

Concept: Nutrient deficiencies in plants cause specific visual symptoms depending on the mobility and function of the nutrient. Iron is an immobile micronutrient, so its deficiency appears first in young leaves, causing interveinal chlorosis where veins remain green while surrounding tissue turns yellow.

Solution: Interveinal chlorosis in young leaves is a classic symptom of iron deficiency. Iron is essential for chlorophyll synthesis and acts as a cofactor in various enzymatic reactions. Since it is not easily translocated within the plant, deficiency symptoms appear in the younger leaves first. The tissue between veins turns yellow while the veins remain green, giving a striped appearance. This condition reduces photosynthesis and overall plant growth. Iron deficiency is more common in alkaline soils where its availability is low. Proper management includes foliar sprays or soil application of iron chelates.

Final Answer: Iron

Answer: (C)

Q30.

Solution

Concept: Soil moisture exists in different forms, and plant-available water lies between field capacity and wilting point. The permanent wilting point is the stage at which soil water is so tightly held that plants cannot extract it, resulting in irreversible wilting and plant stress.

Solution: The wilting point is defined as the soil moisture level at which plants are no longer able to extract sufficient water from the soil to meet their physiological needs. At this stage, plants wilt permanently and cannot recover even if placed in a humid environment. This occurs because water is held too tightly by soil particles, especially in clay soils. It represents the lower limit of available water for plants. Beyond this point, cellular dehydration leads to loss of turgor pressure and eventual plant death if moisture is not replenished. It is an important parameter in irrigation scheduling and soil water management.

Final Answer: Plants can no longer extract water and suffer permanent damage

Answer: (C)

Q31.

Solution

Concept: Irrigation methods vary depending on topography, soil type, and water availability. In uneven or hilly regions, methods that do not require land leveling are preferred. Sprinkler irrigation simulates rainfall and is suitable for such conditions due to its adaptability and uniform water distribution.

Solution: Sprinkler irrigation is the most suitable method for undulating or hilly terrain where leveling the land is not economically feasible. In this system, water is sprayed under pressure through nozzles, imitating natural rainfall. It ensures uniform distribution of water even on uneven surfaces and reduces soil erosion compared to surface irrigation methods. Basin, furrow, and flood irrigation require leveled fields, making them unsuitable for hilly areas. Sprinkler systems are also efficient in water use and can be used for a variety of crops. Therefore, they are widely adopted in regions with uneven topography.

Final Answer: Sprinkler irrigation

Answer: (B)

Q32.

Solution

Concept: In irrigation engineering, the total depth of water required by a crop during its entire growth period is an important concept. It is called delta, which represents the total water demand of a crop over its base period, considering evapotranspiration and crop requirements.

Solution: Delta refers to the total depth of water required by a crop from sowing to harvesting during its entire growth period. It represents the cumulative water need of the crop and is influenced by factors such as climate, crop type, and soil conditions. Delta is directly related to consumptive use of water and is essential for irrigation planning. It helps in determining water supply requirements for efficient crop production. Unlike duty, which relates to area irrigated per unit discharge, delta focuses on total water depth. Therefore, delta is a fundamental parameter in agricultural water management.

Final Answer: Delta

Answer: (A)

Q33.

Solution

Concept: Non-selective herbicides are chemicals that destroy all types of green plant tissues they come into contact with. These herbicides are generally used to control weeds or unwanted vegetation. Their broad-spectrum action makes them effective but also risky, as they can harm desirable crops or plants if not carefully applied.

Solution: Glyphosate is a widely known non-selective herbicide that kills all green plant tissue, regardless of species. It works by inhibiting a key enzyme involved in the production of amino acids necessary for plant growth. Glyphosate is commonly used for weed control in agricultural fields, gardens, and lawns. Unlike selective herbicides, which target specific weeds, glyphosate affects all plants it touches, making it effective in controlling unwanted vegetation but requiring careful application to avoid damage to crops. It is typically used in conjunction with other practices like no-till farming, where it helps manage weeds without disturbing the soil. Its use, however, has raised environmental concerns due to its potential impact on ecosystems, non-target plants, and soil health.

Final Answer: Glyphosate

Answer: (C)

Q34.

Solution

Concept: Integrated Weed Management (IWM) is a holistic approach to weed control that combines multiple methods of controlling weeds, including biological, chemical, cultural, and mechanical controls. Bio-herbicides are a part of the biological control method, where natural organisms like fungi, bacteria, or viruses are used to target and suppress weed growth.

Solution: Bio-herbicides like *Collego* and *Devine* are an example of biological control in Integrated Weed Management. These herbicides use natural organisms, such as fungi or bacteria, to target and suppress the growth of specific weeds. Unlike traditional chemical herbicides, bio-herbicides do not rely on synthetic chemicals and are seen as a more eco-friendly alternative. They work by infecting or inhibiting the growth of weeds without harming crops or other beneficial organisms. The use of bio-herbicides is part of a broader strategy to reduce reliance on synthetic chemicals, preserve biodiversity, and manage weeds in a sustainable way.

Final Answer: Biological Control

Answer: (C)

Q35.

Solution

Concept: The System of Rice Intensification (SRI) is a water-saving farming technique that aims to increase rice yields while reducing resource use. It involves changing planting practices, such as transplanting young seedlings at wider spacings and reducing the water usage in fields, making it more efficient than traditional rice cultivation.

Solution: The SRI technique is primarily known for reducing water use and transplanting young single seedlings rather than using high seed rates and close spacing. In SRI, seedlings are transplanted at a younger age (usually 8–12 days) and spaced widely, which allows for better root development and higher yields. This method also reduces water consumption by minimizing the continuous flooding of fields, which is a common practice in conventional rice farming. By promoting healthier plant growth and improving soil conditions, SRI can lead to better productivity with lower input costs, making it more sustainable and resource-efficient.

Final Answer: Reducing water use and transplanting young single seedlings

Answer: (C)

Q36.

Solution

Concept: In sugarcane cultivation, the removal of dry and senescent leaves is essential to improve air circulation and reduce pest incidence. This practice, called detrashment, helps maintain plant health by minimizing the risk of fungal infections and pests that thrive in dense, humid conditions.

Solution: Detrashment in sugarcane refers to the removal of lower dry and senescent leaves, which helps to improve aeration around the plant. By removing these leaves, the risk of pest infestations and fungal diseases, which thrive in the moist environment created by decaying plant matter, is minimized. Additionally, it allows for better sunlight penetration, which can improve photosynthesis and overall plant growth. This practice is typically carried out after the crop has matured and helps maintain the health of the sugarcane plant throughout the growing season. Detrashment is a vital practice in maintaining high yields and ensuring plant longevity.

Final Answer: Detrashment

Answer: (B)

Q37.

Solution

Concept: Boron is an essential micronutrient for plants, playing a critical role in flower and seed development, cell wall formation, and the transport of sugars. A deficiency in boron can lead to poor grain setting and physiological disorders in crops like wheat.

Solution: In wheat, a deficiency of boron leads to a condition known as sterility, where the plant fails to set seeds properly, resulting in poor grain development. Boron is vital for proper cell division and the formation of seed structures, and its deficiency disrupts the transport of sugars to developing grains. This can lead to empty or poorly developed heads, reducing overall yield. Symptoms of boron deficiency also include poor root development and deformed leaves. To address this, boron can be applied to the soil or as a foliar spray to ensure proper grain setting and maintain healthy crop growth.

Final Answer: Sterility

Answer: (B)

Q38.

Solution

Concept: Drought tolerance in crops is a critical factor for survival in arid and semi-arid regions. Among millets, some varieties are highly resistant to drought conditions due to their deep root systems and ability to store water efficiently.

Solution: Bajra (Pearl Millet) is highly drought-tolerant and is often referred to as the 'Camel of the Desert'. It can grow in harsh, dry conditions where other crops might fail. Bajra has a deep root system that allows it to access water deep in the soil, making it highly resistant to drought. Additionally, it has a low water requirement, and its ability to thrive under high temperatures and limited rainfall makes it an ideal crop for regions prone to water scarcity. As a staple crop in many parts of India and Africa, bajra is critical for food security in dryland areas.

Final Answer: Bajra (Pearl Millet)

Answer: (A)

Q39.

Solution

Concept: Organic farming practices emphasize sustainability and environmental health by avoiding synthetic inputs and focusing on natural methods such as green manuring and crop rotation. These methods help improve soil fertility, control pests, and promote long-term ecological balance.

Solution: The use of green manuring and crop rotation in organic farming is primarily aimed at maintaining soil fertility and breaking pest cycles. Green manuring involves growing specific crops that are later incorporated into the soil to enrich it with organic matter and nutrients. Crop rotation helps prevent the buildup of pests and diseases by alternating crops with different nutrient requirements and pest susceptibilities. These practices reduce the need for synthetic fertilizers and pesticides, promoting biodiversity and soil health, which are key principles of organic farming. Together, they help create a sustainable agricultural system that supports long-term productivity.

Final Answer: Maintain soil fertility and break pest cycles

Answer: (B)

Q40.

Solution

Concept: Precision agriculture involves using advanced technologies to monitor and manage crop health, soil conditions, and water use. NDVI (Normalized Difference Vegetation Index) is a remote sensing tool that helps assess crop health and biomass by analyzing spectral reflectance from plants.

Solution: The Normalized Difference Vegetation Index (NDVI) is used in precision agriculture to monitor crop health and biomass through spectral reflectance. NDVI analyzes the difference between red and near-infrared light reflected by plants, which varies depending on the plant's photosynthetic activity. Healthy vegetation reflects more near-infrared light and absorbs more red light, while stressed or unhealthy plants show the opposite pattern. By using satellite or drone imagery to capture NDVI data, farmers can assess plant vigor, detect stress early, and optimize input usage for better yield. This helps in precision irrigation, nutrient management, and pest control, improving overall agricultural efficiency. **Final Answer:** Crop health and biomass using spectral reflectance

Answer: (B)

Q41.

Solution

Concept: In Natural Farming, various treatments are used to protect plants and enhance growth naturally. Bijamruta is one such traditional treatment that involves preparing a natural mixture of cow dung, cow urine, lime, and water. It is applied to seeds to protect them from soil-borne diseases, offering an eco-friendly alternative to chemical seed treatments.

Solution: 'Bijamruta' is a traditional treatment used in Natural Farming to protect seeds from soil-borne diseases. It is made by mixing cow dung, cow urine, and lime with water, which acts as a natural disinfectant. This treatment not only prevents the growth of harmful pathogens that may affect the seed but also promotes the development of beneficial microorganisms in the soil. By applying Bijamruta to seeds before sowing, farmers can ensure that the plants grow in a healthier environment, thus reducing the need for chemical pesticides and enhancing soil fertility naturally. This practice aligns with the principles of Natural Farming, which emphasize sustainability, ecological balance, and the use of organic materials.

Final Answer: Coating and protecting seeds from soil-borne diseases

Answer: (B)

Q42.

Solution

Concept: The 'Spongy Tissue' disorder in Alphonso mangoes is a physiological condition that reduces the fruit's export quality. It is primarily caused by environmental factors such as high heat during fruit ripening, which leads to improper development of the fruit tissues.

Solution: The 'Spongy Tissue' disorder in Alphonso mangoes is caused by high heat desiccation and convective heat from the soil. When mangoes are exposed to excessive heat during the ripening phase, particularly when the fruit is near the ground where heat and moisture content from the soil are high, the fruit's internal structure becomes malformed. This leads to a spongy texture in the flesh, which significantly reduces the fruit's export quality. The disorder causes unsightly spots and hollow areas within the fruit, making it unfit for high-end markets. Controlling the temperature around the fruit during ripening and managing irrigation practices are crucial in minimizing this disorder and maintaining fruit quality for export.

Final Answer: High heat desiccation and convective heat from soil

Answer: (B)

Q43.

Solution

Concept: 'Degreening' is a post-harvest treatment used in citrus fruits to accelerate the removal of chlorophyll from the peel, making the fruit more appealing and market-ready. Ethylene gas is used for this process, which encourages the natural ripening of the fruit.

Solution: 'Degreening' is a process in citrus fruit handling where ethylene gas is used to remove the green chlorophyll pigment from the peel. This process helps the fruit achieve the desired yellow or orange color, making it more attractive to consumers. Ethylene, a naturally occurring plant hormone, stimulates the ripening process and accelerates the breakdown of chlorophyll, which is essential for the visual appeal of citrus fruits. Degreening is particularly useful for fruits that have been harvested while still immature or green, as it ensures uniform color development and improves the marketability of the fruit. However, this process does not affect the fruit's flavor, which is already developed during the ripening process.

Final Answer: Remove the green chlorophyll pigment from the peel

Answer: (B)

Q44.

Solution

Concept: Blossom End Rot (BER) is a physiological disorder in tomato plants caused by a calcium deficiency. It typically appears as water-soaked spots at the blossom end of the fruit, leading to tissue breakdown and rendering the fruit unmarketable.

Solution: Blossom End Rot (BER) in tomatoes is a common physiological disorder caused by calcium deficiency, which leads to the appearance of water-soaked spots at the blossom end of the fruit. This condition occurs when calcium is not adequately transported to the developing fruit, often due to inconsistent watering or poor soil calcium levels. As the disorder progresses, the affected area becomes dark and sunken, affecting the appearance and quality of the fruit. BER can be prevented by maintaining consistent soil moisture, applying calcium supplements, and ensuring proper irrigation practices. Calcium helps in the structural integrity of cell walls, and a lack of it prevents the proper development of fruit tissue, causing BER to appear.

Final Answer: Blossom End Rot (BER)

Answer: (B)

Q45.

Solution

Concept: The Potato Tuber Moth (PTM) is a serious pest that attacks potato plants. It causes damage both in the field during the growing season and during storage, leading to reduced yield and quality.

Solution: The Potato Tuber Moth (PTM) is a major pest that affects both the standing field crop and the storage (Godowns) of potatoes. During the growing season, the larvae of the PTM bore into the developing tubers, causing physical damage and creating entry points for secondary pathogens. This leads to reduced yield and quality of the potatoes. After harvest, the moth continues to damage stored potatoes, making it a major concern for both field and post-harvest management. Effective control of PTM involves using pheromone traps, biological control agents, and chemical treatments as part of an integrated pest management strategy.

Final Answer: Both the field and the storage

Answer: (C)

Q46.

Solution

Concept: Tongue grafting is a method of grafting used in horticulture, where both the scion and rootstock are cut in a specific way to increase cambial contact. A tongue or notch is made on both parts, allowing better union and faster healing.

Solution: In tongue grafting, a notch (or "tongue") is made on both the scion and the rootstock. This increases the surface area for cambial contact, which facilitates better fusion between the scion and rootstock. The cambium layers of both parts must align for successful grafting. By making the tongues, the plant's vascular tissues connect more effectively, leading to a quicker and stronger graft union. This method is especially useful for grafting fruit trees and is known for producing high-quality grafts. The increased contact helps ensure that nutrients and water can flow between the two parts, promoting better growth. Additionally, it helps minimize the risk of air or moisture entering the graft, which could cause it to fail.

Final Answer: Increase the surface area for better cambial contact

Answer: (A)

Q47.

Solution

Concept: Simple layering is a vegetative propagation method where a branch of the parent plant is bent to the ground and covered with soil to encourage root development, allowing the new plant to form while still attached to the parent.

Solution: Simple layering involves bending a healthy branch of the parent plant to the ground, and then covering it with soil while keeping it attached to the plant. Over time, the buried portion of the branch will develop roots, and once well-rooted, the branch can be cut away from the parent plant and established as a new independent plant. This method is commonly used for propagating plants that do not root easily from cuttings, such as certain shrubs and vines. It is a relatively simple method that requires no special tools or skills, and it can be highly successful for plants that have flexible, low-growing stems.

Final Answer: Simple Layering

Answer: (B)

Q48.

Solution

Concept: Pectin is a naturally occurring substance found in fruits, which plays a key role in the gelling process of jams and jellies. Guava is known to have one of the highest natural pectin contents among fruits.

Solution: Guava is naturally the richest source of pectin, which is essential for setting jellies. Pectin is a complex carbohydrate found in the cell walls of plants, and it helps to form a gel-like consistency when combined with sugar and acid during the jelly-making process. Guava, with its high pectin content, allows for the production of thick and firm jellies without the need for added commercial pectin. This makes guava an ideal fruit for making high-quality, naturally-set jams and jellies. Other fruits, like apples and citrus, also contain significant amounts of pectin, but guava tops the list for its concentrated content. Its use in jellies allows for a more natural, healthier product with fewer additives.

Final Answer: Guava

Answer: (A)

Q49.

Solution

Concept: Sodium benzoate is a commonly used chemical preservative in the food industry, especially for products like tomato ketchup. It helps prevent microbial growth and spoilage, extending the product's shelf life.

Solution: The primary chemical preservative used in the commercial production of tomato ketchup is Sodium Benzoate. It is effective in inhibiting the growth of bacteria, yeast, and molds, which could otherwise lead to the spoilage of the ketchup. Sodium benzoate works by interfering with the microbial cell's metabolism, preventing the growth of microorganisms that cause food spoilage. While other preservatives like potassium metabisulphite and citric acid are also used in food preservation, sodium benzoate is particularly effective in acidic conditions like those found in tomato ketchup. Its use ensures that the ketchup remains safe to consume and maintains its quality throughout its shelf life. However, its use is regulated, as excessive consumption may have health concerns.

Final Answer: Sodium Benzoate

Answer: (B)

Q50.

Solution

Concept: Syneresis, also known as the "weeping" of jelly, is a process where liquid separates from the gel, causing the jelly to become watery. This can occur due to an imbalance in the setting agents or improper cooking.

Solution: The phenomenon of syneresis, or "weeping of jelly," occurs when excess liquid is released from the jelly as it sets, making the jelly appear watery. This is usually caused by a lack of pectin, excess acid, or under-cooking of the jelly mixture. Inadequate cooking prevents the pectin from binding properly with the sugar, leading to a weak gel structure that cannot hold the liquid. On the other hand, excessive acid or sugar content can interfere with the gelling process and cause liquid separation. Using under-ripe fruits, which have lower pectin content, can also lead to syneresis. To avoid this, proper cooking time, correct acid and pectin levels, and using ripe fruits are essential for achieving the desired consistency in jellies and jams.

Final Answer: Excess of acid or lack of pectin

Answer: (B)

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	A	2	B	3	C	4	B	5	B
6	C	7	C	8	C	9	C	10	B
11	C	12	C	13	A	14	A	15	C
16	B	17	B	18	B	19	C	20	A
21	B	22	A	23	B	24	B	25	C
26	C	27	B	28	B	29	C	30	C
31	B	32	A	33	C	34	C	35	C
36	B	37	B	38	A	39	B	40	B
41	B	42	B	43	B	44	B	45	C
46	A	47	B	48	A	49	B	50	B