CUET-UG Agriculture Sample Paper-18

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 dihybrid cross (9 : 3 : 3 : 1), the phenotypic ratio represents the manifestation of which Mendelian law?

(A) Law of Dominance

(B) Law of Segregation

(C) Law of Independent Assortment

(D) Law of Purity of Gametes

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

(A) Mutation

(B) Recombination (Crossing over)

(C) Transcription

(D) Translation

Q3. Which type of RNA is responsible for carrying amino acids to the ribosome during protein synthesis?

(A) mRNA (Messenger RNA)

(B) rRNA (Ribosomal RNA)

(C) tRNA (Transfer RNA)

(D) snRNA (Small nuclear RNA)

Q4. The phenomenon where the F_1 hybrid is superior to both of its parents in terms of yield or vigor is known as:

(A) Inbreeding depression

(B) Heterosis

(C) Backcrossing

(D) Mutation breeding

Q5. Which plant breeding method is most suitable for developing disease-resistant varieties by repeatedly crossing a hybrid with one of its parents?

(A) Pedigree Method

(B) Bulk Method

(C) Backcross Method

(D) Mass Selection

Q6. In plant tissue culture, the unorganized, undifferentiated mass of proliferating cells is called:

(A) Explant

(B) Callus

(C) Somaclone

(D) Protoplast

Q7. The 'Lock and Key' hypothesis of enzyme action explains that:

(A) Enzymes can bind to any substrate

(B) One enzyme is specific to one particular substrate

(C) Enzymes are used up in the reaction

(D) Substrates change the shape of the enzyme permanently

Q8. Which of the following is a structural polysaccharide found in the cell walls of plants?

(A) Glycogen

(B) Starch

(C) Cellulose

(D) Sucrose

Q9. Bacteria that lack a true nucleus and membrane-bound organelles are classified as:

(A) Eukaryotic

(B) Prokaryotic

(C) Mesokaryotic

(D) Saprophytic

Q10. Which of the following soil microorganisms is known for forming symbiotic associations with plant roots called 'Mycorrhizae'?

(A) Bacteria

(B) Fungi

(C) Viruses

(D) Protozoa

Q11. The conversion of Ammonia (NH_3) to Nitrates (NO_3^-) by soil bacteria like Nitrosomonas and Nitrobacter is called:

(A) Denitrification

(B) Nitrification

(C) Ammonification

(D) Nitrogen Fixation

Q12. Which weather element is measured using a Campbell-Stokes recorder?

(A) Relative Humidity

(B) Wind Velocity

(C) Bright Sunshine Hours

(D) Atmospheric Pressure

Q13. The process where water vapor changes directly into ice crystals without passing through the liquid phase is known as:

(A) Condensation

(B) Sublimation

(C) Evaporation

(D) Deposition

Q14. The 'Amritmahal' breed of Karnataka is primarily classified as which type of cattle breed?

(A) Milch breed

(B) Dual-purpose breed

(C) Draught breed

(D) Exotic breed

Q15. Which exotic cattle breed is famous for its high milk fat content (approx. 5.3%) and golden-yellow milk color?

(A) Holstein Friesian

(B) Jersey

(C) Brown Swiss

(D) Red Dane

Q16. The 'Aseel' breed of poultry is most popular for which of the following purposes?

(A) Egg production

(B) Meat (Broiler) production

(C) Game/Cockfighting and sturdiness

(D) Ornamental value

Q17. Which of the following is a dual-purpose poultry breed developed in the USA, characterized by brown egg shells and yellow skin?

(A) White Leghorn

(B) Minorca

(C) Rhode Island Red

(D) Ancona

Q18. The 'Head-to-Head' system of dairy housing is preferred when:

(A) Better supervision of milking is required

(B) Ease of feeding is the priority

(C) Quick removal of manure is needed

(D) The barn is very narrow

Q19. What is the standard moisture content required for the safe storage of 'Silage'?

(A) 10–15%

(B) 25–30%

(C) 60–70%

(D) 85–90%

Q20. Which constituent of a balanced ration is primarily responsible for the repair of body tissues and growth in young calves?

(A) Carbohydrates

(B) Fats

(C) Proteins

(D) Crude Fiber

Q21. The 'Tiger Heart' appearance during post-mortem examination is a characteristic lesion of which livestock disease?

(A) Anthrax

(B) Foot and Mouth Disease (FMD)

(C) Rinderpest

(D) Black Quarter

Q22. Which of the following is a classic clinical symptom of 'Ranikhet' (Newcastle) disease in poultry?

(A) Swelling of the comb and wattles

(B) Paralysis of wings and legs (torticolis)

(C) Sudden drop in water consumption only

(D) Thickening of the skin on legs

Q23. Rinderpest, also known as 'Cattle Plague', has been globally eradicated. It was primarily characterized by:

(A) High fever and 'shooting diarrhea'

(B) Lameness in the hind legs

(C) Internal bleeding in the brain

(D) Formation of tumors in the liver

Q24. Which of the following is a primary advantage of using Artificial Insemination (AI) in dairy cattle?

(A) Increase in the gestation period

(B) Rapid genetic improvement using superior sires

(C) Elimination of the need for heat detection

(D) Reduction in the cost of individual semen straws

Q25. In milk processing, the process of 'Homogenization' is primarily used to:

(A) Kill pathogenic bacteria

(B) Separate cream from the skim milk

(C) Prevent fat globules from rising to the surface

(D) Fortify the milk with Vitamin D

Q26. Which soil amendment is most commonly applied to neutralize highly acidic soils (low pH)?

(A) Gypsum

(B) Agricultural Lime

(C) Elemental Sulfur

(D) Urea

Q27. A soil texture described as 'Loam' generally contains an ideal balance of which three particles?

(A) Sand, Silt, and Clay

(B) Gravel, Sand, and Humus

(C) Silt, Clay, and Calcium

(D) Sand, Peat, and Loess

Q28. In a standard NPK fertilizer bag labeled 10-20-10, what does the middle number represent?

(A) Total Nitrogen content

(B) Soluble Potash (K_2O)

(C) Available Phosphate (P_2O_5)

(D) Total Magnesium content

Q29. Which of the following is classified as a 'Macro-nutrient' essential for plant growth?

(A) Boron

(B) Iron

(C) Nitrogen

(D) Zinc

Q30. Which irrigation method is considered the most water-efficient by delivering water directly to the root zone?

(A) Furrow Irrigation

(B) Drip (Trickle) Irrigation

(C) Border Strip Irrigation

(D) Check Basin Irrigation

Q31. The term 'Evapotranspiration' refers to the total water requirement of a crop, combining:

(A) Rainfall and Groundwater

(B) Surface runoff and Deep percolation

(C) Soil evaporation and Plant transpiration

(D) Seepage and Leaching

Q32. The primary purpose of installing a 'Sub-surface Drainage' system in agricultural land is to:

(A) Increase the soil pH

(B) Lower the water table to prevent waterlogging

(C) Prevent wind erosion

(D) Collect rainwater for later use

Q33. Which weed control method involves the use of 'Crop Rotation' and 'Cover Cropping' to suppress weed growth?

(A) Chemical Control

(B) Biological Control

(C) Cultural Control

(D) Mechanical Control

Q34. Integrated Pest Management (IPM) for weeds emphasizes which of the following strategies?

(A) Exclusive reliance on broad-spectrum herbicides

(B) Total eradication of all non-crop species

(C) A combination of biological, cultural, and chemical tools

(D) Hand-pulling as the sole method of control

Q35. In the cultivation of Rice, the 'Dapog' method is associated with which stage of crop production?

(A) Mechanical harvesting

(B) Raising seedlings in a nursery

(C) Application of pre-emergence herbicides

(D) Deep water irrigation management

Q36. Which of the following is a critical growth stage in Wheat where moisture stress leads to maximum yield loss?

(A) Tillering stage

(B) Crown Root Initiation (CRI) stage

(C) Jointing stage

(D) Dough stage

Q37. Among the millets, which crop is known for having the highest calcium content and is highly drought-tolerant?

(A) Jowar (Sorghum)

(B) Bajra (Pearl Millet)

(C) Ragi (Finger Millet)

(D) Kodo Millet

Q38. The practice of 'Earthing-up' in Sugarcane is primarily done to:

(A) Increase the sugar recovery percentage

(B) Provide support and prevent lodging of the canes

(C) Promote the growth of water sprouts

(D) Induce flowering for seed production

Q39. In Precision Farming, which technology is used to provide precise geographical coordinates for site-specific crop management?

(A) Remote Sensing

(B) Geographic Information System (GIS)

(C) Global Positioning System (GPS)

(D) Variable Rate Technology (VRT)

Q40. The 'Beejamrut' used in Zero Budget Natural Farming (ZBNF) is primarily used for:

(A) Foliar spray to control pests

(B) Seed treatment to protect from soil-borne diseases

(C) Enriching the soil with Nitrogen

(D) Accelerating the decomposition of crop residues

Q41. Which of the following is a prohibited substance under the National Programme for Organic Production (NPOP) guidelines?

(A) Bio-fertilizers like Azotobacter

(B) Vermicompost

(C) Genetically Modified (GM) seeds

(D) Neem cake

Q42. The physiological disorder 'Black Tip' in Mango is caused by the fumes of:

(A) Sulfur Dioxide from Brick Kilns

(B) Carbon Monoxide from heavy traffic

(C) Ethylene from ripening chambers

(D) Methane from waterlogged orchards

Q43. Which variety of Tomato is specifically known for its 'Determinate' growth habit and suitability for processing?

(A) Arka Rakshak

(B) Pusa Ruby

(C) Roma

(D) Arka Saurabh

Q44. 'Citrus Canker' is a serious disease in acid lime caused by which type of organism?

(A) Fungus

(B) Virus

(C) Bacteria

(D) Nematode

Q45. In Potato cultivation, the process of 'Dehaulming' is carried out to:

(A) Increase the number of tubers per plant

(B) Allow the tuber skin to harden before harvest

(C) Prevent the spread of Late Blight to the tubers

(D) Stimulate the sprouting of eyes for the next season

Q46. In 'Air Layering' (Gooty), which material is commonly used to wrap the wounded portion to retain moisture?

(A) Shredded paper

(B) Sphagnum moss

(C) Fine river sand

(D) Dry wheat straw

Q47. The 'Shield Budding' (T-Budding) method is most commercially successful and widely used in the propagation of:

(A) Guava

(B) Citrus and Roses

(C) Banana

(D) Grapes

Q48. For the preparation of a high-quality Jelly, which of the following constituents in the fruit is most essential?

(A) Vitamin C

(B) Pectin

(C) Lycopene

(D) Potassium

Q49. According to FSSAI specifications, what is the minimum Total Soluble Solids (TSS) percentage required for a product to be labeled as 'Fruit Jam'?

(A) 45

(B) 65

(C) 30

(D) 75

Q50. Which chemical preservative is most commonly used in the commercial production of Tomato Ketchup to prevent fermentation?

(A) Potassium Metabisulphite (KMS)

(B) Sodium Benzoate

(C) Citric Acid

(D) Acetic Acid (Vinegar)

Detailed Solutions

Q1.

Solution

Concept: A dihybrid cross studies the inheritance of two traits simultaneously. The phenotypic ratio 9 : 3 : 3 : 1 in the F_2 generation arises when genes assort independently during gamete formation, as described by Mendel's laws.

Solution: In a dihybrid cross involving two pairs of contrasting traits, each pair segregates independently of the other during meiosis. This independent segregation of alleles leads to the formation of all possible combinations of traits in the offspring. As a result, the F_2 generation shows a characteristic phenotypic ratio of 9 : 3 : 3 : 1, which is a direct outcome of the Law of Independent Assortment. This law states that alleles of different genes are distributed independently into gametes.

Final Answer: Law of Independent Assortment

Answer: (C)

Q2.

Solution

Concept: Genetic linkage mapping uses recombination frequency between genes to determine their relative distance on a chromosome, expressed in centiMorgans (cM).

Solution: The unit centiMorgan (cM) is defined based on the frequency of recombination events occurring between two genes during meiosis. When crossing over occurs between homologous chromosomes, it leads to genetic recombination. A 1% recombination frequency is equivalent to 1 centiMorgan. Therefore, the greater the frequency of crossing over between two genes, the farther apart they are considered on the chromosome.

Final Answer: Recombination (Crossing over)

Answer: (B)

Q3.

Solution

Concept: Protein synthesis involves different types of RNA, each with a specific function. Transfer RNA plays a crucial role in decoding messenger RNA into a polypeptide chain.

Solution: During translation, transfer RNA (tRNA) acts as an adaptor molecule. It carries specific amino acids to the ribosome and matches its anticodon with the corresponding codon on mRNA. This ensures that amino acids are added in the correct sequence to form a functional protein. Thus, tRNA is directly responsible for delivering amino acids during protein synthesis.

Final Answer: tRNA (Transfer RNA)

Answer: (C)

Q4.

Solution

Concept: Plant breeding often exploits hybrid vigor, where hybrid offspring show superior qualities compared to their parents.

Solution: Heterosis, also known as hybrid vigor, refers to the phenomenon in which the F_1 generation resulting from a cross between two genetically different parents exhibits superior traits such as higher yield, better growth rate, and improved resistance compared to both parents. This effect is widely used in agriculture to increase crop productivity and performance.

Final Answer: Heterosis

Answer: (B)

Q5.

Solution

Concept: Plant breeding involves developing improved crop varieties with desirable traits such as disease resistance, yield, and quality. Different methods are used depending on the breeding objective and genetic control of traits.

Solution: The backcross method is specifically used to transfer a desirable trait, such as disease resistance, from a donor parent into a high-yielding but susceptible variety. In this method, the hybrid is repeatedly crossed with one of its parents (recurrent parent) to recover most of its traits while retaining the desired gene. It is widely used in developing disease-resistant crop varieties.

Final Answer: Backcross Method

Answer: (C)

Q6.

Solution

Concept: Plant tissue culture is a technique used for growing plant cells or tissues under sterile and controlled conditions. During this process, plant cells can dedifferentiate and form an unorganized mass of cells capable of regeneration.

Solution: In plant tissue culture, a callus is defined as an unorganized, undifferentiated mass of proliferating plant cells. It is formed when plant tissues are cultured on a nutrient medium containing suitable growth hormones such as auxins and cytokinins. This callus can later be induced to form shoots and roots, leading to complete plant regeneration. An explant is the initial plant tissue taken for culture, somaclones are genetically identical plants produced from tissue culture, and protoplasts are plant cells without cell walls. Therefore, the correct answer is callus.

Final Answer: Callus

Answer: (B)

Q7.

Solution

Concept: Enzyme action is highly specific and is explained by different models, including the lock and key hypothesis. This concept is fundamental in understanding biochemical reactions in living organisms.

Solution: The lock and key hypothesis, proposed by Emil Fischer, explains that an enzyme has a specific active site that fits only a particular substrate, similar to a key fitting into a lock. This model highlights the specificity of enzyme-substrate interaction. It does not imply that enzymes act on all substrates, are consumed in reactions, or undergo permanent shape changes. Therefore, the correct statement is that one enzyme is specific to one particular substrate.

Final Answer: One enzyme is specific to one particular substrate

Answer: (B)

Q8.

Solution

Concept: Carbohydrates are classified based on their structure and function in living organisms. Some serve as storage molecules, while others provide structural support to cells.

Solution: Cellulose is a structural polysaccharide found in the cell walls of plants. It provides rigidity, strength, and protection to plant cells. Glycogen is a storage carbohydrate in animals, starch is a storage carbohydrate in plants, and sucrose is a disaccharide used for transport of energy in plants. Therefore, cellulose is the correct structural polysaccharide.

Final Answer: Cellulose

Answer: (C)

Q9.

Solution

Concept: Cellular organization is broadly classified into prokaryotic and eukaryotic types based on the presence or absence of a true nucleus and membrane-bound organelles.

Solution: Bacteria are classified as prokaryotic organisms because they lack a true nucleus and membrane-bound organelles such as mitochondria, endoplasmic reticulum, and Golgi bodies. Their genetic material is present in a nucleoid region without a nuclear membrane. Eukaryotic cells possess a well-defined nucleus, while mesokaryotic is not a standard classification and saprophytic refers to a mode of nutrition. Therefore, bacteria are prokaryotic.

Final Answer: Prokaryotic

Answer: (B)

Q10.

Solution

Concept: Mycorrhizae represent a symbiotic association between plant roots and certain soil microorganisms. In this relationship, both organisms benefit: the plant receives improved nutrient and water absorption, while the microorganism obtains carbohydrates. This association is especially important in enhancing plant growth, improving soil fertility, and increasing resistance to soil-borne diseases. Different groups of microorganisms exist in soil, including bacteria, fungi, protozoa, and viruses, but only specific groups are capable of forming such mutualistic root associations.

Solution: Mycorrhizae are specifically formed by fungi that colonize plant root systems. These fungi extend the root absorption area through their hyphal network, allowing better uptake of nutrients like phosphorus and micronutrients. In return, the plant supplies sugars produced through photosynthesis. This symbiotic relationship is highly beneficial in agriculture and forestry because it enhances plant vigor, especially in nutrient-deficient soils. Among the given options, bacteria, viruses, and protozoa do not form true mycorrhizal associations with plant roots. Therefore, fungi are the correct organisms responsible for forming mycorrhizae.

Final Answer: Fungi

Answer: (B)

Q11.

Solution

Concept: The nitrogen cycle is a key biogeochemical cycle involving the transformation of nitrogen into various chemical forms. Soil microorganisms play a crucial role in converting nitrogen compounds into usable forms for plants. Processes such as nitrogen fixation, ammonification, nitrification, and denitrification ensure continuous cycling of nitrogen in the ecosystem. Each process is carried out by specific bacteria under different environmental conditions.

Solution: Nitrification is the biological oxidation of ammonia (NH_3) into nitrites (NO_2^-) and then into nitrates (NO_3^-). This process is carried out mainly by bacteria such as Nitrosomonas (ammonia to nitrite) and Nitrobacter (nitrite to nitrate). Nitrates are the most usable form of nitrogen for plants. In contrast, denitrification converts nitrates back into nitrogen gas, ammonification converts organic nitrogen into ammonia, and nitrogen fixation converts atmospheric nitrogen into ammonia. Since the question involves conversion of ammonia to nitrates, the correct process is nitrification.

Final Answer: Nitrification

Answer: (B)

Q12.

Solution

Concept: Meteorological instruments are used to measure various atmospheric elements such as temperature, humidity, pressure, wind speed, and sunshine duration. Each instrument is designed to measure a specific weather parameter accurately. Understanding these instruments is important in agriculture, as weather conditions directly affect crop growth, irrigation, and planning of farming activities.

Solution: The Campbell-Stokes recorder is a meteorological instrument used to measure the duration of bright sunshine hours in a day. It consists of a glass sphere that focuses sunlight onto a calibrated paper strip, burning a trace whenever sunlight is intense. The length of the burn mark indicates the total sunshine duration. It does not measure humidity, wind velocity, or atmospheric pressure. Hence, among the given options, bright sunshine hours is the correct weather element measured by this instrument.

Final Answer: Bright Sunshine Hours

Answer: (C)

Q13.

Solution

Concept: Water exists in different physical states and undergoes phase changes depending on temperature and atmospheric conditions. These changes include evaporation, condensation, sublimation, and deposition. Understanding these processes is important in meteorology and agriculture because they influence frost formation, precipitation, and crop damage in cold climates.

Solution: Deposition is the process in which water vapor changes directly into solid ice crystals without first becoming liquid water. This process occurs under very low temperatures and is commonly observed in the formation of frost. It is the reverse of sublimation. Condensation involves gas to liquid change, evaporation involves liquid to gas, and sublimation involves solid to gas. Since the question describes direct gas-to-solid transformation, the correct term is deposition.

Final Answer: Deposition

Answer: (D)

Q14.

Solution

Concept: Indigenous cattle breeds in India are classified based on their utility such as milk production, draught power, or dual-purpose use. Draught breeds are mainly used for agricultural labor and transportation due to their strength and endurance. Karnataka is known for several indigenous cattle breeds adapted to local climatic conditions and farming systems.

Solution: The Amritmahal breed of Karnataka is a well-known draught cattle breed. It is primarily used for heavy work such as ploughing and transportation rather than milk production. These animals are strong, hardy, and well adapted to harsh conditions. Milch breeds are specialized for milk production, while dual-purpose breeds provide both milk and draught power. Exotic breeds are foreign breeds introduced for higher milk yield. Since Amritmahal is mainly used for work purposes, it is classified as a draught breed.

Final Answer: Draught breed

Answer: (C)

Q15.

Solution

Concept: Exotic cattle breeds are introduced breeds known for specialized traits such as high milk yield, milk quality, or adaptability to intensive farming systems. Milk composition, especially fat content, is an important factor in dairy economics. Different breeds produce milk with varying fat percentages and physical characteristics such as color and richness.

Solution: Jersey cattle is an exotic dairy breed known for producing milk with high fat content, approximately 5.3%, and a characteristic golden-yellow color due to high beta-carotene levels. Holstein Friesian produces large quantities of milk but with lower fat content. Brown Swiss and Red Dane also contribute to dairy production but do not match Jersey in fat richness. Therefore, among the given options, Jersey is the breed famous for high-fat milk production.

Final Answer: Jersey

Answer: (B)

Q16.

Solution

Concept: Poultry breeds are classified based on their utility such as egg production, meat production, dual-purpose use, or ornamental and traditional purposes. Some indigenous breeds are also valued for special traits like hardiness and fighting ability.

Solution: The Aseel breed is an indigenous poultry breed of India known for its aggressive behavior, strong body structure, and stamina. It is primarily not used for commercial egg or meat production but is famous for game purposes such as cockfighting and for its sturdiness. These birds are hardy and can survive under harsh conditions, making them valuable in traditional and rural settings. However, their egg-laying capacity is low compared to commercial breeds. Therefore, the correct purpose is game/cockfighting and sturdiness.

Final Answer: Game/Cockfighting and sturdiness

Answer: (C)

Q17.

Solution

Concept: Poultry breeds are developed based on production traits such as egg quality, meat yield, growth rate, and adaptability. Dual-purpose breeds are those that provide both eggs and meat efficiently.

Solution: Rhode Island Red is a well-known dual-purpose poultry breed developed in the USA. It is characterized by good egg production, good body weight for meat, brown egg shells, and yellow skin. It is widely used in backyard and commercial poultry farming due to its adaptability and productivity. White Leghorn is mainly an egg breed, Minorca is also an egg breed, and Ancona is primarily an egg-laying breed with ornamental value. Hence, Rhode Island Red is the correct answer.

Final Answer: Rhode Island Red

Answer: (C)

Q18.

Solution

Concept: Dairy housing systems are designed to improve animal management, milking efficiency, hygiene, and labor utilization. Different arrangements of animal stalls influence supervision and operational convenience.

Solution: The head-to-head system in dairy housing refers to a layout where animals face each other across a central feeding alley. This arrangement allows better supervision during feeding and milking, as animals are easily visible and manageable. It also facilitates efficient feeding and monitoring of animal health. Although manure removal and barn design are important factors, the primary advantage of this system is improved supervision of milking and animal management.

Final Answer: Better supervision of milking is required

Answer: (A)

Q19.

Solution

Concept: Silage is a fermented green fodder preserved under anaerobic conditions for livestock feeding during scarcity periods. Proper moisture content is essential for fermentation and long-term storage quality.

Solution: The ideal moisture content for silage preparation is around 60–70%. At this level, sufficient fermentation occurs, promoting lactic acid production that preserves the fodder and prevents spoilage. If moisture is too low, fermentation is inadequate, and if too high, it leads to spoilage and nutrient loss. Proper moisture ensures good texture, smell, and nutritional value of silage, making it safe and beneficial for animal feeding.

Final Answer: 60–70%

Answer: (C)

Q20.

Solution

Concept: A balanced ration for livestock includes different nutrients such as carbohydrates, fats, proteins, minerals, vitamins, and fiber. Each nutrient has a specific role in body maintenance, growth, and energy supply.

Solution: Proteins are the primary nutrients responsible for the growth and repair of body tissues in livestock, especially in young calves. They are essential for muscle development, enzyme formation, and overall body functioning. Carbohydrates mainly provide energy, fats serve as concentrated energy sources, and crude fiber aids digestion but does not directly contribute to growth. Therefore, proteins are the most important for tissue repair and growth.

Final Answer: Proteins

Answer: (C)

Q21.

Solution

Concept: Many livestock diseases produce characteristic lesions that help in post-mortem diagnosis. These lesions are used to identify diseases accurately in veterinary pathology.

Solution: The 'tiger heart' appearance refers to a streaked, striped pattern seen in the heart muscle during post-mortem examination. This lesion is characteristic of Black Quarter (also known as Blackleg), a bacterial disease caused by Clostridium chauvoei. It affects cattle and leads to severe muscle damage with gas formation and hemorrhages, producing the tiger-striped appearance. Anthrax, FMD, and Rinderpest do not show this specific lesion pattern.

Final Answer: Black Quarter

Answer: (D)

Q22.

Solution

Concept: Viral diseases in poultry, such as Ranikhet disease (Newcastle disease), are highly contagious and affect the respiratory, nervous, and digestive systems. These diseases show characteristic clinical symptoms that help in diagnosis and management in poultry farming.

Solution: Ranikhet disease is caused by the Newcastle disease virus and is one of the most severe viral diseases in poultry. A classic clinical symptom is neurological disturbance, which includes paralysis of wings and legs, twisted neck (torticollis), and incoordination. Other symptoms may include respiratory distress and greenish diarrhea, but paralysis is a key identifying sign. Swelling of comb and wattles is more typical of fowl pox, while skin thickening and reduced water intake are not primary features. Therefore, paralysis and torticollis is the correct symptom.

Final Answer: Paralysis of wings and legs (torticollis)

Answer: (B)

Q23.

Solution

Concept: Rinderpest is a highly contagious viral disease of cattle that historically caused severe economic losses in livestock. It affects the digestive system and leads to high mortality if not controlled.

Solution: Rinderpest, also known as cattle plague, was characterized by sudden onset of high fever followed by severe gastrointestinal symptoms such as profuse watery or "shooting" diarrhea, dehydration, and rapid death. The disease spreads quickly among cattle populations. It does not primarily cause lameness, brain hemorrhage, or tumor formation. The most distinctive clinical sign is high fever accompanied by severe diarrhea, which leads to weakness and death.

Final Answer: High fever and 'shooting diarrhea'

Answer: (A)

Q24.

Solution

Concept: Artificial Insemination (AI) is a reproductive biotechnology used in animal husbandry to improve genetic quality and productivity of livestock. It involves the collection and manual transfer of semen from superior males to females.

Solution: The primary advantage of Artificial Insemination is rapid genetic improvement in livestock populations using semen from genetically superior sires. This allows farmers to improve milk yield, disease resistance, and productivity without maintaining breeding males on every farm. AI also helps in controlling diseases and improving breeding efficiency. However, it still requires proper heat detection and does not eliminate it. It also does not significantly affect gestation period or semen cost as the main benefit. Therefore, genetic improvement is the key advantage.

Final Answer: Rapid genetic improvement using superior sires

Answer: (B)

Q25.

Solution

Concept: Milk is an emulsion of fat in water, and its stability depends on the distribution of fat globules. Processing techniques are used to improve texture, appearance, and shelf stability of milk products.

Solution: Homogenization is a milk processing technique in which fat globules are broken down into smaller particles and evenly distributed throughout the milk. This prevents the separation of cream layer on the surface, ensuring uniform consistency and improved digestibility. It does not kill bacteria (that is pasteurization), does not separate cream, and does not involve vitamin fortification. Therefore, the main purpose of homogenization is to prevent cream rising.

Final Answer: Prevent fat globules from rising to the surface

Answer: (C)

Q26.

Solution

Concept: Soil pH is a critical factor affecting nutrient availability and plant growth. Acidic soils have low pH and often require chemical amendments to neutralize acidity and improve fertility.

Solution: Agricultural lime (calcium carbonate or similar compounds) is commonly used to neutralize acidic soils. It reacts with hydrogen ions in the soil, raising the pH and improving nutrient availability for crops. Gypsum is mainly used for soil structure improvement and sodic soils, sulfur is used to acidify alkaline soils, and urea is a nitrogen fertilizer. Therefore, lime is the correct soil amendment for acidic soil correction.

Final Answer: Agricultural Lime

Answer: (B)

Q27.

Solution

Concept: Soil texture refers to the relative proportion of sand, silt, and clay particles in soil. It plays an important role in water retention, aeration, and nutrient holding capacity, which directly affects crop growth.

Solution: Loam soil is considered ideal for agriculture because it contains a balanced mixture of sand, silt, and clay. This combination provides good drainage, adequate moisture retention, and sufficient nutrient-holding capacity. Gravel and peat are not primary mineral soil components in standard soil texture classification. Therefore, the correct composition of loam soil is sand, silt, and clay.

Final Answer: Sand, Silt, and Clay

Answer: (A)

Q28.

Solution

Concept: Fertilizer labels follow the NPK system, which indicates the percentage composition of essential plant nutrients. These nutrients are Nitrogen (N), Phosphorus (P), and Potassium (K), expressed in a fixed order to guide proper fertilizer application in agriculture.

Solution: In a 10-20-10 NPK fertilizer, the three numbers represent Nitrogen, Phosphate, and Potash respectively. The middle number specifically represents the percentage of available phosphate (P_2O_5), which is essential for root development, flowering, and energy transfer in plants. Nitrogen supports vegetative growth, while potassium improves disease resistance and overall plant health. Magnesium is not part of the standard NPK labeling system. Therefore, the middle value indicates phosphate content.

Final Answer: Available Phosphate (P_2O_5)

Answer: (C)

Q29.

Solution

Concept: Plant nutrients are classified into macro-nutrients and micro-nutrients based on the quantity required by plants. Macro-nutrients are needed in relatively large amounts for growth, development, and physiological functions.

Solution: Nitrogen is a primary macronutrient essential for plant growth. It plays a key role in chlorophyll formation, protein synthesis, and vegetative development. Boron, iron, and zinc are micronutrients required in very small quantities but are still essential for plant metabolic processes. Since nitrogen is required in large amounts, it is classified as a macronutrient.

Final Answer: Nitrogen

Answer: (C)

Q30.

Solution

Concept: Irrigation systems are designed to supply water to crops efficiently. Water-use efficiency is important in agriculture, especially in areas with limited water resources. Different irrigation methods vary in efficiency and water conservation capability.

Solution: Drip irrigation is considered the most water-efficient method because it delivers water directly to the root zone of plants in small, controlled amounts. This minimizes water loss due to evaporation, runoff, and deep percolation. Furrow, border strip, and check basin irrigation methods involve surface application of water, which leads to higher losses and lower efficiency. Therefore, drip irrigation is the best method for conserving water.

Final Answer: Drip (Trickle) Irrigation

Answer: (B)

Q31.

Solution

Concept: Water movement in the soil-plant-atmosphere system is a key factor in crop water requirement estimation. Evapotranspiration is an important concept in irrigation scheduling and agricultural water management.

Solution: Evapotranspiration refers to the combined process of evaporation from the soil surface and transpiration from plant leaves. Together, these processes represent the total water loss from a cropped field. This value is used to estimate crop water requirements for efficient irrigation planning. Rainfall, runoff, and seepage are not part of evapotranspiration. Therefore, the correct components are soil evaporation and plant transpiration.

Final Answer: Soil evaporation and Plant transpiration

Answer: (C)

Q32.

Solution

Concept: Soil drainage systems are used in agriculture to manage excess water in the root zone. Poor drainage leads to waterlogging, reduced oxygen availability, and poor crop growth.

Solution: Sub-surface drainage systems are installed below the soil surface to remove excess water and lower the water table. This helps prevent waterlogging, improves soil aeration, and enhances root development. It does not directly affect soil pH, control wind erosion, or collect rainwater. Its primary purpose is to ensure proper soil moisture conditions for healthy crop growth by maintaining an optimal water table level.

Final Answer: Lower the water table to prevent waterlogging

Answer: (B)

Q33.

Solution

Concept: Weed control methods are classified into chemical, biological, cultural, and mechanical approaches. Cultural practices involve agronomic techniques that suppress weed growth by improving crop competitiveness.

Solution: Crop rotation and cover cropping are cultural weed control methods. Crop rotation interrupts weed life cycles by changing crops in sequence, while cover crops suppress weed growth by shading the soil and competing for resources. Chemical control uses herbicides, biological control uses natural enemies, and mechanical control involves physical removal of weeds. Therefore, the correct classification is cultural control.

Final Answer: Cultural Control

Answer: (C)

Q34.

Solution

Concept: Integrated Pest Management (IPM) is a sustainable approach to pest and weed control that combines multiple methods to minimize environmental impact while maintaining effective control.

Solution: IPM emphasizes the integrated use of biological, cultural, mechanical, and chemical methods to manage pests and weeds effectively. It avoids over-reliance on any single method, especially chemical herbicides, to prevent resistance and environmental damage. It also does not aim for total eradication of all non-crop species, nor does it rely solely on manual labor. Therefore, the correct strategy is a combination of multiple control tools.

Final Answer: A combination of biological, cultural, and chemical tools

Answer: (C)

Q35.

Solution

Concept: Rice cultivation involves several nursery raising techniques to produce healthy seedlings for transplanting. Different methods are used depending on resource availability, time, and labor efficiency. The Dapog method is a modern nursery technique widely used in intensive rice farming systems.

Solution: The Dapog method is a technique used for raising rice seedlings in a nursery. In this method, seeds are sown on a thin layer of soil or banana leaves without soil puddling, resulting in mat-type seedlings that are easy to transplant. It is mainly used during the nursery stage of rice production and allows quick seedling preparation with minimal space and water use. It is not related to harvesting, herbicide application, or irrigation management. Therefore, it is associated with raising seedlings in a nursery.

Final Answer: Raising seedlings in a nursery

Answer: (B)

Q36.

Solution

Concept: Wheat growth is divided into several stages such as germination, tillering, crown root initiation, jointing, flowering, and grain filling. Certain stages are highly sensitive to water stress and directly affect final yield.

Solution: The Crown Root Initiation (CRI) stage is the most critical stage in wheat growth. During this stage, new roots develop, and moisture stress can severely reduce root formation, tillering, and overall yield. Adequate irrigation at CRI ensures strong crop establishment and higher productivity. Although tillering, jointing, and dough stages are also important, CRI is the most sensitive to water stress and results in maximum yield loss if neglected.

Final Answer: Crown Root Initiation (CRI) stage

Answer: (B)

Q37.

Solution

Concept: Millets are drought-resistant cereal crops grown in arid and semi-arid regions. They vary in nutritional content, with some being rich in minerals like calcium and iron, making them highly valuable for human nutrition.

Solution: Ragi (Finger Millet) is known for its exceptionally high calcium content among all cereals and millets. It is also highly drought-tolerant and well-suited for dryland agriculture. While Jowar, Bajra, and Kodo millet are also important drought-resistant crops, they do not match ragi in calcium content. Therefore, ragi is the correct answer.

Final Answer: Ragi (Finger Millet)

Answer: (C)

Q38.

Solution

Concept: Sugarcane cultivation involves several agronomic practices such as earthing-up, irrigation, and fertilization. These practices help in improving crop support, root development, and yield.

Solution: Earthing-up in sugarcane refers to the process of adding soil around the base of the plant. This practice provides physical support to the cane, prevents lodging (falling over), and promotes better root anchorage. It also helps in improving drainage and nutrient uptake. It is not primarily related to sugar recovery, water sprouts, or flowering induction. Therefore, its main purpose is to support the crop and prevent lodging.

Final Answer: Provide support and prevent lodging of the canes

Answer: (B)

Q39.

Solution

Concept: Precision farming uses advanced technologies to manage variability in agricultural fields. It relies on spatial data and mapping tools to optimize input use and improve productivity.
Solution: The Global Positioning System (GPS) is the technology used to obtain precise geographical coordinates for site-specific crop management. It helps in field mapping, machinery guidance, and accurate application of inputs. GIS is used for data analysis and mapping, Remote Sensing collects field information, and VRT applies inputs variably based on data. However, GPS is specifically responsible for providing location coordinates.
Final Answer: Global Positioning System (GPS)

Answer: (C)

Q40.

Solution

Concept: Zero Budget Natural Farming (ZBNF) is an eco-friendly farming system that reduces dependency on external inputs. It uses natural preparations for seed treatment, soil health improvement, and pest management.
Solution: Beejamrut is a microbial seed treatment used in ZBNF. It is prepared from cow dung, cow urine, soil, lime, and water. Its primary function is to treat seeds and protect them from soil-borne pathogens, enhancing germination and early plant health. It is not primarily used as foliar spray, nitrogen enrichment, or decomposition accelerator. Therefore, its main role is seed treatment and protection.
Final Answer: Seed treatment to protect from soil-borne diseases

Answer: (B)

Q41.

Solution

Concept: Organic farming systems such as those defined under the National Programme for Organic Production (NPOP) regulate the use of inputs to ensure ecological balance and food safety. Certain synthetic or genetically modified inputs are strictly restricted or prohibited to maintain organic integrity.
Solution: Under NPOP guidelines, Genetically Modified (GM) seeds are prohibited because organic farming emphasizes natural breeding methods and non-GMO inputs. Bio-fertilizers like Azotobacter, vermicompost, and neem cake are allowed as they are natural and eco-friendly soil amendments. GM seeds are excluded due to concerns related to genetic modification and ecological impact. Therefore, among the given options, GM seeds are not permitted in organic farming systems.
Final Answer: Genetically Modified (GM) seeds

Answer: (C)

Q42.

Solution

Concept: Physiological disorders in plants are caused by environmental pollution, nutrient imbalance, or exposure to harmful gases. Mango fruits are particularly sensitive to air pollutants during development.

Solution: Black Tip disorder in mango is caused by the emission of sulfur dioxide and other gases from brick kilns. These fumes convert into toxic compounds that affect fruit development, leading to discoloration and tip blackening. This disorder is commonly observed in orchards located near brick kiln areas. Carbon monoxide, ethylene, and methane are not primarily responsible for this condition. Therefore, sulfur dioxide fumes are the main cause.

Final Answer: Sulfur Dioxide from Brick Kilns

Answer: (A)

Q43.

Solution

Concept: Tomato varieties are classified based on growth habit (determinate or indeterminate) and their suitability for fresh consumption or processing industries. Determinate varieties are preferred for processing due to synchronized fruiting and easier harvesting.

Solution: Roma is a well-known tomato variety with a determinate growth habit, making it suitable for processing purposes such as paste, puree, and ketchup production. Determinate plants grow to a fixed height and produce fruits in a concentrated period, which is ideal for industrial processing. Other varieties like Arka Rakshak and Pusa Ruby are primarily used for fresh market consumption. Therefore, Roma is the correct processing variety.

Final Answer: Roma

Answer: (C)

Q44.

Solution

Concept: Plant diseases are caused by different types of pathogens such as fungi, bacteria, viruses, and nematodes. Each pathogen produces specific symptoms and requires different management strategies. Citrus crops are highly susceptible to several bacterial and fungal diseases that affect yield and fruit quality.

Solution: Citrus canker is a serious bacterial disease affecting acid lime and other citrus species. It is caused by the bacterium *Xanthomonas citri*. The disease is characterized by raised corky lesions on leaves, stems, and fruits, often surrounded by a yellow halo. These lesions reduce photosynthetic activity, cause premature leaf and fruit drop, and severely affect market quality. The pathogen spreads through rain splash, wind, insects, and infected plant material. Fungal pathogens cause diseases like powdery mildew, viral pathogens cause systemic infections, and nematodes affect roots, but none produce the typical canker lesions seen in citrus canker. Therefore, the correct causal organism is bacteria.

Final Answer: Bacteria

Answer: (C)

Q45.

Solution

Concept: Potato crop management includes practices that improve tuber quality and prevent disease spread. Dehaulming is an important agronomic practice performed before harvest.

Solution: Dehaulming refers to the removal or cutting of potato plant tops (haulms) before harvesting. This practice helps in preventing the spread of diseases such as late blight from foliage to tubers and allows the tuber skin to harden, improving storage quality and reducing damage during harvest. It does not increase tuber number or induce sprouting. Therefore, its main purpose is to allow skin hardening and improve storability.

Final Answer: Allow the tuber skin to harden before harvest

Answer: (B)

Q46.

Solution

Concept: Air layering (also called gooty) is a vegetative propagation technique used in horticultural crops to induce root formation on a stem while it is still attached to the parent plant. Moisture retention is essential for successful root development.

Solution: In air layering, the wounded portion of the stem is wrapped with a moist medium to encourage root formation. Sphagnum moss is most commonly used because it retains moisture effectively and provides a suitable environment for root initiation. It is then covered with plastic or polythene to prevent drying. Other materials like paper, sand, or straw do not retain moisture as efficiently. Therefore, sphagnum moss is the correct material.

Final Answer: Sphagnum moss

Answer: (B)

Q47.

Solution

Concept: Vegetative propagation techniques such as budding and grafting are widely used in horticulture to multiply superior plant varieties. Among these, shield budding (T-budding) is a simple and efficient method used for many fruit and ornamental plants.

Solution: Shield budding or T-budding is most commonly and commercially used in crops like citrus and roses. In this method, a single bud from a desired plant is inserted into a T-shaped incision on the rootstock. It ensures quick healing, high success rate, and uniform plant production. Citrus plants benefit greatly due to compatibility with rootstocks, and roses are widely propagated for ornamental purposes. Banana, guava, and grapes are generally propagated through other methods like suckers, grafting, or cuttings. Therefore, citrus and roses are the correct answer.

Final Answer: Citrus and Roses

Answer: (B)

Q48.

Solution

Concept: Fruit products like jelly, jam, and preserves require specific natural constituents in fruits for proper texture, consistency, and gel formation. Among these, pectin plays a key role in gel formation.

Solution: Pectin is a naturally occurring polysaccharide present in fruits that is essential for gel formation in jelly preparation. When combined with sugar and acid under proper conditions, pectin forms a stable gel structure, giving jelly its characteristic consistency. Fruits with high pectin content are preferred for jelly making. Vitamin C, lycopene, and potassium do not contribute to gel formation. Therefore, pectin is the most essential constituent.

Final Answer: Pectin

Answer: (B)

Q49.

Solution

Concept: Fruit products are standardized under FSSAI regulations to ensure quality, safety, and consistency. Total Soluble Solids (TSS) is an important parameter used to define fruit-based products like jam, jelly, and marmalade.

Solution: According to food processing standards, fruit jam must contain a minimum Total Soluble Solids (TSS) content of about 65%. This ensures proper consistency, preservation, and sweetness of the product. Lower TSS results in poor gel formation and reduced shelf life, while excessively high values may affect texture. Therefore, 65% is the correct minimum requirement for fruit jam.

Final Answer: 65%

Answer: (B)

Q50.

Solution

Concept: Food preservation involves the use of chemical preservatives to prevent microbial spoilage, fermentation, and quality degradation in processed foods such as ketchup, sauces, and juices.

Solution: Sodium benzoate is the most commonly used preservative in commercial tomato ketchup to prevent fermentation and microbial growth. It is effective in acidic conditions and helps extend shelf life without significantly affecting flavor. Potassium metabisulphite is more commonly used in juices and wines, while citric acid and vinegar mainly act as acidulants and flavoring agents rather than primary preservatives. Therefore, sodium benzoate is the correct answer.

Final Answer: Sodium Benzoate

Answer: (B)

Answer Key

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