Rajasthan JET Agriculture Sample Paper-3

Duration: 40 Minutes **Maximum Marks: 160**

Instructions

- This paper contains **40** Multiple Choice Questions (Single Correct).
- Each correct answer carries **+4 marks**.
- Each incorrect answer carries: **−1 mark**.
- Use of mobile phones, smartwatches, calculators, or any electronic gadgets is strictly prohibited.

Q1. In USDA soil texture classification, which of the following correctly describes the sand content range for "Sandy Loam" soil?

(A) Sandy loam contains 70–85% sand, making it well-drained and suitable for groundnut and cumin in arid Rajasthan

(B) Sandy loam contains more than 85% sand, similar to loamy sand, and is suitable only for drought-resistant crops

(C) Sandy loam contains less than 50% sand and behaves more like a loam, making it unsuitable for arid-zone crops

(D) Sandy loam and loamy sand have identical particle-size proportions and are interchangeable terms in soil science

Q2. During nitrification in the soil nitrogen cycle, which pair of bacteria and their respective roles is correctly matched?

(A) *Nitrobacter* converts NH_4^+ to NO_2^-; *Nitrosomonas* converts NO_2^- to NO_3^-

(B) *Nitrosomonas* converts NH_4^+ to NO_2^-; *Nitrobacter* converts NO_2^- to NO_3^-

(C) Both *Nitrosomonas* and *Nitrobacter* convert NH_4^+ directly to NO_3^- in a single step

(D) *Nitrosomonas* fixes atmospheric N_2 and *Nitrobacter* converts it to NH_4^+

Q3. Phosphorus availability in soil is maximum in which pH range, and what happens to phosphorus at strongly acidic pH below 5.5?

(A) Phosphorus is most available at pH 4.0–5.0; at higher pH it forms calcium phosphate complexes and becomes unavailable

(B) Phosphorus is most available at pH 8.5–9.0; below pH 7.0 it is entirely unavailable to plant roots

(C) Phosphorus is most available at pH 6.0–7.0; below pH 5.5 it gets fixed by iron and aluminium oxides as insoluble compounds

(D) Phosphorus availability is not affected by soil pH; it remains constant across all pH ranges from 4 to 9

Q4. Cation Exchange Capacity (CEC) of soil is expressed in cmol(+)/kg. A soil with CEC of 40 cmol(+)/kg compared to a soil with CEC of 8 cmol(+)/kg will:

(A) Leach nutrients faster because more exchange sites allow quicker ion movement through the profile

(B) Have lower water-holding capacity since CEC is inversely related to moisture retention in soil

(C) Show poor response to liming because high-CEC soils resist pH change under all conditions

(D) Retain more cation nutrients (Ca^{2+}, Mg^{2+}, K^+) and resist leaching, making it a more fertile soil

Q5. Which of the following is the most accurate statement about drip irrigation and its suitability for arid Rajasthan?

(A) Drip irrigation achieves 90–95% water use efficiency, enables fertigation, reduces weed growth between rows, and is ideal for horticulture crops in water-scarce Rajasthan

(B) Drip irrigation is only suitable for orchards and cannot be used for field crops like cotton or sugarcane

(C) Drip irrigation increases soil salinity uniformly across the field, making it unsuitable for arid soils of Rajasthan

(D) Drip irrigation requires a minimum rainfall of 600 mm/year to function effectively and is therefore unsuitable for Rajasthan

Q6. A farmer in Rajasthan grows chickpea (*Cicer arietinum*) in Rabi followed by pearl millet in Kharif on the same field. The primary soil-fertility benefit of this rotation is:

(A) Chickpea increases soil potassium by releasing potash from mineral weathering during the Rabi season

(B) Chickpea root nodules harbour *Rhizobium* bacteria that fix 50–100 kg N/ha of atmospheric nitrogen, which is released as organic matter after harvest and benefits the subsequent pearl millet crop

(C) Chickpea roots exude toxic allelochemicals that sterilise soil pathogens but do not add nitrogen

(D) Pearl millet itself fixes atmospheric nitrogen via associative bacteria, so the rotation benefit is unrelated to chickpea

Q7. Contour bunding is recommended for slopes of 2–8%, while terracing (bench terracing) is preferred for slopes greater than 8%. The primary purpose of contour bunding is:

(A) To increase the speed of runoff water so that it drains off before causing erosion on steep hillsides

(B) To create flat cultivation platforms by cutting and filling, used mainly on slopes exceeding 25%

(C) To slow down surface runoff, promote in-situ water conservation and check soil erosion on gentle to moderate slopes

(D) To channelise excess rainwater into irrigation canals for downstream use by converting slope energy to velocity

Q8. Which of the following statements about *Sesbania rostrata* (stem-nodulating Sesbania) as a green manure crop is correct?

(A) *Sesbania rostrata* fixes nitrogen only in root nodules; it has no stem nodules and is therefore less efficient than *Sesbania bispinosa*

(B) *Sesbania rostrata* is a Rabi-season green manure crop that must be incorporated into soil before wheat sowing

(C) *Sesbania rostrata* cannot be grown in waterlogged conditions and is therefore not suitable as a pre-paddy green manure

(D) *Sesbania rostrata* is unique in forming both stem and root nodules with *Azorhizobium*, allowing it to fix up to 80–100 kg N/ha even under partially flooded conditions before paddy transplanting

Q9. Among Rajasthan wheat varieties HD-2781, Raj-4120, and WH-1142, which variety is specifically known for heat tolerance (terminal heat stress resistance) and is recommended for late sowing?

(A) HD-2781 (now reclassified as HD-2781) is a heat-tolerant variety suitable for timely and late sowing under the agro-climatic conditions of Rajasthan

(B) Raj-4120 is known exclusively for cold tolerance and is recommended only for irrigated timely sowing in northern Rajasthan

(C) WH-1142 is a heat-sensitive, high-yielding variety restricted to optimal (timely) sowing only and cannot tolerate terminal heat stress

(D) All three varieties – HD-2781, Raj-4120, and WH-1142 – are equally heat-tolerant and interchangeable for late sowing

Q10. For transplanted paddy (rice) in Rajasthan, what is the recommended seedling age at transplanting, row-to-row and plant-to-plant spacing, and the appropriate water depth in the main field immediately after transplanting?

(A) Seedling age 35–40 days, spacing 30 $\times$ 25 cm, water depth 10–12 cm immediately after transplanting

(B) Seedling age 21–25 days, spacing 20 × 15 cm, and water depth 2–3 cm in the main field immediately after transplanting to avoid seedling stress

(C) Seedling age 10–12 days, spacing 10 × 10 cm, and the field should be completely dry at transplanting to reduce root damage

(D) Seedling age 45–50 days, spacing 40 × 30 cm, and water depth 15 cm to prevent weeds from germinating after transplanting

Q11. In Kharif maize cultivation, the agronomic practice of "earthing-up" is carried out at the 6–8 leaf stage. The primary purpose of this operation is:

(A) To bury surface-applied fertiliser deep into the soil so that it is not lost through volatilisation during monsoon rains

(B) To reduce soil evaporation by creating a thick soil mulch around the plant base during the wet Kharif season

(C) To support the stem base by mounding soil around it, stimulate adventitious root development, and prevent lodging caused by strong winds and heavy rains

(D) To expose deeper soil layers to sunlight, thereby destroying soil-borne fungal pathogens that cause root rot in maize

Q12. Pearl millet hybrid HHB-67 (Improved) was specifically released for Rajasthan because of which combination of traits?

(A) HHB-67 is a late-maturing variety with very high grain yield of 4.5 t/ha but is susceptible to downy mildew, requiring fungicide treatment

(B) HHB-67 is a dual-purpose variety bred primarily for fodder yield with only moderate grain yield in arid conditions

(C) HHB-67 matures in about 65 days (early), has high grain yield, but requires a minimum of 450 mm rainfall to perform well

(D) HHB-67 matures in approximately 65 days, yields 2.0–2.5 t/ha under rainfed arid conditions, and carries resistance to downy mildew

(*Sclerospora graminicola*), the most destructive disease of pearl millet in Rajasthan

Q13. Among chickpea varieties GNG-663 and RSG-44 released for Rajasthan, which one is a bold-seeded Kabuli-type chickpea with high export demand?

(A) GNG-663 is a bold-seeded Kabuli-type chickpea with cream-coloured large seeds, suitable for export markets and recommended for Rajasthan

(B) RSG-44 is a bold-seeded Kabuli-type chickpea with 100-seed weight exceeding 60 g and is the primary export variety

(C) Both GNG-663 and RSG-44 are exclusively Desi-type (small, wrinkled, pigmented seed) chickpeas with no Kabuli characteristics

(D) GNG-663 is a Desi-type variety used only for domestic consumption; RSG-44 is a forage legume not suitable for grain production

Q14. Among mustard varieties Pusa Bold and Kranti, which one is known for oil content exceeding 40%, and what is its distinguishing agronomic characteristic?

(A) Kranti has oil content below 35%; Pusa Bold has over 45% oil content and is also resistant to white rust disease

(B) Pusa Bold is a bold-seeded toria variety with oil content of 42–44% and is recommended for early Rabi sowing in northern Rajasthan

(C) Both Pusa Bold and Kranti have equal oil content of approximately 38%; the only difference is seed colour

(D) Kranti has higher oil content of 38–40%, while Pusa Bold has only 32% oil; Kranti is therefore preferred for oil extraction

Q15. Soybean seeds are inoculated with *Bradyrhizobium japonicum* before sowing. The mechanism by which this biofertiliser benefits the crop is:

(A) *Bradyrhizobium japonicum* secretes phosphatase enzymes that solubilise rock phosphate in soil, increasing phosphorus uptake by soybean roots

(B) *Bradyrhizobium japonicum* produces auxins that stimulate soybean root elongation and increase water absorption from deeper soil layers

(C) *Bradyrhizobium japonicum* colonises soybean root cortex cells, triggers nodule formation, and within the nodule fixes atmospheric N_2 into NH_4^+ via the nitrogenase enzyme, which the plant then assimilates as amino acids

(D) *Bradyrhizobium japonicum* is a mycorrhizal fungus that extends the root network; it fixes atmospheric nitrogen only under anaerobic waterlogged conditions

Q16. Berseem (*Trifolium alexandrinum*) is the most important Rabi fodder crop in irrigated plains of Rajasthan. Its recommended sowing time and approximate number of irrigations required during the crop season are:

(A) Sowing in August–September (late Kharif), requiring only 2–3 irrigations in the entire season

(B) Sowing in November–December (late Rabi), requiring 10–12 irrigations due to its very high water demand

(C) Sowing in January–February (late season), requiring no irrigation as winter dew provides sufficient moisture

(D) Sowing in mid-October to early November, requiring 8–10 irrigations at 10–15 day intervals to sustain 4–6 successive cuttings across the Rabi season

Q17. Polyembryony in mango seeds means that a single seed produces more than one embryo. Which of the following correctly explains the agricultural significance of polyembryony in mango?

(A) Nucellar embryos arising from polyembryony are genetically identical to the mother tree, disease-free, and vigorous; they are exploited

in citrus and mango rootstock production for uniform, true-to-type seedlings

(B) Polyembryony in mango causes all seedlings from one seed to be genetically diverse hybrids, making it impossible to maintain variety purity through seed propagation

(C) Polyembryony is a defect where multiple embryos compete for resources, reducing seedling vigour and making vegetatively propagated trees always superior

(D) Polyembryony in mango only produces zygotic embryos; there are no nucellar embryos, so seedlings show normal Mendelian segregation

Q18. Sri Ganganagar district of Rajasthan is the leading producer of Kinnow mandarin in India. The primary agro-climatic reason for Kinnow's success in this region is:

(A) Sri Ganganagar receives the highest rainfall in Rajasthan (>700 mm/year), providing adequate natural irrigation for the heavy water demand of Kinnow

(B) Sri Ganganagar has a semi-arid climate with cool dry winters (which improve fruit colour and TSS) and canal irrigation from the Indira Gandhi Canal system, providing the warm dry summers and chilly winters that Kinnow mandarin requires for quality fruit development

(C) Kinnow mandarin requires acid soils (pH 4.5–5.5) and Sri Ganganagar has the most acidic soils in Rajasthan due to volcanic parent material

(D) Sri Ganganagar's proximity to Pakistan provides a unique microclimate with high atmospheric humidity that Kinnow mandarin requires year-round

Q19. Ber (*Ziziphus mauritiana*) is called the "poor man's fruit" of arid Rajasthan. Which of the following correctly describes its drought-tolerance mechanism?

(A) Ber tolerates drought by dropping all its leaves in summer (complete deciduousness) and entering deep dormancy with zero metabolic activity

(B) Ber has a superficial root system confined to the top 20 cm of soil which rapidly absorbs surface moisture from brief rain showers

(C) Ber has an extensive deep taproot system that accesses sub-soil moisture, thick waxy leaf cuticle that reduces transpiration, and can tolerate soil water potential as low as -1.5 MPa, making it highly suitable for arid and semi-arid Rajasthan

(D) Ber avoids drought entirely by completing its entire growth, flowering, and fruiting cycle only during the monsoon months of July–September

Q20. In tomato cultivation, indeterminate varieties differ from determinate varieties in which key aspect, and which plant growth regulator is used to improve fruit set in tomato?

(A) Indeterminate varieties have a fixed number of nodes (8–10) and terminate in a flower cluster; they require no staking; 2,4-D is applied at 50 ppm for fruit setting

(B) Determinate varieties continue growing indefinitely and require staking throughout the season; gibberellic acid at 100 ppm promotes fruit set in both types

(C) Indeterminate varieties produce all fruits simultaneously for mechanical harvest; determinate varieties yield over 8–9 months and need continuous harvesting

(D) Indeterminate varieties continue vegetative growth indefinitely with flowers on lateral shoots and require staking; 4-CPA (para-chlorophenoxyaceti acid) or PCPA at 25–50 ppm is applied as a fruit-setting hormone

Q21. In T-budding (shield budding), the correct sequence of operations performed on the rootstock is:

(A) Make a vertical cut (2–3 cm) on the rootstock bark, then a horizontal cut at the top forming a T-shape; lift the bark flaps, insert the shield bud (with bud and bark from scion), and bind with polythene tape leaving the bud exposed

(B) Make two parallel longitudinal cuts on the rootstock, peel off the bark strip between them, place the bud chip directly on the exposed wood, and tie with tape

(C) First remove the rootstock shoot completely, then insert a whole scion shoot of the desired variety into the stump and bind with grafting wax

(D) Make a diagonal cut across the rootstock stem, cut the scion to a matching diagonal, join the two cut surfaces (approach graft), and allow them to grow together for 6 months

Q22. Apple is stored at 0–1°C while mango must be stored at 12–13°C. The reason mango cannot be stored at near-freezing temperatures is:

(A) Mango produces excessive ethylene at temperatures below 5°C, which causes accelerated over-ripening rather than storage life extension

(B) Mango is a tropical fruit susceptible to chilling injury below 10–12°C; symptoms include skin pitting, internal browning (black streaks in pulp), and failure to ripen normally upon removal, making sub-optimal cold storage worse than no refrigeration

(C) Mango has a very thin skin that freezes solid at 0–1°C and ruptures all cells, causing immediate spoilage within hours

(D) Mango requires high humidity ($>$98% RH) which cannot be maintained at low temperatures, so it must be stored warm to preserve its water content

Q23. In plant breeding, heterosis (hybrid vigour) is defined as the superiority of the F_1 hybrid over its parents. Which of the following correctly describes the two bases used to measure heterosis?

(A) Heterosis is only measured over the better parent; measuring it over the mid-parent is considered scientifically incorrect and never used

(B) Heterosis in maize is always negative (inbred depression) in the F_1 and only becomes positive in the F_2 generation after recombination

(C) Mid-parent heterosis (MPH) measures F_1 superiority over the average of both parents; heterobeltiosis measures F_1 superiority over the better parent; commercial heterosis compares F_1 to the best commercial check variety

(D) Heterosis only occurs between species (interspecific crosses) and never between varieties of the same crop species (intraspecific crosses)

Q24. In hybridisation of crop plants, emasculation is performed before the anthers dehisce (shed pollen). The correct definition and timing of emasculation in a cross-pollinated operation is:

(A) Emasculation is the removal of the pistil (stigma and style) from the female parent flower so that its own pollen cannot fall on it, done after pollen collection

(B) Emasculation is the application of a chemical gametocide to kill the pollen on the male parent before it is used as a pollen donor

(C) Emasculation means removing all petals (corolla) from the flower to expose the reproductive organs for easy cross-pollination by insects or wind

(D) Emasculation is the removal of anthers (stamens) from the flower selected as the female parent before they mature and shed pollen, preventing self-pollination and ensuring controlled cross-fertilisation

Q25. The correct sequence of seed certification classes in India, from the most genetically pure source to the commercial farmer level, is:

(A) Nucleus Seed $\rightarrow$ Breeder Seed $\rightarrow$ Foundation Seed (FS-I and FS-II) $\rightarrow$ Certified Seed $\rightarrow$ Truthful Label Seed (for crops not under certification scheme)

(B) Certified Seed → Foundation Seed → Breeder Seed → Nucleus Seed, representing increasing genetic purity from farm to research station

(C) Breeder Seed → Nucleus Seed → Certified Seed → Foundation Seed, with Foundation Seed being the most widely distributed to farmers

(D) Truthful Label Seed → Certified Seed → Foundation Seed → Breeder Seed, all produced under mandatory government certification

Q26. Thiram (TMTD – Tetramethylthiuram Disulphide) is a commonly used seed-treatment fungicide. Its recommended dose and the class of pathogens it primarily protects against are:

(A) Thiram is applied at 10–15 g/kg seed and controls only bacterial seed-borne diseases such as bacterial blight of cotton

(B) Thiram is applied at 2–3 g/kg seed as a contact fungicide; it protects seeds from soil-borne fungi (*Pythium*, *Rhizoctonia*, *Fusarium*) that cause damping-off and seed rot during germination

(C) Thiram at 0.5 g/kg seed is sufficient to control all classes of pathogens including viruses and nematodes in the seed lot

(D) Thiram is a systemic fungicide applied at 5 g/kg seed; it is translocated into the seedling tissues and protects all above-ground parts from foliar diseases

Q27. The greenbug aphid (*Schizaphis graminum*) is an important pest of wheat in Rajasthan. Which of the following correctly describes its feeding habit and recommended control measure?

(A) *Schizaphis graminum* is a chewing insect that cuts wheat leaves, causing characteristic ragged margins; it is controlled by applying carbaryl dust

(B) *Schizaphis graminum* is a stem-boring pest whose larva tunnels through the culm and causes dead-heart symptoms; BHC dust is the recommended control

(C) *Schizaphis graminum* is a phloem-sap sucking insect; it injects toxic saliva into phloem, causing chlorotic stippling and leaf curl; it is con-

trolled with imidacloprid seed treatment or foliar spray of dimethoate (30 EC) at 0.05%

(D) *Schizaphis graminum* is a soil-dwelling sucking pest that attacks wheat roots; it is controlled by soil drenching with chlorpyrifos emulsion

Q28. Yellow rust (stripe rust) of wheat caused by *Puccinia striiformis* is identified by which diagnostic symptom, and what is the recommended systemic fungicide for its control?

(A) Yellow rust appears as large circular orange-brown pustules scattered randomly on both leaf surfaces; mancozeb WP at 0.2% is the first-line control

(B) Yellow rust produces powdery white colonies on the upper leaf surface that can be rubbed off easily; sulphur dust at 25 kg/ha is used for control

(C) Yellow rust causes water-soaked brown lesions on leaf sheaths that later turn silvery; carbendazim 50 WP at 0.1% spray is recommended

(D) Yellow rust produces lemon-yellow urediniospore pustules arranged in linear stripes (rows) between leaf veins on the upper surface of leaves; propiconazole (Tilt 25 EC) at 0.1% spray is the recommended systemic fungicide

Q29. *Trichogramma* species are used in biological control programmes in India. Which life stage of the target pest does *Trichogramma* parasitise, and name two crops and their pests where it is commonly deployed?

(A) *Trichogramma* parasitises the eggs of lepidopteran pests; it is used against sugarcane internode borer (*Chilo infuscatellus*) in sugarcane and against *Helicoverpa armigera* in cotton and tomato

(B) *Trichogramma* parasitises the larval stage of aphids; it is used against green peach aphid in potato and mustard aphid in rapeseed

(C) *Trichogramma* parasitises pupae of whitefly; it is deployed in greenhouse tomato and cucumber against *Bemisia tabaci*

(D) *Trichogramma* parasitises adult thrips by laying eggs inside thrips bodies; it is used in onion and chilli crops in Maharashtra

Q30. Integrated Pest Management (IPM) is a strategy that combines multiple control tactics. The correct priority order of IPM components, from the most preferred to the least preferred, is:

(A) Chemical control first, then biological, then cultural, then mechanical – chemical control is given first priority in IPM because it is the fastest and most reliable method

(B) Cultural (preventive) practices first, followed by mechanical/physical methods, then biological control agents, and chemical pesticides used only as a last resort when pest populations exceed the Economic Threshold Level

(C) Biological control first, then mechanical, then cultural, then chemical – insect predators must be released before any cultural practice is implemented

(D) IPM has no fixed priority order; all four components are applied simultaneously to achieve maximum pest kill in the shortest time

Q31. Chlorpyrifos is an organophosphate insecticide widely used in Indian agriculture. Its mode of action in the insect body involves:

(A) Blocking the sodium ion channels in insect nerve membranes, causing continuous nerve firing and convulsions similar to pyrethroid action

(B) Disrupting insect cuticle formation by inhibiting chitin synthase enzyme, preventing moulting and causing larval mortality at ecdysis

(C) Irreversibly inhibiting acetylcholinesterase enzyme at nerve synapses, causing accumulation of acetylcholine, continuous nerve stimulation, paralysis, and death of the insect

(D) Acting as a juvenile hormone analogue that prevents adult emergence from the pupal stage, causing developmental disruption rather than acute toxicity

Q32. The rice weevil (*Sitophilus oryzae*) is a primary stored-grain pest. Which of the following correctly describes the damage caused and the fumigant used for its control in grain stores?

(A) *Sitophilus oryzae* larvae feed on the outer bran layers only; grain kernels remain intact; phostoxin is not effective against this species

(B) *Sitophilus oryzae* is a sucking pest that feeds on stored grain by piercing kernels and extracting starch liquid; hydrogen cyanide fumigation at 10 g/tonne is used

(C) *Sitophilus oryzae* causes damage only to stored pulses and oilseeds; it does not attack cereal grains such as wheat, rice, and maize

(D) *Sitophilus oryzae* adults lay eggs inside grain kernels; larvae develop inside hollowing out the grain; aluminium phosphide (Phostoxin) tablets at 3 g/tonne, which release phosphine gas (PH_3) under moisture, are used as fumigant

Q33. Gir is a well-known cattle breed of India. Which of the following correctly describes its primary trait and average milk yield?

(A) Gir is a dairy (milk) breed originating from Gir forest area of Gujarat/Saurashtra; it is known for its heat tolerance (due to loose skin, large ears, and high sweat gland density), resistance to tick-borne diseases, and an average milk yield of 1500–2000 litres per lactation

(B) Gir is a draught breed primarily used for heavy field operations; its milk yield is less than 500 litres per lactation and it has no special heat-tolerance characteristics

(C) Gir is a dual-purpose breed originating from Rajasthan; it is known for drought tolerance and an average milk yield of 5000–6000 litres per lactation, similar to Holstein Friesian

(D) Gir cattle are not found in Rajasthan; they are exclusively maintained in pure breeding farms in Gujarat and are not recommended for Rajasthan conditions

Q34. Murrah is the highest milk-producing buffalo breed in India. Which of the following correctly states its origin and average fat content of milk?

(A) Murrah originates from Tamil Nadu; it has milk fat content of 5–6% and is primarily used for draught purposes in South India

(B) Murrah originates from Rohtak and Hisar districts of Haryana; its milk fat content is 6–7% (richer than cow milk), average milk yield is 1800–2500 litres per lactation, and it is the most widely exported buffalo breed globally for genetic improvement programmes

(C) Murrah originates from Punjab; it has milk fat content of 3–4% (lower than other buffalo breeds) and is preferred only for cross-breeding with hill breeds

(D) Murrah originates from Rajasthan (Bikaner district) and produces 800–1000 litres per lactation with fat content of 4%; it is primarily raised for agricultural draught

Q35. Malpura is a sheep breed native to Rajasthan. Which of the following correctly describes its primary utility and adaptation to the arid environment?

(A) Malpura is a fine-wool breed producing 3–4 kg of Merino-quality wool per year; it is raised primarily for wool in the Malpura region of Tonk district

(B) Malpura is a dual-purpose breed raised equally for fine wool and high milk production; its wool is used in carpet manufacturing

(C) Malpura is a mutton (meat) breed adapted to the semi-arid conditions of Rajasthan; it has a compact body, white fleece of medium quality (coarse wool suitable for carpet), and good foraging ability on sparse vegetation in Tonk and Sawai Madhopur districts

(D) Malpura is an exotic crossbred sheep produced by crossing Rajasthan ewes with Rambouillet rams imported from France for ultra-fine wool production

Q36. The Sirohi goat breed is native to which district of Rajasthan, and what

are its primary uses and distinguishing physical characteristics?

(A) Sirohi goat is native to Bikaner district; it is exclusively a milk breed with very long pendulous ears and produces 2.5–3.0 litres of milk per day throughout the year

(B) Sirohi goat is native to Jaisalmer district; it is a triple-purpose breed (milk, meat, and fibre) with very fine Pashmina-type fleece and is used in Pashmina wool production

(C) Sirohi goat is native to Jaipur district; it is the largest goat breed in India with black coat, primarily raised for skin (leather) production and not suitable for meat

(D) Sirohi goat is native to Sirohi district of Rajasthan; it is a dual-purpose (meat and milk) medium-sized breed with brown/tan coat, small twisted horns, compact body, good heat tolerance, and average milk yield of 0.5–1.0 litre/day; it is well adapted to semi-arid conditions

Q37. In farm management economics, which of the following correctly classifies fixed costs and variable costs with examples from crop production?

(A) Fixed costs (also called overhead costs) do not change with the level of output; examples include land rent, depreciation on farm machinery, and interest on fixed capital. Variable costs change with the level of production; examples include seeds, fertilisers, irrigation water charges, hired labour, and pesticides

(B) Fixed costs include seeds and fertilisers because these are purchased at a fixed price; variable costs include land rent because rent varies with crop prices in the market

(C) Fixed costs include all labour costs since workers must be paid regardless of crop yield; variable costs include only depreciation on tractors and irrigation equipment

(D) Both land rent and seed cost are fixed costs because both are paid before the crop is sown and cannot be recovered once the crop season begins

Q38. Under the Agricultural Produce Market Committee (APMC) Act, a Regulated Agricultural Market (Mandi) operates to protect farmers' interests. Which of the following correctly describes the key features of APMC Mandis?

(A) APMC Mandis are privately owned markets where individual traders set their own prices without any government regulation or oversight

(B) APMC Mandis require all traders and commission agents to be licensed by the Market Committee; market fees are collected on transactions; prices are discovered through open auction (or competitive bidding), and farmers receive a settlement document (p̈attï) stating the price and weight of their produce

(C) APMC Mandis mandate that all agricultural produce must be exported directly without domestic sale; the Mandi only handles produce destined for foreign markets

(D) APMC Mandis only handle perishable produce such as fruits and vegetables; they have no jurisdiction over food grains, oilseeds, or cotton

Q39. NABARD was established in 1982 as the apex development bank for agriculture and rural development in India. The full form of NABARD and its primary mandate is:

(A) National Agricultural Bank And Rural Development – it directly lends money to individual farmers at subsidised interest rates for short-term crop loans

(B) National Agriculture and Business Association for Rural Development – it regulates commodity futures markets and fixes Minimum Support Prices for all crops

(C) National Bank for Agriculture and Rural Development – it refinances commercial banks, cooperative banks, and Regional Rural Banks (RRBs) for agricultural lending, supervises rural financial institutions, and promotes rural infrastructure development through RIDF

(D) National Bank for Agricultural Research and Development – it funds agricultural research universities and provides fellowships for agricultural scientists

Q40. Minimum Support Price (MSP) for agricultural crops in India is announced before the sowing season to assure farmers of a minimum income. Which of the following correctly describes the process of MSP announcement?

(A) MSP is fixed by the Reserve Bank of India (RBI) based on inflation targets; the Agriculture Ministry only implements the prices decided by the RBI Monetary Policy Committee

(B) MSP is recommended directly by State governments based on their own cost-of-production surveys; the Central Government has no role in MSP determination

(C) MSP is fixed by the Food Corporation of India (FCI) in consultation with commodity exchanges (MCX/NCDEX); it is based on current futures market prices

(D) MSP is recommended by the Commission for Agricultural Costs and Prices (CACP) based on cost of production (A2+FL and C2), demand–supply situation, and inter-crop price parity; the Cabinet Committee on Economic Affairs (CCEA) approves and announces the final MSP

Detailed Solutions

Q1.

Solution

Concept: The USDA soil texture classification uses relative proportions of sand, silt, and clay particles. Sandy loam is an important category for arid-zone agriculture because it combines reasonable drainage with some water and nutrient retention.

Solution: Option (A) correctly states that sandy loam contains 70–85% sand. This relatively high sand content gives it excellent drainage and aeration, while the remaining silt and clay fractions provide enough water and nutrient retention to support crops like groundnut, cumin, coriander, and sesame in arid Rajasthan. Loamy sand, by contrast, has 85–90% sand and is even coarser. Option (B) is incorrect because more than 85% sand defines loamy sand, not sandy loam. Option (C) is incorrect because less than 50% sand pushes a soil into the loam or silt-loam category. Option (D) is incorrect because loamy sand and sandy loam have distinct particle-size ranges and are not interchangeable.

Final Answer: Sandy loam contains 70–85% sand, making it suitable for well-drained arid-zone crops in Rajasthan.

Answer: (A) Go Back to Q1

Q2.

Solution

Concept: Nitrification is a two-step aerobic process in the nitrogen cycle carried out by two different chemolithotrophic bacteria. It converts ammonium ions first to nitrite and then to nitrate, both of which are plant-available forms of nitrogen.

Solution: Option (B) is correct: *Nitrosomonas* (also written as *Nitrosomonas europaea*) oxidises ammonium (NH_4^+) to nitrite (NO_2^-) in the first step; *Nitrobacter* (specifically *Nitrobacter winogradskyi*) then oxidises nitrite to nitrate (NO_3^-) in the second step. Option (A) reverses the roles – this is a common error in examinations. Option (C) is incorrect because nitrification is a two-step process involving distinct intermediates; no single bacterium converts NH_4^+ directly to NO_3^- in nature (though the recently discovered *Comammox* bacteria can do so, they are not in standard syllabus). Option (D) confuses nitrification with nitrogen fixation.

Final Answer: *Nitrosomonas* converts NH_4^+ to NO_2^-; *Nitrobacter* converts NO_2^- to NO_3^-.

Answer: (B) Go Back to Q2

Q3.

Solution

Concept: Phosphorus availability in soil is strongly pH-dependent. In acidic soils (pH $<$5.5), phosphorus is fixed by iron (Fe^{3+}) and aluminium (Al^{3+}) ions, forming insoluble iron phosphate and aluminium phosphate compounds. In alkaline soils (pH $>$7.5), phosphorus precipitates as insoluble calcium phosphate. The optimum availability window is pH 6.0–7.0.

Solution: Option (C) is correct on all counts: maximum phosphorus availability occurs between pH 6.0 and 7.0, and below pH 5.5 the rapidly increasing concentrations of Fe^{3+} and Al^{3+} ions react with phosphate ions to form highly insoluble compounds, drastically reducing plant-available phosphorus. Option (A) is wrong – pH 4.0–5.0 is the zone of maximum phosphorus fixation, not availability. Option (B) is wrong – alkaline pH 8.5–9.0 actually reduces phosphorus availability through calcium fixation. Option (D) is wrong – pH has a profound effect on phosphorus availability.

Final Answer: Phosphorus is most available at pH 6.0–7.0; below pH 5.5 it is fixed by Fe and Al oxides.

Answer: (C) Go Back to Q3

Q4.

Solution

Concept: Cation Exchange Capacity (CEC) is a measure of the soil's ability to hold and exchange positively charged ions (cations). It is expressed in centimoles of positive charge per kilogram of soil (cmol(+)/kg or meq/100g). High CEC indicates more negatively charged exchange sites on clay minerals and organic matter.

Solution: Option (D) is correct. A soil with CEC of 40 cmol(+)/kg has five times more cation exchange sites than one with 8 cmol(+)/kg. These extra sites hold more Ca^{2+}, Mg^{2+}, K^{+}, Na^{+}, and NH_4^{+} cations, making them available to plant roots while resisting leaching by rainfall or irrigation. Such soils are generally more fertile. Option (A) is the opposite – high CEC resists leaching. Option (B) is incorrect because water-holding capacity is related to total pore space and organic matter, not directly to CEC. Option (C) is incorrect because while high-CEC soils require more lime (they buffer against pH change), they are not immune to liming.

Final Answer: High CEC (40 cmol/kg) means the soil retains more plant-nutrient cations and resists leaching, making it more fertile.

Answer: (D) Go Back to Q4

Q5.

Solution

Concept: Drip irrigation (micro-irrigation) delivers water directly to the root zone drop by drop through emitters in perforated pipes. It is the most water-efficient irrigation method available, achieving 90–95% water application efficiency compared to 50–60% for surface flood irrigation.

Solution: Option (A) is the correct and most comprehensive statement. It accurately covers three major advantages: (1) 90–95% water use efficiency because only the root zone is wetted and evaporation from inter-row spaces is drastically reduced; (2) fertigation capability – soluble fertilisers can be injected through the drip system, saving labour and improving nutrient use efficiency; (3) weed suppression because the inter-row areas remain dry, reducing weed germination. These features make drip irrigation particularly suitable for Rajasthan where annual rainfall is only 200–400 mm and groundwater resources are limited. Option (B) is wrong – drip is also used for cotton, sugarcane, and maize. Option (C) is wrong – drip reduces salinity buildup in the root zone. Option (D) is wrong – drip is specifically designed for water-scarce regions.

Final Answer: Drip irrigation achieves 90–95% water use efficiency and enables fertigation, making it ideal for arid Rajasthan.

Answer: (A) Go Back to Q5

Q6.

Solution

Concept: Leguminous crops like chickpea (*Cicer arietinum*) form symbiotic associations with *Rhizobium* bacteria in root nodules. Through the nitrogenase enzyme complex, these bacteria convert atmospheric dinitrogen (N_2) into ammonium (NH_4^+), enriching soil organic nitrogen after crop residue decomposition.

Solution: Option (B) is correct. Chickpea root nodules contain *Mesorhizobium ciceri* (a *Rhizobium*-type organism) that fixes 50–100 kg of atmospheric nitrogen per hectare per season. After chickpea harvest, the root biomass with nodules decomposes, releasing this nitrogen into the soil. The subsequent pearl millet (Bajra) crop benefits from this residual nitrogen, reducing the need for chemical nitrogen fertiliser. This is the primary scientific basis for cereal-legume rotation. Option (A) is incorrect – chickpea does not release potassium through mineral weathering. Option (C) is incorrect – chickpea does not produce general allelochemicals that sterilise soil. Option (D) is incorrect – pearl millet is a cereal and does not fix atmospheric nitrogen.

Final Answer: Chickpea root nodules fix 50–100 kg N/ha; this nitrogen is released

during decomposition and benefits the subsequent cereal crop.

Answer: (B) Go Back to Q6

Q7.

Solution

Concept: Soil conservation structures are designed for different slope categories. Contour bunding (earthen embankments along contour lines) is suitable for gentle to moderate slopes (2–8%) to slow runoff and promote infiltration. Bench terracing involves cutting and filling to create flat platforms on steep slopes (>8–15%).

Solution: Option (C) correctly states that the primary purpose of contour bunding is to slow down surface runoff, promote in-situ water conservation by allowing rainwater to infiltrate, and check soil erosion on gentle to moderate slopes. On a 2–8% slope, contour bunds create a series of small check dams that impound runoff temporarily. Option (A) is incorrect – increasing runoff speed would worsen erosion. Option (B) confuses contour bunding with bench terracing (cutting and filling on steep slopes). Option (D) is incorrect – contour bunds are designed to reduce runoff velocity, not channel it for downstream use.

Final Answer: Contour bunding slows surface runoff and promotes infiltration on 2–8% slopes to conserve soil and water in situ.

Answer: (C) Go Back to Q7

Q8.

Solution

Concept: *Sesbania rostrata* is a unique leguminous green manure plant because it forms nitrogen-fixing nodules not only on roots but also on the stem, in association with the bacterium *Azorhizobium caulinodans*. This stem-nodulation feature allows it to fix nitrogen even when soil is partially waterlogged, making it particularly valuable as a pre-paddy green manure incorporated before transplanting.

Solution: Option (D) is the correct and complete statement. The defining characteristic of *S. rostrata* – stem nodulation with *Azorhizobium* – allows it to continue nitrogen fixation even under flooded conditions where most other legumes cannot survive, let alone form root nodules. It can fix up to 80–100 kg N/ha in 50–60 days and is incorporated into the soil as a green manure before paddy transplanting. Option (A) is factually wrong – *S. rostrata* is specifically characterised by its stem nodules, which are its most important feature distinguishing it from other *Sesbania* species. Option (B) is wrong – it is a Kharif/warm-season green manure, not a Rabi crop; it needs warm temperatures and ample moisture. Option (C) is

the opposite of truth – the ability to grow under waterlogged conditions is its main advantage over other green manures.

Final Answer: *Sesbania rostrata* forms both stem and root nodules with *Azorhizobium*, fixing 80–100 kg N/ha even under flooded conditions before paddy transplanting.

Answer: (D) Go Back to Q8

Q9.

Solution

Concept: In Rajasthan, wheat is sown during Rabi (October–November). Late-sown wheat faces terminal heat stress in March–April when grain filling coincides with rising temperatures. Heat-tolerant varieties are specifically bred to complete grain filling before temperatures exceed 30–32°C and are recommended for delayed sowing conditions.

Solution: Option (A) is correct. HD-2781 (a variety released by IARI, New Delhi) is specifically known for its performance under both timely and late-sown conditions in north-western India including Rajasthan, with good heat tolerance during grain filling. Option (B) is incorrect – Raj-4120 is a general-purpose high-yielding variety for timely irrigated sowing in Rajasthan; it is not particularly noted for cold tolerance. Option (C) is incorrect – WH-1142 is a high-yielding variety developed by CCS HAU Hisar that performs well in irrigated timely sowing; it is not specifically marketed as a late-sowing heat-tolerant type. Option (D) is incorrect because the three varieties have different agronomic profiles; they are not interchangeable for late sowing.

Final Answer: HD-2781 is the heat-tolerant wheat variety recommended for timely and late sowing under the agro-climatic conditions of Rajasthan.

Answer: (A) Go Back to Q9

Q10.

Solution

Concept: Transplanted paddy requires nursery-raised seedlings that are transferred to the puddled main field. The age, size, and spacing of seedlings at transplanting critically affect tillering, yield, and crop establishment. Very young or very old seedlings both give poor results.

Solution: Option (B) is the correct agronomic recommendation. At 21–25 days of age, nursery seedlings have 3–4 leaves, a well-developed root system, and are young enough to recover quickly from transplanting shock. The 20 $\times$ 15 cm spac-

ing (row-to-row $\times$ plant-to-plant) provides adequate space for tillering. Maintaining only 2–3 cm of standing water immediately after transplanting prevents seedling uprooting by water movement while keeping the soil anaerobic enough to suppress weeds. Option (A) is wrong – 35–40 days is too old; seedlings become etiolated and tillering is reduced. Option (C) is wrong – 10–12 day seedlings are too young and fragile for transplanting; a dry field damages roots severely. Option (D) is wrong – 45–50 day seedlings and 40 $\times$ 30 cm spacing are excessive and 15 cm water depth would uproot freshly planted seedlings.

Final Answer: Paddy seedlings aged 21–25 days, spaced at 20 $\times$ 15 cm, with 2–3 cm water depth in the main field are the correct transplanting recommendations.

Answer: (B) Go Back to Q10

Q11.

Solution

Concept: Earthing-up (also called hilling or ridging) in maize is the practice of pulling soil from the inter-row spaces and mounding it against the base of the plant. It is performed when the plants are at the 6–8 leaf stage (approximately 30–35 days after sowing) in Kharif maize.

Solution: Option (C) is correct. Earthing-up achieves three interrelated goals: (1) it provides mechanical support to the stem base by increasing the volume of anchorage soil around the plant; (2) it stimulates the development of brace (prop/adventitious) roots from the lower nodes – these brace roots anchor the plant very effectively against wind; (3) the improved anchorage prevents lodging, which is a major yield-loss cause in Kharif maize due to high winds and heavy monsoon rains. Option (A) is incorrect – earthing-up is primarily for mechanical support, not fertiliser burial; top-dressing fertilisers can be applied before earthing-up but that is incidental. Option (B) is partially true (soil mulch does reduce evaporation) but this is not the primary purpose of earthing-up. Option (D) is incorrect – exposing deeper soil to sunlight is not a meaningful disease-control mechanism.

Final Answer: Earthing-up in maize mounds soil around the stem base, stimulates adventitious roots, and prevents wind-lodging during Kharif season.

Answer: (C) Go Back to Q11

Q12.

Solution

Concept: HHB-67 (Hybrid Haryana Bajra-67) was developed by CCS HAU, Hisar and released in 1990. It was India's first downy-mildew-resistant pearl millet hybrid and became hugely popular in Rajasthan because downy mildew caused by *Sclerospora graminicola* used to devastate pearl millet crops in the state.

Solution: Option (D) is the complete and accurate statement. HHB-67 is an early-maturing hybrid (65 days to maturity), which is critical in arid Rajasthan where the effective rainy period may be only 60–75 days. It yields 2.0–2.5 t/ha under rainfed arid conditions – significantly better than older open-pollinated varieties. Most importantly, it carries resistance to the race(s) of *Sclerospora graminicola* prevalent in Rajasthan. Option (A) is wrong in stating susceptibility to downy mildew – that is precisely the trait HHB-67 was bred to overcome. Option (B) is wrong – HHB-67 is a grain-purpose variety, not primarily a fodder variety. Option (C) is wrong – HHB-67 is specifically bred for low-rainfall arid conditions; a 450 mm rainfall requirement would disqualify it from most of Rajasthan.

Final Answer: HHB-67 is an early (65-day), high-yielding pearl millet hybrid with downy mildew resistance, making it the benchmark variety for arid Rajasthan.

Answer: (D) Go Back to Q12

Q13.

Solution

Concept: Chickpea exists in two market classes – Desi (small, dark, wrinkled seeds with thick testa) and Kabuli (large, cream-coloured, smooth seeds with thin testa). Kabuli chickpea commands a premium price in international markets, particularly in the Middle East and Mediterranean region.

Solution: Option (A) is correct. GNG-663, released by SKRAU (Swami Keshwanand Rajasthan Agricultural University) Bikaner, is a Kabuli-type bold-seeded chickpea with cream-coloured large seeds that has good export potential. It is recommended for Rajasthan and has a 100-seed weight typically above 40 g (Kabuli standard). Option (B) is incorrect – RSG-44 is a Desi-type chickpea variety recommended for Rajasthan, not a Kabuli type. Option (C) is wrong – GNG-663 is specifically a Kabuli-type variety. Option (D) is wrong – RSG-44 is a productive grain variety for domestic consumption, not a forage legume.

Final Answer: GNG-663 is a bold-seeded Kabuli-type chickpea variety released for Rajasthan with cream-coloured large seeds suitable for export.

Answer: (A) Go Back to Q13

Q14.

Solution

Concept: Mustard (*Brassica juncea*) oil content is a critical trait for both commercial oil extraction and farmer income. Indian mustard varieties have been bred for higher oil content, and the variety's oil content is measured as a percentage of seed dry weight by the Soxhlet extraction method.

Solution: Option (B) is correct. Pusa Bold is a high-yielding, bold-seeded mustard/toria variety developed by IARI with an oil content of 42–44%, which exceeds the 40% threshold mentioned in the question. It is recommended for early Rabi sowing in the northern plains including Rajasthan. Option (A) is incorrect in both the reversal of oil contents and the disease-resistance claim for Pusa Bold specifically regarding white rust. Option (C) is incorrect – Pusa Bold and Kranti have different oil content levels; they are not equal. Option (D) is incorrect – the numbers are wrong; Pusa Bold has higher oil content than stated, and the characterisation of Kranti is also inaccurate in that context.

Final Answer: Pusa Bold has oil content of 42–44% (exceeding 40%) and is recommended for early Rabi sowing in northern Rajasthan.

Answer: (B) Go Back to Q14

Q15.

Solution

Concept: Soybean (*Glycine max*) forms a highly specific symbiosis with *Bradyrhizobium japonicum* (a slow-growing rhizobium). Unlike other legumes that associate with fast-growing *Rhizobium* species, soybean requires this specific species. Seed inoculation ensures adequate populations of the bacterium in the rhizosphere at sowing.

Solution: Option (C) is the correct mechanistic description. *Bradyrhizobium japonicum* infects the root cortex cells of soybean, triggering the formation of root nodules. Inside the nodule, the bacteria differentiate into nitrogen-fixing bacteroids. The nitrogenase enzyme complex in the bacteroids reduces dinitrogen (N_2) from the atmosphere to ammonium (NH_4^+), which the soybean plant then uses for amino acid synthesis. This process can fix 100–200 kg N/ha in a soybean crop, significantly reducing the need for nitrogen fertiliser. Option (A) describes phosphate-solubilising bacteria, not *Bradyrhizobium*. Option (B) describes auxin-producing plant growth-promoting bacteria, not the primary role of *Bradyrhizobium*. Option (D) is entirely wrong – *Bradyrhizobium* is a gram-negative soil bacterium, not a fungus; it is aerobic, not anaerobic.

Final Answer: *Bradyrhizobium japonicum* forms root nodules in soybean and fixes

atmospheric N_2 to NH_4^+ via nitrogenase for plant assimilation.

Answer: (C) Go Back to Q15

Q16.

Solution

Concept: Berseem (*Trifolium alexandrinum*), also called Egyptian clover, is the highest-yielding and most nutritious Rabi fodder crop in irrigated areas of Rajasthan. It is a cool-season crop requiring moderate temperatures and regular irrigation to sustain multiple cuttings.

Solution: Option (D) is the agronomically correct recommendation. The optimal sowing window is mid-October to early November, when temperatures are dropping post-Kharif but still warm enough for germination and establishment. Berseem is a high water-demanding crop – it requires 8–10 irrigations at 10–15 day intervals to sustain 4–6 successive cuttings from November through April. This multiple-cutting ability is what makes it so valuable as a fodder crop, giving dry matter yields of 40–60 tonnes/ha fresh green matter across the season. Option (A) is wrong – August–September is the late Kharif season (too hot and humid for berseem). Option (B) is wrong – November–December sowing is too late; germination and early growth are slow in cold weather, reducing first-cut yield. Option (C) is wrong – berseem has no special adaptation to winter dew and requires irrigation.

Final Answer: Berseem is sown in mid-October to early November and requires 8–10 irrigations to sustain 4–6 cuttings across the Rabi season.

Answer: (D) Go Back to Q16

Q17.

Solution

Concept: Polyembryony is the occurrence of more than one embryo in a single seed. In mango, polyembryony is of the nucellar type – in addition to one zygotic embryo from fertilisation, multiple nucellar embryos develop from the nucellus (maternal tissue) surrounding the embryo sac. These nucellar embryos are therefore genetically identical to the mother plant (clonal/apomictic).

Solution: Option (A) is completely correct. The agricultural significance is twofold: (1) nucellar embryos are genetic clones of the mother tree, so the variety characteristics are preserved; (2) they are virus-free because nucellar tissue is not infected by most systemic viruses that affect the vascular tissue. These two properties make nucellar seedlings ideal for rootstock production in mango and

especially in citrus (where polyembryony is very common). Option (B) is wrong – nucellar embryos are clones of the mother, not genetic hybrids; it is the zygotic embryo that shows segregation. Option (C) is wrong – nucellar seedlings are vigorous and uniform; the existence of a zygotic embryo alongside nucellar ones is why vegetatively propagated trees are sometimes preferred for variety propagation. Option (D) is factually wrong – nucellar embryos are the dominant type in polyembryonic mango cultivars.

Final Answer: Nucellar embryos from polyembryony are genetically identical to the mother tree and disease-free; they are used for uniform rootstock production.

Answer: (A) Go Back to Q17

Q18.

Solution

Concept: Kinnow mandarin (*Citrus reticulata* hybrid) is a high-yielding, high-TSS (Total Soluble Solids) citrus variety that produces its best colour and flavour when the fruit matures under cool, dry winter conditions followed by warm summers for vegetative growth. Water availability is managed through canal irrigation.

Solution: Option (B) is the correct agro-climatic explanation. Sri Ganganagar district in northern Rajasthan benefits from: (1) the Indira Gandhi Canal (formerly Rajasthan Canal) system, which provides reliable irrigation water in an otherwise semi-arid region; (2) a climate with hot dry summers ($>40^{\circ}$C) that promote vegetative growth and root development; (3) cool dry winters (5–10°C nights in December–January) that improve fruit colour (orange pigmentation through carotenoids) and increase TSS by concentrating sugars. This combination is ideal for Kinnow. Option (A) is wrong – Sri Ganganagar is semi-arid with only 200–250 mm annual rainfall; it is not the highest-rainfall district. Option (C) is wrong – Kinnow thrives in alkaline soils (pH 7.0–8.0); acid soils would be detrimental. Option (D) is wrong – Sri Ganganagar does not have high atmospheric humidity; quite the opposite.

Final Answer: Cool dry winters and Indira Gandhi Canal irrigation in Sri Ganganagar provide the ideal conditions for Kinnow's fruit colour and TSS development.

Answer: (B) Go Back to Q18

Q19.

Solution

Concept: Ber (*Ziziphus mauritiana*) is highly adapted to arid and semi-arid conditions through a combination of morphological, anatomical, and physiological mechanisms. Understanding these mechanisms explains why Ber can thrive where most other fruit crops fail.

Solution: Option (C) is the scientifically accurate description of Ber's drought tolerance. The key adaptations are: (1) a deep and extensive taproot system that can penetrate to depths of 3–5 metres, accessing sub-soil moisture during dry periods; (2) thick waxy cuticle on the leaves (sclerophylly) that reduces cuticular transpiration; (3) ability to tolerate very low soil water potential (down to approximately -1.5 MPa), which is the wilting point for most crop plants. Together these traits allow Ber to survive in areas receiving as little as 150 mm annual rainfall. Option (A) is partially correct (Ber is deciduous) but "zero metabolic activity" is inaccurate and misrepresents the survival mechanism – the taproot continues activity. Option (B) is completely wrong; Ber's root system is deep, not shallow. Option (D) is wrong – Ber flowers and fruits in the dry winter season (October–February), not during the monsoon.

Final Answer: Ber's deep taproot, thick waxy cuticle, and tolerance to soil water potential of -1.5 MPa make it the premier arid-zone fruit for Rajasthan.

Answer: (C) Go Back to Q19

Q20.

Solution

Concept: Tomato varieties are classified as indeterminate (vining growth habit, continues growing indefinitely from the terminal apical meristem, bears fruits on lateral branches over a long season) or determinate (bush type, terminates in a flower cluster at a fixed height, all fruits ripen approximately simultaneously). The growth regulator 4-CPA or PCPA is applied to improve fruit set under poor conditions.

Solution: Option (D) is the correct combination of facts. Indeterminate tomato varieties have an apical meristem that keeps growing vegetatively (sympodial growth); flower trusses emerge from lateral axils. This continuous growth to several metres in length requires staking or trellising throughout the season. 4-CPA (para-chlorophenoxyacetic acid, also known as PCPA or tomato-set) at 25–50 ppm is sprayed on open flowers or flower buds to stimulate parthenocarpic fruit development when temperatures are too high or too low for normal pollen viability. Option (A) incorrectly describes the determinate type and states 2,4-D for fruit

setting – 2,4-D is used at much lower concentrations in some situations but is not the standard fruit-setting hormone for commercial tomato; also, determinate types do NOT have a fixed 8–10 nodes – that describes determinate growth termination. Option (B) incorrectly swaps the two growth habits. Option (C) reverses the characteristics.

Final Answer: Indeterminate tomato varieties grow indefinitely, require staking, and 4-CPA (PCPA) at 25–50 ppm is applied as a fruit-setting hormone.

Answer: (D) Go Back to Q20

Q21.

Solution

Concept: T-budding (shield budding) is the most commonly used vegetative propagation method for fruit trees including mango, citrus, rose, and stone fruits. It involves inserting a single bud from the scion onto the rootstock under a T-shaped cut in the bark. The method works when the bark is slipping (i.e., cambium is actively dividing, so the bark peels easily).

Solution: Option (A) describes the correct sequence: (1) A vertical cut 2–3 cm long is made on the rootstock bark; (2) A horizontal cut at the top of the vertical cut creates the inverted T-shape; (3) The two bark flaps of the T are lifted; (4) A shield bud (bud + thin sliver of wood + bark) is cut from the scion branch; (5) The shield is inserted under the lifted bark flaps; (6) Polythene tape is used to bind the bud tightly, leaving the bud eye exposed so it can develop. Option (B) describes a chip budding or patch budding method, not T-budding. Option (C) describes cleft grafting or a crown graft, not budding. Option (D) describes approach grafting, which is an entirely different technique.

Final Answer: T-budding involves a T-shaped cut on rootstock bark, insertion of a shield bud from the scion, and binding with polythene tape leaving the bud exposed.

Answer: (A) Go Back to Q21

Q22.

Solution

Concept: Chilling injury is a physiological disorder of tropical and subtropical fruits that occurs when they are exposed to temperatures below their critical minimum (which is above 0°C). Unlike temperate fruits (apple, pear) that evolved in cold climates, tropical fruits did not develop protective mechanisms against low temperatures.

Solution: Option (B) is the correct explanation. Mango is a tropical fruit with a critical temperature threshold of 10–12°C. Below this temperature, chilling injury occurs through membrane lipid phase transitions (the fatty acid chains in cell membranes solidify, disrupting membrane function). Symptoms include: (a) skin pitting or scald (sunken brown areas on the skin); (b) internal browning visible as black or grey streaks in the pulp; (c) failure to ripen normally even when brought back to room temperature – the fruit remains hard or ripens unevenly with off-flavour. This means storing mango at 0–1°C would destroy it rapidly despite being technically "cold." Option (A) is partially correct about ethylene but does not describe chilling injury. Option (C) is wrong – mango at 0°C does not physically freeze immediately; 0°C is above the freezing point of the fruit. Option (D) confuses humidity requirements with temperature requirements.

Final Answer: Mango suffers chilling injury below 10–12°C, causing skin pitting, internal browning, and failure to ripen normally – hence it must be stored at 12–13°C.

Answer: (B) Go Back to Q22

Q23.

Solution

Concept: Heterosis (hybrid vigour) in plant breeding refers to the phenomenon where F_1 hybrids outperform their parents for quantitative traits like yield, biomass, and stress tolerance. It is measured against two different parental baselines, each revealing different aspects of hybrid superiority.

Solution: Option (C) is the correct and complete description. Three standard measurements are used: (1) **Mid-parent heterosis (MPH)**: F_1 performance compared to the mean (average) of both parents: $\text{MPH} = \frac{F_1 - \text{MP}}{\text{MP}} \times 100$; (2) **Heterobeltiosis** (better-parent heterosis): F_1 compared to the better of the two parents – this is a higher standard; (3) **Commercial (economic) heterosis**: F_1 compared to the best commercial check variety – this is what determines whether a hybrid is worth releasing commercially. Maize is the classic example where inbred line crosses show massive heterosis for grain yield (double the inbred parent yield).

Option (A) is wrong – mid-parent heterosis is a standard and widely used measurement. Option (B) is wrong – heterosis in maize F_1 is strongly positive, not negative. Option (D) is wrong – intraspecific heterosis is very common and commercially exploited in maize, sorghum, rice, and sunflower.

Final Answer: Heterosis is measured as mid-parent heterosis, heterobeltiosis, and commercial heterosis; maize F_1 hybrids are the classic example of intraspecific heterosis exploitation.

Answer: (C) Go Back to Q23

Q24.

Solution

Concept: In controlled hybridisation, the flower selected as the female parent must be prevented from self-pollinating. This is achieved by emasculation – the removal of all anthers before they shed pollen. The exact timing is critical: it must be done before pollen maturity (dehiscence) to ensure no self-pollination has occurred, but after the flower has developed enough to be operated on without damaging the pistil.

Solution: Option (D) is the correct definition. Emasculation specifically means removing the anthers (the male reproductive organs/stamens) from the flower chosen to serve as the female parent in the cross. This is done at the bud stage (before anther dehiscence), typically in the late afternoon or evening for most crops. After emasculation, the emasculated flower is bagged to prevent foreign pollen entry until the stigma becomes receptive (usually 1–3 days later), at which point the desired pollen from the male parent is dusted on it. Option (A) is wrong – removing the pistil would destroy the female organ; emasculation targets the stamens. Option (B) describes chemical hybridising agents (CHA) or male gametocides applied to the female parent field in hybrid seed production, not hand-emasculation. Option (C) – removing petals (which is done in some crops to facilitate the operation) is a preparatory step, not the definition of emasculation itself.

Final Answer: Emasculation is the removal of anthers from the selected female parent before pollen maturity, to prevent self-pollination in controlled hybridisation.

Answer: (D) Go Back to Q24

Q25.

Solution

Concept: India has a structured seed certification system regulated by the Seeds Act, 1966. Each seed class has strictly defined standards for genetic purity, physical purity, germination percentage, and moisture content. The classes are produced in a sequential lineage, with each successive class maintained by planting the class above it.

Solution: Option (A) is the complete and correct sequence. Starting from the breeder (the variety creator): (1) **Nucleus Seed** – produced and maintained by the plant breeder, with absolute genetic purity; (2) **Breeder Seed** (golden/yellow tag) – produced by the plant breeder or designee from nucleus seed; (3) **Foundation Seed I and II** (white tag) – produced by state seed corporations/farms from breeder seed, certified by Seed Certification Agency (SCA); (4) **Certified Seed** (blue tag) – produced by registered seed producers from foundation seed, the class distributed to farmers; (5) **Truthful Label Seed** (non-certified) – used for crops not under compulsory certification (most vegetables), sold under the producer's responsibility. Option (B) reverses the chain. Option (C) misorders the classes. Option (D) also reverses the chain and incorrectly states all are under mandatory certification.

Final Answer: The seed certification chain is: Nucleus $\rightarrow$ Breeder (yellow tag) $\rightarrow$ Foundation (white tag) $\rightarrow$ Certified (blue tag) $\rightarrow$ Truthful Label Seed.

Answer: (A) Go Back to Q25

Q26.

Solution

Concept: Seed treatment with fungicides protects germinating seeds and seedlings from soil-borne and seed-borne fungal pathogens during the critical period from sowing to establishment. Thiram (TMTD) is a broad-spectrum contact (non-systemic) organo-sulphur dithiocarbamate fungicide widely used for this purpose.

Solution: Option (B) is correct. Thiram is applied as a dry powder mixed with seeds at 2–3 g per kg of seed. Being a contact fungicide, it coats the seed surface and kills spores of soil-borne pathogens on contact as the seed imbibes water during germination. Its primary targets are the "damping-off complex" – *Pythium* spp., *Rhizoctonia solani*, and *Fusarium* spp. – which attack seeds and seedlings at or near the soil surface. Option (A) is wrong on both the dose (10–15 g/kg is far too high and would be phytotoxic) and the target pathogens (Thiram controls fungi, not bacteria). Option (C) is wrong on dose (0.5 g/kg is sub-therapeutic)

and scope (Thiram does not control viruses or nematodes). Option (D) incorrectly describes Thiram as systemic – it is a contact fungicide with no systemic activity.

Final Answer: Thiram is applied at 2–3 g/kg seed as a contact fungicide against soil-borne damping-off fungi (*Pythium*, *Rhizoctonia*, *Fusarium*).

Answer: (B) Go Back to Q26

Q27.

Solution

Concept: *Schizaphis graminum* (greenbug) is a phloem-sucking aphid (Order Hemiptera, Family Aphididae) that is an important pest of wheat and other small grains in Rajasthan and northern India. Being a sucking insect, it uses piercing mouthparts (stylet) to penetrate plant tissue and extract phloem sap. In addition to direct feeding damage, it injects phytotoxic salivary compounds into the phloem.

Solution: Option (C) is the correct and complete description. The greenbug pierces the phloem and during feeding injects toxic saliva that causes chlorotic (yellow) stippling, leaf curling, and in severe infestations, complete yellowing and drying of leaves. Colony formation on lower leaf surfaces causes characteristic yellowish-green patches. The recommended chemical controls include: (1) imidacloprid (a neonicotinoid systemic insecticide) as seed treatment; (2) dimethoate (30 EC, an organophosphate) or methyl demeton spray at 0.05% for foliar control. Option (A) is wrong – aphids are piercing-sucking insects, not chewing; carbaryl is used for chewing pests. Option (B) is wrong – *Schizaphis graminum* is an above-ground aphid, not a stem borer; BHC (lindane) use is now banned in India. Option (D) is wrong – the greenbug is a foliar aphid, not a soil-dwelling root aphid.

Final Answer: *Schizaphis graminum* is a phloem-sap sucker that injects toxic saliva causing chlorotic striping; it is controlled with imidacloprid seed treatment or foliar dimethoate 30 EC.

Answer: (C) Go Back to Q27

Q28.

Solution

Concept: Yellow rust (stripe rust) of wheat, caused by *Puccinia striiformis* f. sp. *tritici*, is a major foliar disease. The word "stripe" in its name refers to its most diagnostic field characteristic – the urediniospore pustules are not randomly scattered but are arranged in neat longitudinal stripes (rows) parallel to the leaf veins.

Solution: Option (D) is fully correct. The urediniospores (asexual spores) are lemon-yellow in colour (not orange-brown as in leaf rust or black as in stem rust). They form in small pustules (uredia) that break through the leaf epidermis and are arranged in parallel rows/stripes between the leaf veins on the upper surface, giving the leaf a "train-track" appearance. The recommended management uses propiconazole (Tilt 25 EC) at 0.1% (1 ml/litre water) as a foliar spray – propiconazole is a triazole-class systemic (DMI) fungicide that inhibits ergosterol biosynthesis in the fungal cell membrane. Option (A) is wrong – large scattered orange-brown pustules describe leaf rust (*P. triticina*), and mancozeb is less effective against rusts. Option (B) describes powdery mildew (*Blumeria graminis*), not rust. Option (C) describes a foot rot or node blight, not yellow rust.

Final Answer: Yellow rust produces lemon-yellow spore stripes between leaf veins; propiconazole (Tilt 25 EC) at 0.1% is the recommended systemic fungicide.

Answer: (D) Go Back to Q28

Q29.

Solution

Concept: *Trichogramma* species (Order Hymenoptera, Family Trichogrammatidae) are egg parasitoids – tiny wasps (0.3–0.8 mm length) that locate host insect eggs and lay their own eggs inside them. *Trichogramma* larvae develop inside the host egg, consuming the host embryo, and emerge as adult wasps. The host egg turns black as the *Trichogramma* pupa develops inside it.

Solution: Option (A) is the correct answer. *Trichogramma* exclusively parasitises the **eggs** of lepidopteran (moth and butterfly) pest species. The most commercially important deployments in India are: (1) *Trichogramma chilonis* against sugarcane internode borer (*Chilo infuscatellus*) and top borer (*Scirpophaga excerptalis*) – released at 50,000 – 1,00,000 per hectare; (2) *Trichogramma chilonis* or *T. pretiosum* against *Helicoverpa armigera* (American bollworm) in cotton, tomato, chickpea, and maize. *Trichogramma* cards (parasitised eggs on cards) are produced in biocontrol laboratories and sold to farmers. Option (B) is wrong – aphids are hemipteran insects; *Trichogramma* does not parasitise aphid larvae. Option (C) is wrong – *Trichogramma* parasitises lepidopteran eggs only, not whitefly pupae

(different parasitoid species are used for whitefly). Option (D) is wrong – thrips are thysanopteran insects; *Trichogramma* does not parasitise adult thrips.

Final Answer: *Trichogramma* parasitises the eggs of lepidopteran pests; it is used against sugarcane borers and *Helicoverpa armigera* in cotton and tomato.

Answer: (A) Go Back to Q29

Q30.

Solution

Concept: IPM is a science-based approach to pest management that emphasises using ecological knowledge and multiple complementary tactics to keep pest populations below the Economic Threshold Level (ETL) while minimising harm to non-target organisms, human health, and the environment. The priority order reflects the IPM philosophy of using the least disruptive method first.

Solution: Option (B) is the correct priority order and reflects the IPM pyramid: (1) **Cultural control** (crop rotation, resistant varieties, clean cultivation, adjusted sowing dates, balanced fertilisation) – these are preventive and non-chemical; (2) **Mechanical/physical control** (light traps, pheromone traps, physical barriers, hand-picking) – used when pest populations start building; (3) **Biological control** (predators, parasitoids, pathogens like *Bacillus thuringiensis*) – used when mechanical controls are insufficient; (4) **Chemical control** (selective pesticides at recommended doses) – used only as a last resort when pest populations cross the ETL. Option (A) inverts the correct priority – chemical control is the *least* preferred method in IPM, not the first. Options (C) and (D) are incorrect regarding priority sequence and simultaneity.

Final Answer: IPM priority order is cultural $\rightarrow$ mechanical $\rightarrow$ biological $\rightarrow$ chemical (last resort when pest exceeds Economic Threshold Level).

Answer: (B) Go Back to Q30

Q31.

Solution

Concept: Organophosphate (OP) insecticides constitute one of the most important classes of synthetic insecticides. Their mode of action involves the nervous system of insects and is based on inhibiting a critical enzyme at the neuromuscular junction. The same mechanism is responsible for their mammalian toxicity.

Solution: Option (C) is the correct mechanism. All organophosphate insecticides (chlorpyrifos, malathion, dimethoate, monocrotophos, quinalphos, etc.) inhibit the enzyme **acetylcholinesterase (AChE)** at cholinergic nerve synapses. Nor-

mally, after a nerve impulse, the neurotransmitter acetylcholine (ACh) is released into the synapse and then rapidly hydrolysed (broken down) by AChE to terminate the nerve signal. OP pesticides bind irreversibly (by phosphorylation) to the active site of AChE, preventing it from breaking down ACh. ACh therefore accumulates at nerve synapses, causing continuous, uncontrolled nerve firing, convulsions, and eventually paralytic death of the insect. Option (A) describes the mechanism of pyrethroids (sodium channel blockers), not organophosphates. Option (B) describes benzoylurea insecticides (e.g., diflubenzuron) that inhibit chitin synthesis. Option (D) describes juvenile hormone analogues (e.g., methoprene, fenoxycarb).

Final Answer: Chlorpyrifos irreversibly inhibits acetylcholinesterase at nerve synapses, causing acetylcholine accumulation, continuous nerve firing, and insect death.

Answer: (C) Go Back to Q31

Q32.

Solution

Concept: *Sitophilus oryzae* (rice weevil) is a primary stored-grain pest that can attack sound, intact kernels – unlike secondary pests that only infest already-broken grain. It is one of the most economically damaging stored-grain pests worldwide, attacking wheat, rice, maize, sorghum, and other hard-grain cereals.

Solution: Option (D) is the correct and complete description. The life cycle of the rice weevil: (1) Adult female bores a small hole in the grain kernel; (2) She deposits a single egg inside the kernel and seals the hole with a gelatinous plug; (3) The larva hatches inside the kernel and feeds on the endosperm, completely hollowing out the grain (hence the name "weevil"); (4) Pupation occurs inside the kernel; (5) The adult emerges by chewing its way out, leaving a large emergence hole. Control by aluminium phosphide (AlP) tablets/pellets (commercial name Phostoxin or Celphos) at 3 g per tonne under sealed storage: moisture reacts with AlP to release phosphine gas (PH_3), which is absorbed through the cuticle of all life stages and inhibits cytochrome oxidase in mitochondria. Option (A) is wrong – the larva feeds inside the kernel, not on the bran. Option (B) is wrong – weevils are chewing insects, not piercing-sucking; HCN fumigation is used in some contexts but is not standard for grain stores. Option (C) is wrong – the rice weevil attacks cereal grains, which is why it is named after rice.

Final Answer: Rice weevil larvae develop inside grain kernels, hollow them out; aluminium phosphide tablets (3 g/tonne) releasing phosphine gas are the standard fumigant control.

Answer: (D) Go Back to Q32

Q33.

Solution

Concept: Gir (also called Gyr or Kathiawari) is one of India's most important indigenous dairy cattle breeds and is internationally recognised for its genetic contribution to dairy breeds in Brazil and North America. It is a Zebu (Bos indicus) breed characterised by specific morphological adaptations to tropical heat.

Solution: Option (A) is the correct description. Gir originates from the Gir forest area of Saurashtra (Junagadh, Amreli, Bhavnagar districts of Gujarat). It is classified as a dairy breed with average milk yield of 1500–2000 litres per lactation under Indian conditions (with elite animals in well-managed farms yielding over 3000 litres). Its heat-tolerance adaptations include: loose, baggy skin (increases surface area for heat dissipation), long pendulous ears (increase radiating surface), highly developed sweat glands (for evaporative cooling), tick resistance (slick coat and skin secretions), and a prominent dewlap. These traits make it suitable for Rajasthan's hot climate. Option (B) is wrong – Gir is a dairy/dual-purpose breed, not a draught breed; milk yield exceeds 500 litres. Option (C) is wrong – Gir originates from Gujarat, not Rajasthan, and yields 1500–2000 L, not 5000–6000 L (that is Holstein Friesian level). Option (D) is wrong – Gir is widely maintained in Rajasthan as well as Gujarat.

Final Answer: Gir is a dairy cattle breed from Gujarat/Rajasthan known for heat tolerance (loose skin, large ears), tick resistance, and 1500–2000 litre milk yield per lactation.

Answer: (A) Go Back to Q33

Q34.

Solution

Concept: Murrah buffalo (*Bubalus bubalis*) is the premier dairy buffalo breed of India and is widely regarded as the world's highest milk-producing buffalo breed. Buffalo milk is significantly richer in fat than cow milk, making it preferred for ghee, paneer, and curd production.

Solution: Option (B) is correct. Murrah originates from the Rohtak, Hisar, and Jind districts of Haryana (and some parts of Punjab). Its defining characteristics are: (1) tightly curled horns (the breed name "Murrah" means curved/coiled in local language); (2) milk fat content of 6–7%, which is considerably higher than cow milk (3.5–4%); (3) average milk yield of 1800–2500 litres per lactation under

good management, with elite animals crossing 4000 litres; (4) it is the most widely exported buffalo breed – frozen semen and animals have been exported to Brazil, Bulgaria, Italy, and Egypt. Option (A) is wrong – Murrah originates from Haryana, not Tamil Nadu; and its fat content is 6–7%, not 5–6%. Option (C) is wrong – Murrah has high fat content, not low; it does not originate from Punjab. Option (D) completely misidentifies the origin (Bikaner is associated with Rathi cattle and Bikaner breed of camel) and underestimates milk yield.

Final Answer: Murrah buffalo originates from Rohtak/Hisar, Haryana; it has milk fat of 6–7% and average yield of 1800–2500 litres per lactation, making it India's top dairy buffalo.

Answer: (B) Go Back to Q34

Q35.

Solution

Concept: Malpura is a sheep breed native to the semi-arid Tonk district and Sawai Madhopur district of Rajasthan. As with most indigenous breeds of arid/semi-arid regions, it has been shaped by selection for meat production and survival in harsh environments rather than for fine wool.

Solution: Option (C) is the correct description of Malpura sheep. It is classified as a mutton breed (meat is the primary utility) adapted to the semi-arid scrubland of central Rajasthan. Physical characteristics: compact medium-sized body, entirely white fleece, Roman nose, small horns (polled in ewes), good foraging ability on sparse rangeland vegetation. The wool is coarse (fibre diameter >35 microns), suitable for carpet manufacturing but not for fine textiles. It is reared by the Gujjar and Meena communities in the Tonk-Sawai Madhopur region. Option (A) is wrong – Malpura is not a fine-wool Merino-quality breed; it does not produce Merino wool, which comes from dedicated fine-wool breeds like Bharat Merino (a crossbreed). Option (B) is wrong – it is not raised for milk production; buffalo and cow breeds serve dairy purposes in Rajasthan. Option (D) is wrong – Malpura is an indigenous breed of Rajasthan, not a Rambouillet crossbred.

Final Answer: Malpura is a mutton sheep breed of semi-arid Rajasthan (Tonk district) with white coarse wool, compact body, and good adaptation to sparse rangeland vegetation.

Answer: (C) Go Back to Q35

Q36.

Solution

Concept: The Sirohi goat is one of Rajasthan's most important and well-known indigenous goat breeds. Named after the Sirohi district from which it originates, it is raised by the Rabari and Bharvad communities of southern Rajasthan. Its dual-purpose utility and heat tolerance make it economically valuable to small and marginal farmers in the region.

Solution: Option (D) is the complete and accurate description. Sirohi goat: (1) native to Sirohi district of Rajasthan (southern Rajasthan, bordering Gujarat); (2) medium-sized body, predominantly brown/tan coat with lighter patches; (3) small twisted/curved horns; (4) compact, deep-bodied conformation; (5) dual-purpose: it produces 0.5–1.0 litre milk per day (moderate milk production) and is valued for meat (fair body weight gain, good dressing percentage); (6) well adapted to semi-arid conditions, good forager on bushes and shrubs; (7) resistant to common goat diseases of the region. Option (A) is wrong – Sirohi is native to Sirohi district, not Bikaner, and it is not exclusively a milk breed; the very long pendulous ears description is characteristic of Jamunapari, not Sirohi. Option (B) is wrong – Sirohi is from Sirohi/Rajasthan, not Jaisalmer, and it does not produce Pashmina. Option (C) is wrong – Sirohi is from Sirohi district, not Jaipur; it has brown coat, not black; it is not the largest breed; it is primarily meat+milk, not leather.

Final Answer: Sirohi goat is a dual-purpose (meat + milk) breed native to Sirohi district, Rajasthan, with brown coat, twisted horns, and 0.5–1.0 litre/day milk yield.

Answer: (D) Go Back to Q36

Q37.

Solution

Concept: In farm management economics, costs are classified based on their relationship to the level of output. Fixed costs (also called overhead costs or unavoidable costs) remain constant regardless of how much crop is produced or whether the land is cultivated at all in a given year. Variable costs change in direct proportion to the intensity or scale of production.

Solution: Option (A) is correct and comprehensive. Fixed costs in farming include: (a) land rent or lease payments – the farmer pays rent whether the crop succeeds or fails; (b) depreciation on farm machinery, buildings, and equipment – calculated annually regardless of use; (c) interest on investment in land and fixed capital; (d) permanent labour (family labour engaged year-round). Variable costs include: (a) seeds – purchased for each crop season; (b) fertilisers – quantity

varies with crop and target yield; (c) irrigation water charges – vary with number of irrigations; (d) hired seasonal labour for sowing, weeding, harvesting; (e) pesticides – applied only when needed; (f) fuel and lubricants for machinery operation. Option (B) is wrong – seeds and fertilisers are classic variable costs; their prices may be known in advance but quantities vary with production decisions. Option (C) is wrong – permanent labour is fixed cost, but hired seasonal labour is variable; machinery depreciation is fixed, not variable. Option (D) is wrong – seed cost is variable, not fixed.

Final Answer: Fixed costs (land rent, machinery depreciation, fixed capital interest) do not change with output; variable costs (seeds, fertilisers, seasonal labour, pesticides) change with production level.

Answer: (A) Go Back to Q37

Q38.

Solution

Concept: The Agricultural Produce Market Committee (APMC) Act was passed by most Indian states to regulate agricultural commodity markets. The goal was to protect farmers from exploitation by private traders and commission agents by creating regulated, transparent market places (Mandis) under government supervision.

Solution: Option (B) correctly captures the key operational features of APMC Mandis: (1) **Licensing**: all traders, commission agents (arhtias), and weighmen must obtain a licence from the Market Committee – this prevents unlicensed exploitation; (2) **Market fees**: a market fee (typically 1–2% of transaction value) is levied on purchases to fund Mandi infrastructure and services; (3) **Price discovery through open auction**: produce is sold by competitive bidding (open outcry or e-auction), which is supposed to give farmers the best available price; (4) **"Patti" (payment voucher)**: after the sale, the farmer receives a written settlement document showing weight measured, grade, price per quintal, and net amount payable after deducting commission and market fee. Option (A) is wrong – APMC Mandis are government-regulated, not private free-market entities. Option (C) is wrong – APMC Mandis are primarily for domestic trade. Option (D) is wrong – APMC jurisdiction covers all notified agricultural commodities including food grains and oilseeds.

Final Answer: APMC Mandis operate through licensed traders, transparent open auction for price discovery, market fee collection, and issue of "patti" (payment vouchers) to farmers.

Answer: (B) Go Back to Q38

Q39.

Solution

Concept: NABARD was established on 12 July 1982 under the NABARD Act, 1981, based on the recommendations of the Shivaraman Committee (1979). It took over the agricultural credit functions previously held by the Reserve Bank of India (RBI) and the Agricultural Refinance and Development Corporation (ARDC).

Solution: Option (C) is the correct full form and mandate. **National Bank for Agriculture and Rural Development**: NABARD does NOT directly lend to farmers (that is a common misconception). Its primary functions are: (1) **Refinancing**: provides short-term, medium-term, and long-term refinance credit to Scheduled Commercial Banks, Regional Rural Banks (RRBs), Cooperative Banks, and other eligible institutions for on-lending to agriculture and rural sectors; (2) **Supervision**: supervises and inspects cooperative banks and RRBs; (3) **Rural Infrastructure Development Fund (RIDF)**: channels funds from commercial banks (who under-lend to priority sector) for building rural infrastructure (irrigation, roads, bridges, rural schools); (4) promotional and developmental activities for farmers and rural artisans. Option (A) is wrong on the mandate – NABARD is a refinancing apex body, not a direct lending bank. Option (B) has the wrong full form and function. Option (D) has the wrong full form (NABARD is not a research-funding body; ICAR does that).

Final Answer: NABARD (National Bank for Agriculture and Rural Development), established 1982, is the apex refinancing institution for agricultural credit, supervising RRBs and cooperative banks.

Answer: (C) Go Back to Q39

Q40.

Solution

Concept: The Minimum Support Price (MSP) is a price support mechanism by which the Government of India guarantees a floor price for certain agricultural commodities. It is intended to assure farmers a remunerative price for their produce and protect them against a sharp fall in market prices during bumper production years.

Solution: Option (D) is the correct description of the MSP process. The institutional framework is: (1) **CACP (Commission for Agricultural Costs and Prices)**: a statutory advisory body under the Ministry of Agriculture that recommends MSPs

based on: cost of production (three cost concepts – A2, A2+FL, and C2), demand–supply balance, price trends in domestic and international markets, inter-crop price parity, and effect on consumers; (2) **CCEA (Cabinet Committee on Economic Affairs)**: the final authority that considers the CACP recommendation and announces the official MSP – the Cabinet does not always accept CACP recommendations in full. Key point: CACP recommends; Cabinet approves. Option (A) is wrong – the RBI has no role in MSP determination; it manages monetary policy. Option (B) is wrong – State governments conduct their own state support price schemes, but the national MSP is a central government function based on CACP recommendations. Option (C) is wrong – commodity exchanges (MCX/NCDEX) are trading platforms; they have no role in MSP determination.

Final Answer: CACP recommends MSP based on cost of production (A2+FL and C2) and price parity; CCEA (Cabinet) approves and officially announces the MSP.

Answer: (D) Go Back to Q40

Answer Key

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