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	<p>Answer: C</p> <p>Organic farming is a non-conventional farming system in which the use of synthetic chemicals is restricted. Organic farming restricts the use of synthetic chemicals, which are usually harmful to the environment, to increase biodiversity. Biodiversity is all the diverse ecosystems &amp; the organisms in them. It may be referred to as the diversity of all species in a habitat, or sum of all species in a habitat.</p>
<p>1. A farmer who does NOT use chemical pesticides or fertilisers is MOST likely practising</p> <p>(A) crop farming (B) mixed farming (C) organic farming (D) continuous farming</p>	<p>An ecosystem is a biological community of interacting organisms &amp; their physical environment. An ecosystem is made of biotic factors (the organisms) &amp; abiotic factors (their physical environment e.g. air, sunlight, temperature, water &amp; soil pH).</p> <p>Organic farming maintains biodiversity by preserving an ecosystem's biotic &amp; abiotic factors. Overall, there are 30% more species found on organic farms than on conventional farms.</p> <p>Organic farming also enhances farm income, as organically produced agricultural products are more expensive than crops grown using conventional agriculture or using non-conventional farming methods that allow synthetic chemicals. However, consumers concerned about the environment are usually willing to pay the higher prices for organically produced agricultural products.</p>
<p>2. A person who engages in primary agricultural production is known as</p> <p>(A) a farmer (B) a manager (C) an engineer (D) an educator</p>	<p>Answer: A</p> <p>A farmer cultivates land, grows crops, raises livestock and sell the resulting produce; this is known as primary agricultural production. The farmer liaises (establishes a working relationship with) with agricultural advisors such as extension officers and is aware of new developments and methods of production so he/she can make efficient use of land and resources.</p>
<p>3. Total income minus total expenditure determines the</p> <p>(A) net profit (B) net income (C) gross income (D) fixed costs</p>	<p>Answer: A</p> <p><i>Note there is an error in this question. Net income and net profit are one and the same.</i></p> <p>Gross income, also called total income, is all of the money that a business receives from sales of goods and services. <i>Gross income = Total sales</i></p> <p>Net income, or net profit, is income after total money for expenses is deducted. <i>Net income = Gross income - Total expenses</i></p> <p>Fixed expenditure is fixed costs. It is expenditure that does not increase or decrease with the level of production. Examples include land rental, machinery, buildings, insurance premiums, taxes, loan installments and depreciation. <i>Total fixed expenditure (TFE) is the sum of all fixed expenditures.</i></p> <p>Variable expenditure - this is the same as variable costs. It is expenditure that increases or decreases with the level of production. Examples include the cost of fuel, feed, fertilisers, medications and pesticides. <i>Total variable expenditure (TVE) is the sum of all variable expenditures.</i></p>

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<p>4. Gross margin is determined by</p> <p>(A) a record of all items bought and sold on the farm</p> <p>(B) a list of old prices and current prices of farm items</p> <p>(C) a record of recurrent expenses of operating the farm</p> <p>(D) an estimate of the total income minus variable expenses of the farm</p>	<p>Answer: D</p> <p>Gross margin or income above variable expenditure, is the mathematical difference between gross income and total variable expenditure. Gross margin is important because it shows the farmer exactly how profitable the farm is, even more so than net profit. Businesses with higher gross margins will have more money left over to spend on other operations.  <i>Gross margin = Gross income - Total variable expenditure (TVE)</i></p>
<p>5. Which of the following assets may be considered fixed capital?</p> <p>(A) Seeds</p> <p>(B) Buildings</p> <p>(C) Fertilisers</p> <p>(D) Medication</p>	<p>Answer: B</p> <p>In agribusiness, capital is a factor of production used in combination with land, labour and management to produce goods and services to satisfy consumers. It is all of the business' assets, such as funds in bank accounts and/or funds borrowed from lending institutions e.g. banks, credit unions &amp; cooperatives, as well as stocks of materials, machinery buildings, land etc.</p> <p>Capital is used to purchase and maintain assets such as land, buildings, tools, machinery &amp; consumables such as seeds, fuel, fertilizer, medications, pesticides, herbicides, pay employees, pay bills etc. In other words, capital is used to finance the acquisition of inputs.</p> <p>Fixed capital - all items on a farm that have more than one year of productive life. These are items that need to be renewed only after many years. Examples are buildings, machinery, equipment, land, fences, tree crops, livestock, ponds etc.</p> <p>Working capital - all items on a farm that are used up in the production of crops or livestock. In other words, these items have less than a year of productive life; indeed, some of them need to be renewed daily. This can be further divided into:</p> <ul style="list-style-type: none"> <li>• Stocks - stores of consumables such as fertilisers, pesticides, medication, feed, fuel</li> <li>• Cash - money need to purchase fixed capital or stocks and to pay wages for labour and services</li> </ul>
<p>6. The acronym CDB represents</p> <p>(A) Central Depository Bank</p> <p>(B) Caribbean Diversified Bank</p> <p>(C) Central Development Bank</p> <p>(D) Caribbean Development Bank</p>	<p>Answer: D</p> <p>The Caribbean Development Bank (CDB) is a regional agricultural financial institution that provides loans to Caribbean governments for development of:</p> <ul style="list-style-type: none"> <li>• Agriculture - credit, marketing, storage, land development, fisheries, forestry, irrigation, training</li> <li>• Infrastructure - roads, bridges, water supply etc.</li> </ul>

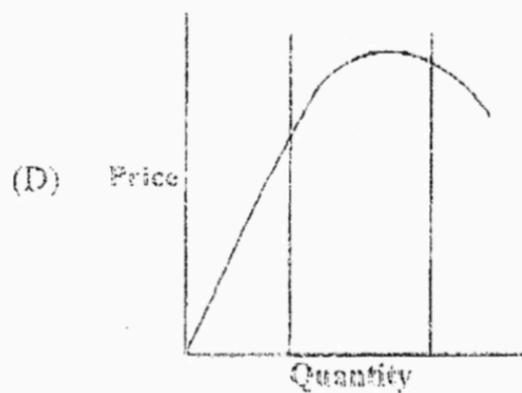
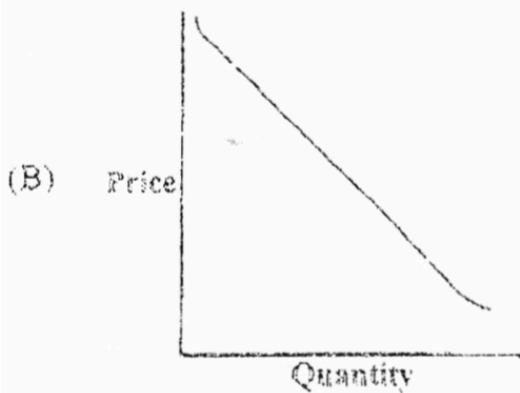
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	<p>Answer: A</p> <p>To secure a loan, a farmer needs:</p> <ul style="list-style-type: none"> <li>• A farmer's registration - the applicant (farmer applying for a loan) must be a registered farmer. In Trinidad and Tobago and Jamaica, registration of farmers is done by the Ministry of Agriculture at regional and county agricultural offices. Farmers who are registered have a better chance of getting loans, subsidies and other national incentives.</li> <li>• Creditworthiness - the creditworthiness or credit rating of a farmer is a measure of the farmer's ability to pay off debts.</li> </ul>
<p>7. Which of the following are MOST advantageous to a small farmer in securing a loan from the bank?</p> <p>I. Keeping records of farming activities</p> <p>II. Showing growth in farming enterprises</p> <p>III. Growing crops on leased land</p> <p>(A) I and II only</p> <p>(B) I and III only</p> <p>(C) II and III only</p> <p>(D) I, II and III</p>	<ul style="list-style-type: none"> <li>• A farm proposal and budget estimate - the farm proposal outlines the farmer's intentions and details the enterprises the farmer proposes, the farming techniques, the resources needed and the anticipated output and income. Using the farm proposal, the farmer prepares and submits a budget estimate for each of the enterprises he or she intends to develop. The proposal's budget explains the amount of loan required for the proposed farming business.</li> <li>• Farm records and experience - these provide evidence of previous enterprises and indicate the experience of the applicant. Many farmers keep poor farm records. Without farm records, the lending institution will not believe the farmer has the ability to run an agricultural enterprise successfully.</li> <li>• Collateral or security - financial institutions make sure that the farmer has some form of collateral or security to offer that will cover the total amount of the loan should the farmer not be able to repay the money. This may be in the form of property, for example, land, a house, farm machinery, equipment or livestock.</li> <li>• Character references - honesty, sincerity, perseverance and a determination to work hard are character traits that are highly regarded.</li> </ul>
<p>8. Which of the following describes 'subsistence farming'?</p> <p>(A) Growing crops on the types of soil that can sustain them</p> <p>(B) A method practised on large plantations to supply food for their workers</p> <p>(C) An extensive system, utilizing complex farming methods</p> <p>(D) Growing food mainly to meet one's requirements and selling the surplus</p>	<p>Answer: D</p> <p>Subsistence farming, form of farming in which nearly all of the crops or livestock raised are used to maintain the farmer and the farmer's family, leaving little, if any, surplus (produce in excess of what the farmer and his family need) for sale or trade. Usually there is very little surplus for sale.</p>

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<p>9. The process whereby commodities are utilized is known as</p> <p>(A) marketing (B) production (C) consumption (D) management</p>	<p>Answer: C</p> <p>Marketing, production and consumption are the 3 economic functions. Management is an economic factor or production, not an economic function. The other economic factors of production are land, labor and capital. Production is the process of combining various material inputs (raw materials, labor etc.) with relevant plans and expertise in order to make a product or service; for example combining water, yeast and flour (inputs) to make bread (output). Marketing is the economic function that satisfies the wants of people. It is all of the activities involved in moving goods and services from the producer to the consumer. Marketing links production and consumption. Consumption is the purchase and use of goods and services by clients and customers, known as consumers.</p>
<p>10. A Central Agency buys from farmers and sells to consumers. The agency also sets certain prices for agricultural produce. Functions such as these relate MAINLY to</p> <p>(A) distribution (B) marketing (C) consumption (D) production</p>	<p>Answer: B</p> <p>Marketing is all of the activities involved in moving goods and services from the producer to the consumer. Marketing links production and consumption; it incorporates several business activities in a coordinated way to move goods and services from the site of production to the site of sale to consumers.</p> <p>Middlemen operate between the producers and consumers. They are commission agents, brokers, merchant wholesalers, processors and retailers (vendors). Merchant wholesalers purchase goods from multiple farms &amp; collect them together at a central point for distribution to processors and retailers. They often use the services of commission agents and brokers to buy goods from farmers. The wholesalers then sell the goods:</p> <ul style="list-style-type: none"> <li>• To retailers, who sell the goods to customers</li> <li>• To processors, who use the goods as raw materials to make secondary products which they sell to retailers who then sell them to consumers.</li> </ul>

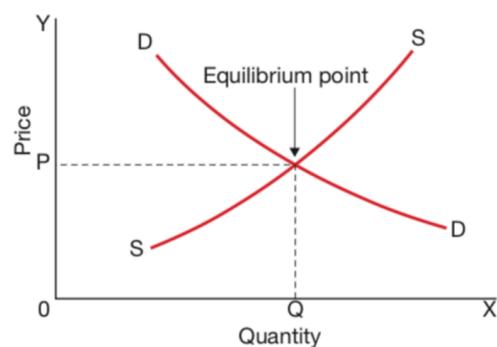
Items 11 - 12 refer to the following graphs.



11. From which graph can the equilibrium price of a product be determined?
12. Which graph represents the demand curve?

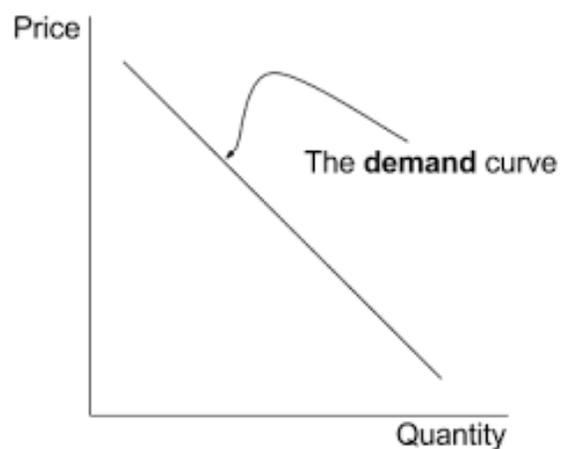
Answer to 11: C

The price of a commodity in a perfect market is determined by interaction of the two market forces that affect sales of the commodity: demand for the commodity and supply of the commodity. The price of the commodity is determined by the demand for it in relation to the conditions of its supply at a particular time. At some point, demand and supply are brought into balance or equilibrium. The point at which this happens is called the equilibrium point, the quantity at which this point is reached is called the equilibrium quantity, and the price at this point is called the equilibrium price. The graph on the right illustrates.



Answer to 12: B

Demand is the quantity of a product that consumers are willing to buy at a certain price at a particular time. Demand is directly related to price. A decrease in price will lead to an increase in demand. An increase in price will lead to a decrease in demand. Demand is one of a commodity's two market forces (forces that determine sales of the commodity). The other is supply. A demand curve is a graph that plots price against quantity demanded. It slopes downward to the right. It represents the information in a demand schedule as a graph. It shows the relationship between demand and price: as price rises, demand decreases. The graph on the right illustrates.



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13. A lack of rural infrastructure in an area could result in

(A) rural to urban drift  
 (B) urban to rural drift  
 (C) environmental issues  
 (D) interest in agriculture

Answer: A

Rural urban drift is migration of people from rural to urban areas to live. This is usually due to a lack of infrastructure in rural areas e.g. poor roads, no public utilities such as electricity, pipe-borne water, phone service, etc. This causes agricultural lands in rural areas to be abandoned since there is no one to farm them.

14. Which of the following are essential for a banker to consider when processing a loan application from a farmer?

I. Collateral  
 II. Project proposal  
 III. Credit history  
 IV. Character references

(A) I and II only  
 (B) III and IV only  
 (C) I, II and III only  
 (D) II, III and IV only

Answer: C

See notes for question 1.

*Note: there is a mistake in this question. All 4 are necessary, but there is no option with all 4.*

15. Which of the following is a feature of a cooperative?

(A) Each member has one vote.  
 (B) Non-members have one vote.  
 (C) Members cannot obtain a loan.  
 (D) Members with more shares vote more than once.

Answer: D

A cooperative is a business venture that is collectively owned, controlled, operated, used and managed by its members on a non-profit or cost basis, for the economic benefit of all its members. A cooperative enables its members, as a group, to improve their economic status.

The table below shows principles of cooperative operation. Additionally, cooperatives use the practice of cumulative voting, whereby members with more shares can vote multiple times, according to the number of shares they have. Therefore A is not a feature of cooperatives. Obviously non-members cannot vote, so B is not a feature. Financial cooperatives such as cooperative banks offer loans to their members; C is therefore not a feature. The principle of one man, one vote does not apply to all due to cumulative voting, so D is not a feature.

Principle	Explanation
Open membership	Membership is open to any person, regardless of gender, race, colour or creed.
Joint ownership	Each member is an owner of the cooperative.
Democratic control	Control of the cooperative is based on each member having one vote and not on the amount of money a member has invested.
Team management	Members operate and manage the cooperative as a team.
Patron-members	Members are the patrons (funders) and the users of the services provided by the cooperative.
Non-profit business	Generally, business transactions do not generate a profit; they aim to cover the costs only. However, any returns above cost are shared equitably amongst all the members.
Service investments	Members invest in the cooperative to be provided with certain services and not for a profitable financial return.

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<p>16. Produce consumed by the farm family is considered as</p> <p>(A) an expenditure (B) a variable cost (C) a fixed cost (D) an income</p>	<p>Answer: B</p> <p>Expenditure is money used by to purchase new inputs, improve existing inputs, or pay debts. Variable costs (VCs) are costs that increase or decrease with the level of production. Fixed costs (FCs) are costs that do not increase or decrease with the level of production. Income is money earned by producing commodities that are in demand and selling them at current market prices to wholesalers, retailers and consumers.</p> <p>Produce consumed by the farm can be classified as a variable cost.</p>
<p>17. Which of the following is NOT a fixed cost?</p> <p>(A) Depreciation of farm machinery (B) Repairs to buildings (C) Insurance (D) Taxes</p>	<p>Answer: B</p> <p>Fixed costs (FCs) are costs that do not increase or decrease with the level of production. Examples include land rental, machinery, buildings, insurance premiums (the amount of money paid for an insurance policy), taxes, loan installments and depreciation (a reduction in the value of an asset over time, due in particular to wear and tear). Other variable costs include all repairs and maintenance, labor, etc. No matter how much or little production occurs, these costs do not change, e.g. suppose a farmer buys a tractor and is paying \$5,000 per month. That monthly payment is his loan installment. Regardless of how much or little production happens, the farmer still has to pay that money every month; it does not change.</p> <p>Variable costs (VCs) are costs that increase or decrease with the level of production. Examples include the cost of fuel, feed, fertilisers, medications and pesticides. For example, to increase production on a chicken farm, the farmer will increase the number of chicks he purchases, as well as the amount of feed, medicines etc. he purchases. Thus the amount of money spent on these inputs increases with the increased production, i.e. the cost of these inputs increases with increased production. If production decreases, so to does the money spent on these inputs, so the cost of these inputs decreases with decreasing production.</p>
<p>18. Total farm income is the same as</p> <p>(A) gross income (B) net farm income (C) net value of products (D) gross margin income</p>	<p>Answer: A</p> <p>Gross income, also called total income, is all of the money that a business receives from sales of goods and services.</p> <p><i>Gross income = sum of all sources of income</i></p>

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<p>19. A farmer wants to increase the number of broilers he is rearing. The expected change in income and expenditure is presented in</p> <p>(A) a partial budget (B) a complete budget (C) an income statement (D) an expenditure statement</p>	<p>Answer: A</p> <p>A partial budget is prepared when there is a change in a specific aspect of the existing farm plan that requires modification of the budget. For example, a farmer may want to know whether replacing one crop with another crop, or buying a pick-up truck instead of hiring one, would be more profitable. In such situations, most of the income (receipts) and expenses (costs) in the existing budget will remain the same and only a few of them will change. A partial budget identifies the income and expenses that will change and sets out how additional costs and income will affect the change in profit. The farmer can therefore determine if the proposed change is economically sensible or not. A partial budget provides an estimate of expected change in income and expenditure resulting from the proposed farm plan change. Therefore it is prepared before the proposed change is implemented. Both a complete budget and a partial budget are prepared before the start of the operation. A complete budget is prepared before the start of the entire operation that it covers. A partial budget is prepared before the proposed farm plan change that it covers is implemented.</p>
<p>20. Which of the following organisations aims to promote agricultural development, improve nutrition and pursue food security?</p> <p>(A) The University of the West Indies (B) Organisation of American States (C) Food and Agriculture Organisation (D) Caribbean Food and Nutrition Institute</p>	<p>Answer: C</p> <p>The Food and Agriculture Organization (FAO) is an international agricultural development institution. It is a sub-organization of the United Nations (UN). It promotes agricultural development; improves global nutrition, pursues global food security, encourages and supports development of rural areas, provides information/technical assistance and provides a neutral forum for countries to meet and discuss agricultural issues.</p> <p>The University of the West Indies is a regional educational institution that offers tertiary agricultural education through its Faculty of Agriculture.</p> <p>The Organization of American States (OAS) is a regional political institution.</p> <p>The Caribbean Food and Nutrition institute (CFNI) is a regional food and nutrition institution. It is part of the Pan-American Health Organization/World Health Organization (PAHO/WHO). It promotes food security and nutritional health.</p>

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	<p>Answer: D</p> <p>The factors that affect soil formation are parent material, time, climate, relief and organisms.</p> <p>Parent material refers to the mineral material from which the soil is formed. Soils will carry the characteristics of the parent material such as color, texture, structure, mineral composition. For example, if soils are formed from an area with large rocks (parent rocks) of red sandstone, the soils will also be red in color and have the same feel as its parent material.</p> <p>Time - soils take thousands of years to form. Young soils have some characteristics from their parent material, but as they age, the addition of organic matter, exposure to moisture, and other environmental factors, may change their features. With time, they settle and are buried deeper below the surface, taking time to transform. Eventually they may change from one soil type to another.</p>
<p>21. The type of soil that is formed in an area depends MAINLY on the</p> <p>(A) surface run-off          (B) type of vegetation          (C) water-holding capacity          (D) type of parent material</p>	<p>Climate is probably the most important factor that can shape the formation of soils. Two important climatic components: temperature and rainfall, are key. They determine how quickly weathering will be, and what kind of organic materials may be available on and inside of the soils. Moisture determines the chemical and biological reactions that will occur as the soils are formed. Climate with more rainfall means more vegetative cover and more animal action. It also means more runoff, more percolation (the running of water through spaces between soil particles) and more water erosion.</p> <p>Relief refers to the landscape position and the slopes it has. Steep, long slopes mean water will run down faster and potentially erode the surfaces of slopes. The effect will be poor soils on the slopes, and richer deposits at the foot of the slopes. Also, slopes may be exposed to more direct sunlight, which may dry out soil moisture and render it less fertile.</p> <p>Organisms - the source &amp; richness of organic matter is due to the living organisms that live on and in the soils. Plants in particular provide vegetative residue that are added to soils. Plant roots also hold the soils and protect them from wind and water erosion. Plants shelter the soils from the sun and other environmental conditions, helping the soils to retain the needed moisture for chemical and biological reactions.</p>
<p>22. A soil sample taken from Ms Ali's farm shows a pH reading of 7.0. The soil is said to be</p> <p>(A) alkaline          (B) neutral          (C) slightly acidic          (D) slightly alkaline</p>	<p>Answer: B</p> <p>Soil pH is the acidity or alkalinity of a soil. pH is measured in pH units on a scale running from pH 0 (completely acidic) to pH 14 (completely alkaline). A pH of 7 is neutral (neither acidic nor alkaline). As the pH gets lower, i.e. from 6.9 down to 0, the acidity gets higher, As the pH gets higher, i.e. From 7.1 to 14, the alkalinity gets higher. Soils generally range from pH of 3 to 10. Plant nutrients become unavailable according to a soil's pH level. If the pH is too low, i.e. the soil is too acidic, plants can get poisoned.</p>

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<p>Item 23 refers to the following cycle.</p> <p>23. The atmospheric gas being utilized in the manufacture of food by plants is</p> <p>(A) oxygen (B) nitrogen (C) hydrogen (D) carbon dioxide</p>	<p>Answer: D</p> <p>The carbon cycle is the natural recycling of carbon in nature. All carbon in nature, including in plants, originally comes from atmospheric carbon dioxide gas. The carbon enters plants via photosynthesis. The process of photosynthesis releases oxygen into the air as a byproduct. Carbon in plants enters animals when they feed on plants; this is called nutrition. Carbon in dead plants and animals enters the soil via decomposition by bacteria and fungi. Fossilization is a process that converts dead plants and animals into fossil fuels (petroleum, natural gas and coal), rather than them decomposing. Combustion (burning) of plants (e.g. trees for fuel) and fossil fuels returns carbon to the atmosphere as carbon dioxide gas.</p> <p>Photosynthesis is the process by which plants manufacture organic food from inorganic materials. The plant uses carbon dioxide and water (inorganic materials) to produce glucose (organic food) using energy from sunlight trapped by chlorophyll. The process mainly takes place in leaves, in tissue called palisade mesophyll tissue.</p>
<p>24. Which of the following should be recommended to a farmer cultivating a parcel of land that floods in the rainy season?</p> <p>I. Construct deep drains. II. Plant on high beds. III. Plant crops without preparing the land.</p> <p>(A) I only (B) I and II only (C) II and III only (D) I, II and III</p>	<p>Answer: B</p> <p>Drain formation and is one of the steps of land preparation. The purpose of land preparation in crop production is to provide the necessary soil conditions that encourage the successful establishment of young seedlings and/or the vigorous germination and establishment of seeds. The steps in land preparation, in order, are site selection, land clearing, tillage, drain formation &amp; leveling and bed formation.</p> <p>After the drains have been dug, the land needs to be leveled to form beds suited to the crop, soil type, season and weather conditions. During the dry season, flat-topped beds may be used. In the rainy season, the beds need to be constructed so that excess water is removed, especially in areas with clay soil. Cambered beds have slightly sloping tops. Ridges and furrows create channels for water to drain away and mounds have raised portions in the centre. The farmer may use a variety of beds: cambered beds, ridges and furrows, mounds on cambered beds and ridges and furrows on cambered beds.</p>
<p>25. Which of the following is NOT an organic fertiliser?</p> <p>(A) Compost (B) Crop residues (C) Farmyard manures (D) Sulphate of ammonia</p>	<p>Answer: D</p> <p>A fertilizer (American English) or fertiliser (British English) is any material of natural or synthetic origin that is applied to soil or to plant tissues to supply one or more plant nutrients essential to the growth of plants.</p> <p>Inorganic fertilizers are chemical fertilizers that supply nutrient elements for the growth of crops made by chemical means, such as ammonium sulphate. They can supply one or more nutrients, e.g. ammonium sulphate supplies nitrogen.</p> <p>Organic fertilizers, more commonly called manures, are natural fertilizers obtained from plants and animals, such as compost, crop residues and farmed manures</p>

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<p>26. Farmer Zara observes premature falling of buds in her tomato crop. Which of the following fertilisers would MOST likely correct this problem?</p> <p>(A) Urea                  (B) Calcium nitrate                  (C) Muriate of potash                  (D) Sulphate of ammonia</p>	<p>Answer: C</p> <p>In plants, potassium is essential for carbohydrate formation &amp; transfer. In flowering plants, it is necessary for flowering and fruiting. Signs of potassium deficiency are leaf drying &amp; decay from the tips backward, irregular yellowing (mottling) of leaves &amp; premature falling of flower buds.</p> <p>Potassic fertilizers supply potassium and therefore will correct the problem. Examples are muriate of potash and sulphate of potash. Wood ash also provides potassium but in very small amounts. Mixed fertilizers such as 13:13:21 are also high in potassium. However the fertilizers that are highest in potassium are muriate of potash (60% potassium) and sulphate of potash (48 to 50% potassium).</p>
<p>27. Which of the following practices will NOT assist in maintaining soil fertility?</p> <p>(A) Staking                  (B) Mulching                  (C) Crop rotation                  (D) Good drainage</p>	<p>Answer: A</p> <p>Mulching is the application of mulch. A mulch is a covering, as of straw (dried grass), compost, or plastic sheeting, spread on the ground around plants to prevent excessive evaporation or erosion, enrich the soil, etc.</p> <p>Crop rotation is the practice of growing a series of different types of crops in the same area across a sequence of growing seasons. Good drainage reduces soil erosion due to water. All 3 of the above help to maintain soil fertility.</p> <p>Staking is the practice of driving a stake or rod into the ground close to a plant to provide support for its stems. Tomato is the most common example of crops that are staked. Staking is done because some plant stems, such as tomato, are too weak to remain upright on their own. Staking has no effect on soil fertility.</p>
<p>28. Which of the following is NOT required for photosynthesis to occur?</p> <p>(A) Water                  (B) Light                  (C) Oxygen                  (D) Chlorophyll</p>	<p>Answer: C</p> <p>Photosynthesis is the process by which plants manufacture organic food from inorganic materials. The plant uses carbon dioxide and water (inorganic materials) to produce glucose (organic food) using energy from sunlight trapped by chlorophyll. The process mainly takes place in leaves, in tissue called palisade mesophyll tissue. Oxygen is a byproduct of the process, not a requirement.</p>

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<p>29. A chisel plough is an implement for</p> <p>(A) moulding (B) ridging tillage (C) primary tillage (D) secondary tillage</p>	<p>Answer: C</p> <p>A chisel plough, or subsoiler, is a primary tillage tractor attachment used to break up hardpans in subsoils. A hardpan is an impermeable layer; water cannot penetrate it. Therefore if left intact, water accumulates above it, waterlogging the topsoil. In waterlogging, soil becomes saturated with water. This drives air out of the soil. Without soil air, plant roots cannot get oxygen to respire; they thus die, killing the plants. A tractor attachment called a subsoiler or chisel plough is used to break up hardpans. However, subsoiling is expensive. Hardpans are mainly caused by excessive traffic on topsoil, causing soil compaction. If the farmer wishes to avoid hardpan development, he therefore needs to limit traffic on the soil.</p> <p>Hardpan break-up is part of primary tillage. Primary tillage is breaking up the surface of the soil by ploughing (plowing in American English). Ploughing is turning up the soil. An implement called a plough (or plow) is used. Ploughing may be by hand or using a plough pulled by an animal or a tractor. At the end of primary tillage, the soil is in large clods or lumps. The effect of primary tillage is to loosen or break up the soil surface, allow air and water to enter the soil more freely &amp; bury or mix organic matter with the soil.</p> <p>Secondary tillage is breaking up large clods of soil into smaller pieces, or aggregates, and the production of a tilth suitable for seed germination and crop growth. The process may be done manually using a hoe, rake or hand fork, or mechanically using a harrow and a rotovator. The effect of secondary tillage is to obtain a tilth suited to the crop, produce a seedbed for the cultivation of crops, cut up and mix organic matter (crop residues or stubble) into the soil &amp; allow the roots of crop plants to penetrate easily and grow freely in the soil.</p>
<p>30. Which of the following is MOST beneficial to biodiversity?</p> <p>(A) Reafforestation (B) Habitat destruction (C) Reduced pollution (D) Competitive species</p>	<p>Answer: C</p> <p>Biodiversity is an important consideration in sustainable farming, especially organic farming. It is all the diverse ecosystems &amp; the organisms in them. It may be referred to as the diversity of all species in a habitat, or sum of all species in a habitat. An ecosystem is a biological community of interacting organisms &amp; their physical environment. An ecosystem is made of biotic factors (the organisms) &amp; abiotic factors (their physical environment e.g. air, sunlight, temperature, water &amp; soil pH).</p> <p>B obviously harms diversity instead of benefitting it, so B is not correct. Of A, C and D, C is the most beneficial, as pollution broadly affects all species in an ecosystem.</p>
<p>31. When using a garden fork, it should be inserted at a slight angle (not vertically) into the ground</p> <p>(A) for ease of penetration into the soil (B) to protect organisms in the soil (C) to improve drainage of the soil (D) to increase aeration of the soil</p>	<p>Answer: A</p> <p>Slightly angling the fork as it is pushed into the soil eases its penetration of the soil.</p>

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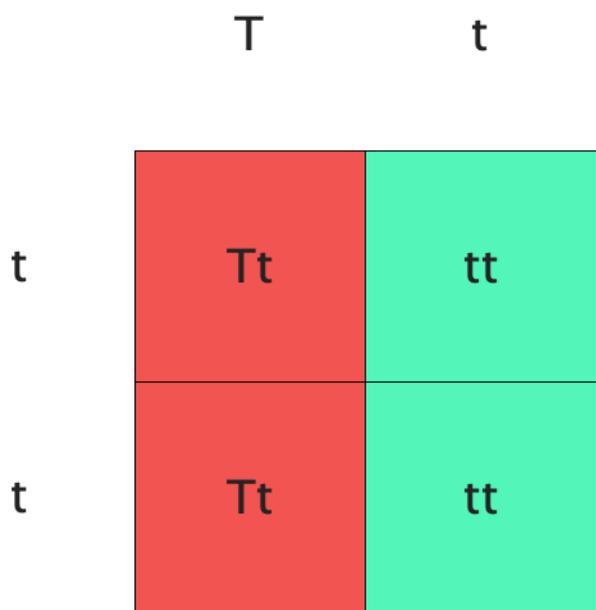
<p>32. The correct sequence for cleaning and maintaining tools is</p> <p>(A) wash, dry, sharpen and oil          (B) wash, oil, dry and sharpen          (C) oil, wash, sharpen and dry          (D) sharpen, wash, oil and dry</p>	<p>Answer: A</p> <p>Tools should first be washed, then dried. Cutting edges should be sharpened, then the tool should be oiled to reduce rusting.</p>
<p>33. Spraying crops with a knapsack sprayer should be done</p> <p>(A) in an east to west direction          (B) in the direction of the prevailing wind          (C) across the direction of the prevailing wind          (D) against the direction of the prevailing wind</p>	<p>Answer: C</p> <p>Ideally a knapsack sprayer should not be used in windy conditions. However the next best thing is to spray across the direction of the wind. Spraying in against the wind, or downwind, blows the pesticide onto the farmer as it is sprayed. Spraying in the direction of the prevailing wind blows the chemical across a wide area; enough may not therefore land on the intended plants and may furthermore much more likely to land on unintended plants. Spraying across the direction of the wind lowers the likelihood of this occurring, as well as ensuring more of the pesticide lands on the intended plants instead of blowing away.</p>
<p>34. A selective herbicide is one which</p> <p>(A) destroys all types of weeds          (B) destroys the chlorophyll in leaves          (C) is applied to weeds that have grown          (D) kills some plants but has no effect on others</p>	<p>Answer: D</p> <p>A herbicide is any substance that is toxic to plants. They are usually used to control weeds.</p> <p>Technically, a weed is any plant that grows where it is not wanted. However there are certain wild plants that are of no economic value, may poison or cause injury to livestock, and easily kill crops by crowding them out in terms of spacing, by taking most of the soil's nutrients, and by growing much faster than crops and thus shading them from sunlight, which the crops require for photosynthesis. These plants are what are commonly thought of as weeds.</p> <p>Herbicides can be classified in different ways. Pre-emergent herbicides kill weeds before they emerge from the soil. Post-emergent herbicides kill weeds after they emerge from the soil. Contact herbicides kill only the part of the plant on which they are sprayed. The root system is not killed and the weed may grow back from the roots. Systemic herbicides are absorbed by the plants and taken into the root system, so the whole weed is killed and thus does not re-emerge. Grass-specific herbicides kill only weeds of the Graminae (grass) family. Broadleaf herbicides kill weeds except those of the Graminae (grass) family.</p> <p>Selective herbicides kill certain plants as they work on processes that happen in those plants only, while non-selective herbicides kill any plant as they work on processes that happen in all plants.</p>

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<p><u>Items 35 - 36</u> refer to the following options.</p> <p>(A) Root hairs          (B) Xylem vessels          (C) Phloem vessels          (D) Leaves</p> <p>Match each of the following items with one of the options above, each of which may be used once, more than once or not at all.</p> <p>35. Absorb mineral salts and nutrients from the soil</p> <p>36. Transport manufactured foods throughout the plant</p>	<p>Answer to 35: A</p> <p>Root hair cells (black arrow pointing at one of the root hair cells) are single tubular (tube-shaped) root cells. Their distinctive lateral (elongation (state of being horizontally lengthened) increases the surface of exchange between the plant's root system and the soil. The main function of root hairs is the uptake of water and dissolved mineral salt and nutrients from the soil.</p> <p>Answer to 36: C</p> <p>In translocation, phloem vessels transport the glucose produced by photosynthesis &amp; other substances manufactured by the plant to other parts of the plant for use or storage.</p>
<p>37. Which of the following chemicals is used to accelerate ripening of fruits?</p> <p>(A) Chlorine          (B) Ethylene          (C) Iodine          (D) Oxygen</p>	<p>Answer: B</p> <p>Ethylene gas is a major plant hormone that influences diverse processes in plant growth, development and stress responses throughout the plant life cycle. Responses to ethylene, such as fruit ripening, are significant to agriculture. Ethylene regulates fruit ripening by coordinating the expression of genes that are responsible for a variety of processes, including a rise in respiration, autocatalytic ethylene production and changes in color, texture, aroma and flavor.</p>

	<p>Answer: B</p> <p>Tissue culture is a process used to create new plants. In the process, a small piece of plant tissue is taken from a plant and placed in a solution that contains nutrients and hormones that will help the tissue grow into a plantlet quickly. The solution used is called culture solution or growth medium. In this process, the growth medium or culture solution is very important as it contains various plant nutrients in the form of 'jelly' known as agar as well as plant hormones that are necessary for the growth of the plant. The plants produced from tissue culture are genetically identical to the parent plant that provided the tissue.</p>
<p>38. Plant tissue culture ensures that</p> <p>I. certified virus-free plants are produced</p> <p>II. new varieties can be selected quickly</p> <p>III. seasonal changes do not affect plantlet production</p> <p>(A) I and II only</p> <p>(B) I and III only</p> <p>(C) II and III only</p> <p>(D) I, II and III</p>	<p>The process is as follows:</p> <ol style="list-style-type: none"> <li>1. A small piece of plant tissue is taken from the growing point of a plant or from the tip of the plant and placed on a sterile jelly that contains nutrients and plant hormones.</li> <li>2. The hormones make the cells in the plant tissue divide rapidly, producing many cells that form a shapeless lump called a callus.</li> <li>3. The callus is then transferred to another jelly containing plant hormones that will stimulate it to develop roots.</li> <li>4. The callus with roots is moved to another jelly containing different hormones that will stimulate the development of shoots.</li> <li>5. The callus, having roots and shoots now, separates into tiny plantlets. In this way, many tiny plantlets are produced from just a few original plant cells or tissue.</li> </ol> <p>The new plants are clones of the original plant, i.e, they are produced asexually from the original plant, to which they are genetically identical. Thus if the original plant is virus-free, the new plants are certifiably virus free. As the plantlets are grown in a lab, seasonal changes do not affect their production. However, production of new plant varieties involves plant breeding, which involves asexual production; tissue culture is not involved in this process.</p>
<p>39. A tall pigeon pea plant with the genotype, Tt, is crossed with a dwarf pigeon pea plant with the genotype, tt.</p> <p>What is the possible phenotype of the offspring?</p> <p>(A) <math>\frac{3}{4}</math> tall plants, <math>\frac{1}{4}</math> short plants</p> <p>(B) <math>\frac{1}{2}</math> tall plants, <math>\frac{1}{2}</math> short plants</p> <p>(C) All short plants</p> <p>(D) All tall plants</p>	<p>Answer: B</p> <p>Alleles are different forms of a gene that code for contrasting characteristics. In this question, T and t are alleles - different forms of the same gene that control height. T codes for tallness and t codes for shortness.</p> <p>A genotype is the collection of genes on paired chromosomes. TT, Tt and tt are genotypes. Genotypes cause phenotypes. A phenotype is the physical expression of a genotype. For example, if a genotype causes tallness, then the phenotype is tallness. If a genotype codes for shortness, then the phenotype is shortness.</p> <p>In a pair of alleles, one allele may be dominant and the other may be recessive. The dominant allele displays its characteristic in the phenotype even though the recessive allele is present. The recessive allele only shows its characteristic in the phenotype only if the dominant allele is absent.</p> <p>In this question, T is dominant over t. So genotypes TT and Tt produce tall plants and genotype tt produce short plants. The phenotypes of the offspring are 50% tall, 50% short. The diagrams below illustrate.</p>

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1 trait cross  
4 squares  
2 unique allele combinations

Genotype	Count	Percent
Tt	2	50
tt	2	50

40. The process whereby dried grass is placed around the base of plants to keep the area moist is termed

(A) staking  
(B) moulding  
(C) mulching  
(D) irrigating

Answer: C

Mulching is the application of mulch. A mulch is a covering, as of straw (dried grass), compost, or plastic sheeting, spread on the ground around plants to prevent excessive evaporation or erosion, enrich the soil, etc.

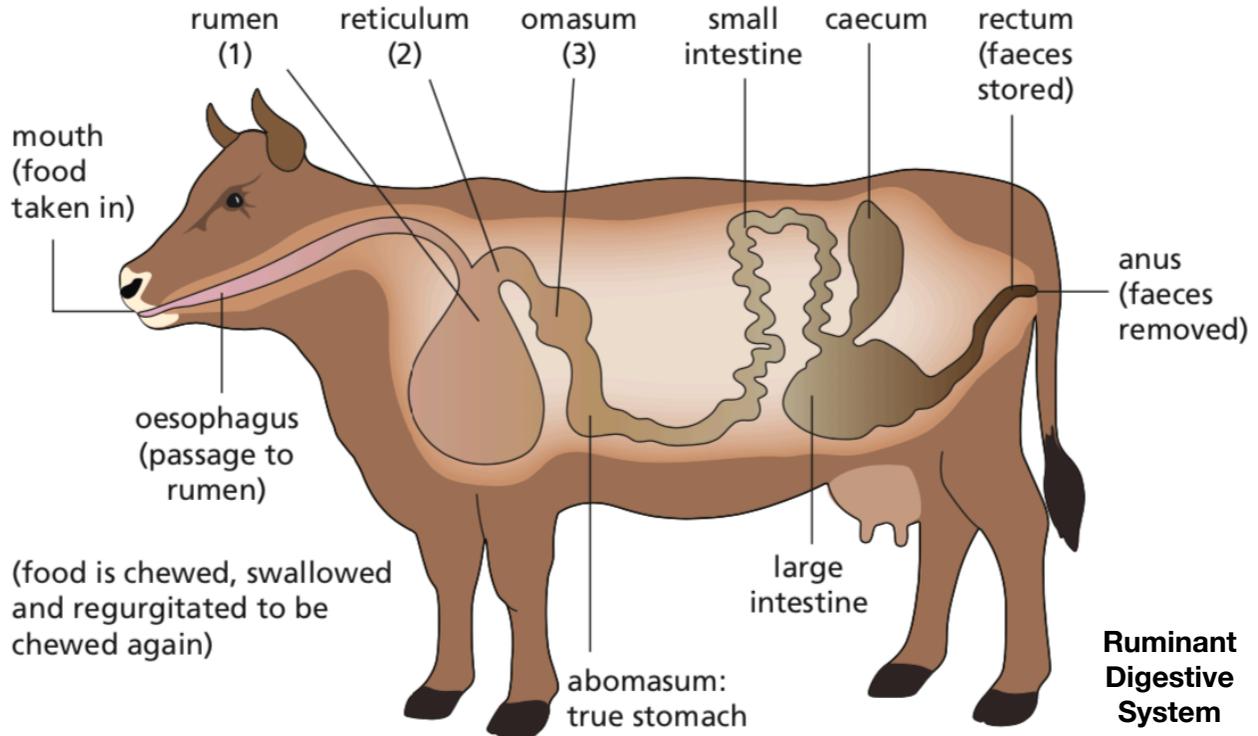
41. Which of the following animals regurgitates food, chews it and swallows it again?

(A) Pig  
(B) Goat  
(C) Rabbit  
(D) Poultry

Answer: B

Goats, sheep and cattle are ruminants. A ruminant is an animal that has a rumen. The rumen is part of a ruminant's complex, four-chambered stomach. It allows a ruminant to live entirely on cellulose (the main material in vegetation, i.e. grass and herbage). The four chambers of a ruminant's stomach are the rumen, the reticulum, the omasum and the abomasum. The rumen is the largest chamber. Food is swallowed without chewing and enters the rumen from the mouth, where the cellulose in the food is digested by bacteria, which also manufacture B-complex vitamins, which the ruminant's body absorbs (they are nutrients). The food passes into the reticulum. The food is now semi-liquid. The reticulum forms the semi-liquid food into boluses or cuds, which are returned to the mouth via regurgitation, or anti-peristalsis, for chewing (commonly called 'chewing the cud'). The chewed cuds are swallowed and pass back through the rumen and reticulum to the omasum. The omasum squeezes liquids out of the cuds. Fatty acids and water are absorbed from the cuds into the bloodstream through the wall of the omasum. The remaining solids in the cuds are passed from the omasum to the abomasum. The abomasum produces gastric juice, which begins digesting proteins in cuds into amino acids, and fats in the cuds into fatty acids and glycerol. The cuds become completely liquified and enter the small intestine. All the simple nutrient molecules resulting from the digestion of the food (amino acids, glucose, fatty acids & glycerol) are absorbed into the animal's bloodstream here. The undigested remains of the food pass into the large intestine, where water is absorbed from them and they are formed into feces, which are removed from the ruminant's body via egestion/defecation through the anus.

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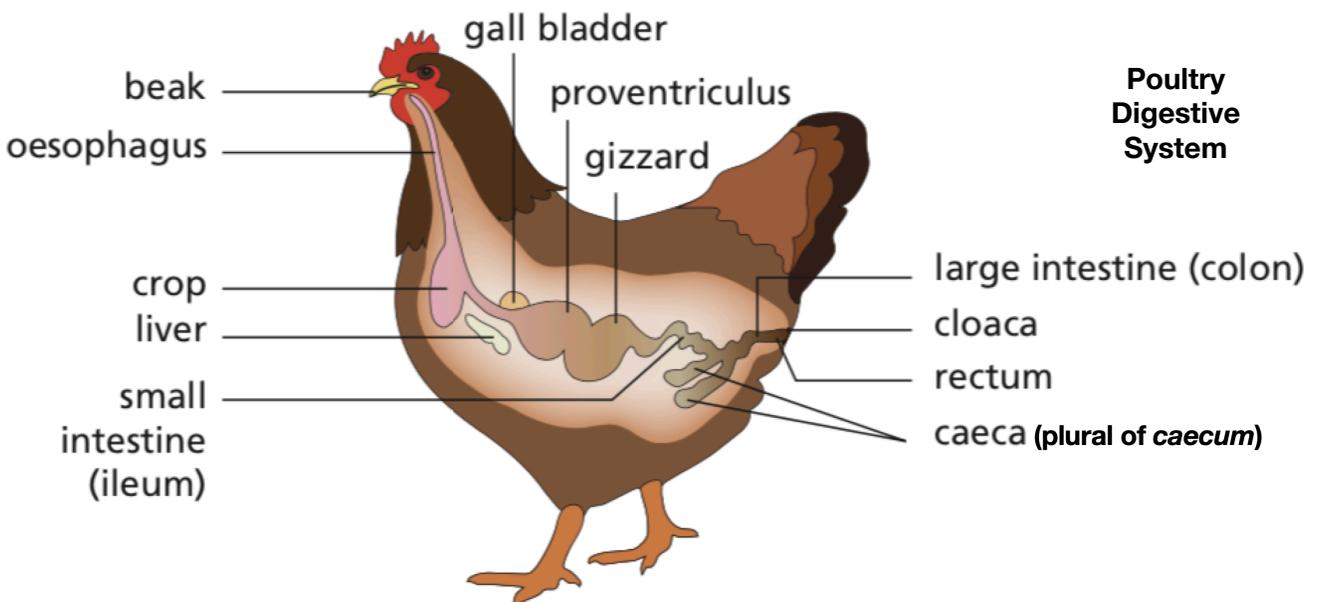


Bacteria and other micro-organisms in (1) and (2) break down cellulose. Water is absorbed from (3). Digestion continues in the true stomach and small intestine.

42. Which part of the digestive system of a bird stores food immediately after swallowing?
- (A) Crop
  - (B) Gizzard
  - (C) Proventriculus
  - (D) Small intestine

Answer: A

The crop stores food after swallowing. The food then passes to the proventriculus. The proventriculus is a tube-like area that produces digestive juices such as pepsin and hydrochloric acid. The food is thoroughly soaked with these digestive juices here. The food then passes to the gizzard, a muscular organ that grinds up the food. The gizzard has small stones called grit (swallowed by the bird or fed to the bird as a constituent of its feed) to assist in grinding up the food. The food then passes to the small intestine, where nutrients are absorbed from it into the birds' body.

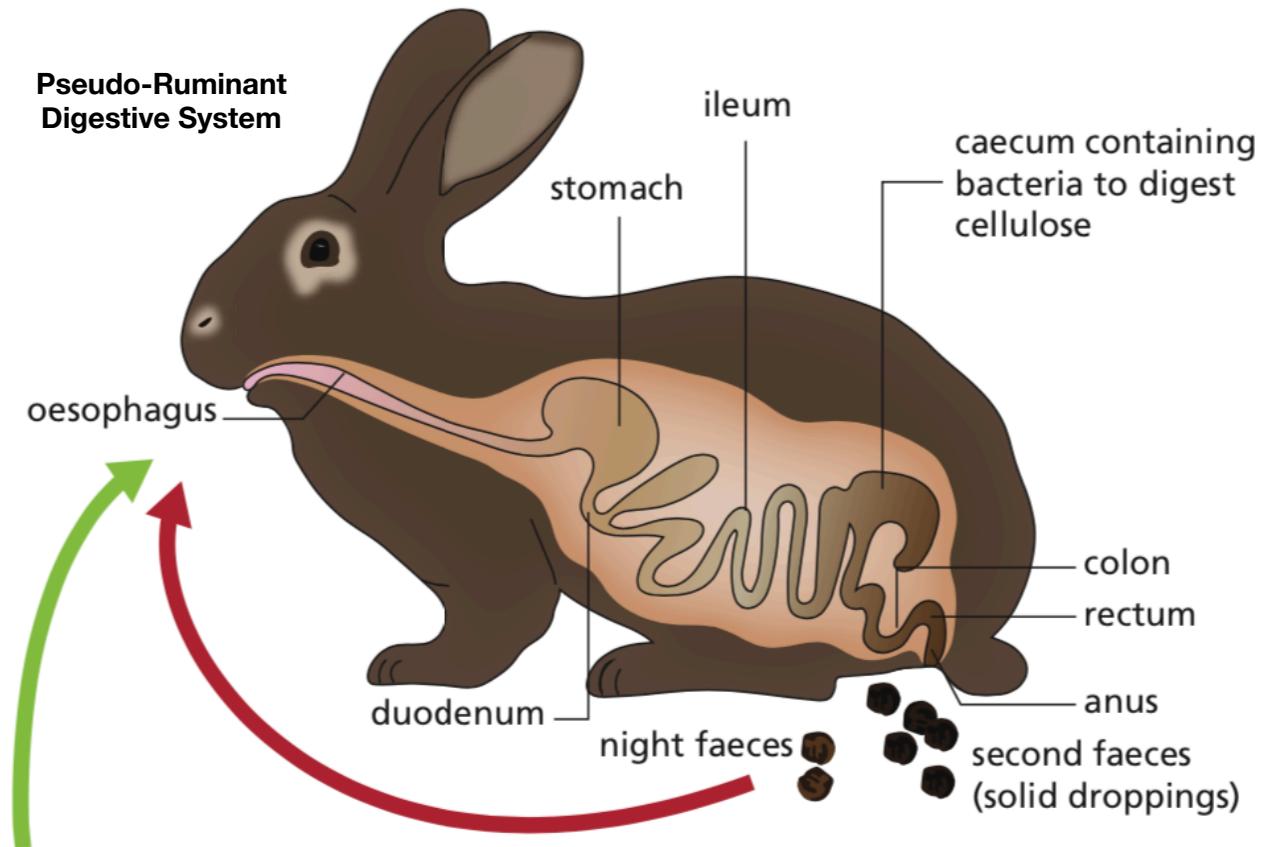


43. In rabbits, most cellulose digestion takes place in the
- (A) rectum
  - (B) stomach
  - (C) caecum
  - (D) oesophagus

Answer: C

Rabbits are pseudo-ruminants. A pseudo-ruminant is an animal that is able to live entirely on cellulose (from vegetation), but does not have a rumen. Instead of a rumen, pseudo-ruminants have a digestive organ called a caecum that performs the same function as a rumen: digestion of cellulose.

**Pseudo-Ruminant Digestive System**



1. Food is eaten for the first time

2. Night faeces are eaten

44. Fish meal in an animal ration is a rich source of

- (A) fats
- (B) protein
- (C) vitamins
- (D) carbohydrate

Answer: B

A feedstuff is any food provided for livestock. Feedstuffs, provide nutrients for energy, growth, development, maintenance, production and reproduction

There are 4 types of feedstuffs: forages, fodder, silage and concentrates. A forage is any food obtained by animals via grazing. Fodder is dried feedstuffs, such as hay, straw and chaff; they are used when forage is unavailable. Fodder can also include green chopped feedstuffs, for example, corn stalks, elephant grass and kudzu. Silage is pasture grasses, legumes and other crops that have been conserved and stored in silos. Concentrates are produced commercially in feed mills using local and imported feedstuffs. They are designed to suit the maintenance and production needs of different farm animals and they can be mixed, mashed, ground, granulated or pelleted.

Concentrates may be high protein, low protein, high fibre, low fibre, high carbohydrate, rich in essential vitamins and minerals, or have a low percentage of fat or low moisture content.

Rice, wheat middlings, brewer's grain and molasses are feedstuffs that are all high in carbohydrates. Soybean, acacia, kudzu and gliricidia are all forage legumes; these are high in proteins. Fish meal is also high in proteins. The other feedstuffs provide various nutrients, such as lipids, vitamins and minerals.

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45. A ration which supplies the required nutrients in the correct proportion BEST defines a

(A) starter ration  
 (B) balanced ration  
 (C) production ration  
 (D) maintenance ration

Answer: B

There are 3 types of rations: balanced, maintenance and production.  
 A balanced ration is a ration that contains all the necessary nutrients for growth and production in the right proportion for the animal.  
 A maintenance ration is the amount of food needed to prevent any increase or decrease in the live weight of the animal; this is just enough to supply energy for all metabolic activities.  
 A production ration is a ration that supplies nutrients in excess of maintenance; this excess is used for increased production.  
 Rations are used for 2 processes: steaming up and flushing. Steaming up is feeding a production ration used in the late stages of pregnancy to increase mammary tissues (tissues that produce milk in breasts) and their blood supply. Flushing is feeding a production ration that is used to increase the fertility rate of female livestock.

46. Broilers which are 4 – 6 weeks old should be fed

(A) starter  
 (B) grower  
 (C) finisher  
 (D) laying ration

Answer: C

Broiler chicks require broiler starter feed for the first four weeks of their life. The broiler starter feed should be at least 20 percent protein, preferably 23 percent protein. After four weeks, feed a 19 percent protein feed (broiler developer or finisher) should be fed to the birds.  
 Broilers should never be fed layer ration. Layer ration is high in calcium, which is needed by layers for development of strong eggshells. Eggshells consist mainly of calcium carbonate, along with small amounts of protein and other organic compounds. The high calcium content in layer ration damages broilers' kidneys.

47. The efficiency with which feed is converted into meat is known as the

(A) digestibility of feed  
 (B) dressing percentage  
 (C) feed conversion ratio  
 (D) feed efficiency conversion

Answer: C

Feed conversion ratio (FCR) is the quantity of feed required by an animal to gain a unit of weight; the unit may be kg, lbs or whatever unit that the weight is measured in. It is a measure of the efficiency with which an animal converts feed into meat.  
 The table below gives the FCRs of common Caribbean livestock animals.

Class of livestock	Average feed conversion ratio (FCR)
Cattle	4.5 to 5.0 : 1
Pig	3.5 to 4.0 : 1
Goat	4.5 to 5.0 : 1
Rabbit	3.0 to 3.5 : 1
Chicken	3.0 to 3.5 : 1

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	<p>Answer: A</p> <p>There are 5 types of grazing systems used by Caribbean farmers: zero, rotational, strip, continuous and deferred.</p> <p>Zero grazing refers to the cutting, chopping and feeding of forage crops to animals housed in pens or stalls, called feedlots. The animals feed on grass without having to graze, hence the term zero grazing. Grass or leafy plants raised as feed for fenced-in livestock is called soilage. Examples of the soilage or legume mixtures used in this system include elephant grass, guinea grass, also known kudzu, Guatemala grass and pangola grass.</p>
<p>48. Which of the following are characteristics of zero grazing?</p> <p>I. Animals are reared in a feedlot system.</p> <p>II. Forage is cut and taken to the animals</p> <p>III. Animals are fed only on concentrates.</p> <p>(A) I and II only          (B) I and III only          (C) II and III only          (D) I, II and III</p>	<p>In rotational grazing, the pasture area is subdivided into six or eight paddocks. Each paddock is systematically grazed in sequence, with the animals being moved from one paddock to another. The stocking rate (the number of animals present in the paddock) is usually high, e.g. 20 –25 cows per hectare. Each paddock is grazed for three to seven days, depending on the stocking rate and herbage growth. After that time, the paddock is rested and the animals are moved to another paddock. The system continues until the last paddock has been grazed and the cycle is then repeated. When paddocks are not being grazed they undergo pasture management.</p> <p>Strip grazing is a variation of the rotational system. A single paddock is grazed progressively, strip by strip, using movable electric fences to restrict the animals. The fences can be moved forwards once or twice daily, offering the animals a strip of fresh pasture for grazing.</p> <p>In continuous grazing, animals are allowed to graze on the same pasture area for a very long period. This system is normally practiced on expansive range lands only, where fencing is absent and probably impractical. The stocking rate is usually low.</p> <p>In deferred grazing, certain paddocks of pasture grass or legumes are withheld for later use. In tropical countries, it is the called the practice of conserving ‘standing hay’. The forage that is withheld usually matures, loses its succulence (juiciness), palatability and some nutritive value, but it is important as a maintenance ration, especially in the dry season. Leafier grasses and legumes, such as Guinea grass or kudzu, and giant star grass, are most suitable for this type of grazing</p>
<p>49. When building pens for animals, the farmer must ensure that they are well ventilated. This is done to facilitate the movement of</p> <p>(A) air          (B) feed          (C) water          (D) forage</p>	<p>Answer: A</p> <p>Ventilation is the provision of fresh air to a room, building, etc.</p>

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<p>50. Debeaking is a process used to</p> <p>(A) artificially incubate eggs                  (B) reduce cannibalism in poultry                  (C) provide brooding conditions chicks                  (D) prevent the condition called bound</p>	<p>Answer: B</p> <p>Debeaking is the removal of about 2 mm of the chicken's upper beak using a hot iron. It is no longer generally practiced as it has been found to be cruel. Beak trimming is a preventive measure to reduce damage caused by injurious pecking such as cannibalism, feather pecking and vent pecking, and thereby improve livability (survival of livestock).</p>
	<p>Answer: A</p> <p>There are 2 systems: deep litter &amp; battery cage                  The deep litter system keeps the birds together in a deep material called litter that covers the floor. The battery cage system keeps the birds singly in a line of cages called a battery.</p> <p>The deep litter system is usually used for broilers. The litter can be rice hulls, wood shavings or any material that does not produce large amounts of dust. A 30 cm wall is built around the floor to contain the litter. The litter is 3 to 4 cm deep; this allows it to generate sufficient heat to dry the watery feces. Feedbags are hung on the wire mesh to keep out drafts and rain. There are 2 feeders and 3 waterers for every 100 birds. The floor spacing is one square foot (0.09 m<sup>2</sup>) per bird. Light is necessary as it stimulates egg production in layers and feeding in broilers. If layers are raised using the deep litter system, nest boxes and perches are used; there is one nest box for every 4 to 5 birds; the cock to hen ratio is 1: 10 to 1:12. Layers start to lay from about 5 months; their economic life is about 2 years. The</p>
<p>51. The space required per bird for rearing broilers in the deep litter system is</p> <p>(A) 0.09 m<sup>2</sup>                  (B) 1.0 m<sup>2</sup>                  (C) 9.0 m<sup>2</sup>                  (D) 10.0 m<sup>2</sup></p>	<p>The deep litter system is practiced where land to build chicken houses is limited. It is usually used for layers in egg production. Each hen is confined to a cage just large enough to permit limited movement. The cages are arranged in lines called batteries. Feeders and waterers are placed outside the cages in front of the birds. A slightly sloped tray runs behind the cages to collect laid eggs.</p>
	<p>Answer: A</p> <p>Breeds of rabbits include Flemish Giant, New Zealand White, New Zealand Red, California and Chinchilla. Breeds of goats include Saanen, British Alpine, Anglo-Nubian and Toggenburg. Breeds of pigs include Landrace, Large White, Duroc, Hampshire and Tamworth. Breeds of layer chickens include White Leghorn, Rhode Island Red, Bevan Brown (or Bovan Brown) and Hyline. Breeds of broiler chickens include Vantress Cross, Peterson and Shaver. Breeds of sheep include Barbados Blackbelly, Blackhead Persian, West African and Virgin Island White. Breeds of dairy cattle include Jersey, Jamaica Hope and Holstein (or Holstein-Friesian). Breeds of beef cattle include Jamaica Black, Jamaica Red (or Jamaica Red Poll), Charolais, Zebu and Buffalypso.</p>
<p>52. Which of the following animals is reared for milk production?</p> <p>(A) Holstein                  (B) Landrace                  (C) Jamaica Red                  (D) Jamaica Black</p>	<p>Breeds of rabbits include Flemish Giant, New Zealand White, New Zealand Red, California and Chinchilla. Breeds of goats include Saanen, British Alpine, Anglo-Nubian and Toggenburg. Breeds of pigs include Landrace, Large White, Duroc, Hampshire and Tamworth. Breeds of layer chickens include White Leghorn, Rhode Island Red, Bevan Brown (or Bovan Brown) and Hyline. Breeds of broiler chickens include Vantress Cross, Peterson and Shaver. Breeds of sheep include Barbados Blackbelly, Blackhead Persian, West African and Virgin Island White. Breeds of dairy cattle include Jersey, Jamaica Hope and Holstein (or Holstein-Friesian). Breeds of beef cattle include Jamaica Black, Jamaica Red (or Jamaica Red Poll), Charolais, Zebu and Buffalypso.</p>

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<p>53. The incubation period of a hen's egg is</p> <p>(A) 10 - 12 days          (B) 16 - 18 days          (C) 19 - 21 days          (D) 28 - 30 days</p>	<p>Answer: C</p> <p>Incubation is the process of providing the conditions needed to hatch fertile eggs. The incubation period is the period between laying and hatching.</p> <p>In chickens, the incubation period is 21 days. The only possible answer with 21 days is C, so this is the best answer to choose.</p>
<p>54. In the process of embryo transfer, an embryo is transferred from a donor to a</p> <p>(A) calf          (B) heifer          (C) foster mother          (D) surrogate mother</p>	<p>Answer: D</p> <p>The selection of animals for breeding is mainly based on their performance. Traditionally, good dairy cows have been used for breeding, but a cow will produce only about eight calves in her lifetime, and half of them could be male. Nowadays, 'desirable' cows can be made to produce many embryos, which are transferred to the uterus of another cow or deep frozen for later implantation. This technique is known as embryo transfer. The cow that carries the calf to term (bears and delivers the calf) is called a surrogate mother. It increases the number of offspring from the 'desirable' cow.</p>
<p>55. Day-old chicks should be kept at a temperature of</p> <p>(A) 30 °C          (B) 35.5 °C          (C) 36.7 °C          (D) 40 °C</p>	<p>Answer: B</p> <p>Brooding is the special care given to day-old chicks for the first 2–3 weeks of their lives. It provides comfort for the chicks, confines the chicks to an area in which they are as safe as possible, and allows for easy record-keeping e.g. of chick survival. There are two types of brooding: natural and artificial.</p> <p>In natural brooding, the hen incubates a clutch of eggs and produces a brood of chicks. She provides protection and warmth for the newly hatched chicks. She keeps them under her wings and feathered body until they develop feathers and are able to withstand colder weather conditions. If the area around the poultry house is securely fenced, the hen may roam freely with her chicks.</p> <p>Alternatively, she may be confined to a coop, which protects her and the chicks from rain, hot sun, draughts and predators such as rats, mongooses and stray cats.</p> <p>The farmer ensures that both the hen and the chicks have sufficient feed and water at all times.</p> <p>In artificial brooding, the day-old chicks are housed in a specially prepared area, usually a corner of the poultry house, where they are protected, kept warm and provided with litter, feed and water.</p> <p>A lamp called a brooding lamp, ideally an infra-red or heating bulb, is used to keep the chicks warm. They need an initial temperature at 35 °C; this is reduced by 2 °C each week until it reaches 24–26 °C. If the temperature is too low, they huddle below the light and all will make loud, insistent 'peep-peep' noises. If the temperature is too high, they silently pant and scatter as far from the light as they can get. If the temperature is suitable, they will disperse evenly &amp; eat and drink normally; some will 'peep' contentedly and others will not.</p> <p>The question asks about day-old chicks, so they need the initial temperature of 35°C. The closest answer is 35.5°C, so this is the best answer to choose.</p>

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<p>56. Which of the following is a common viral disease of poultry?</p> <p>(A) Newcastle (B) Feather loss (C) Crop bound (D) Aspergillosis</p>	<p>Answer: A</p> <p>Newcastle disease is caused by a virus. It affects poultry of all ages. Symptoms are loss of appetite, droopiness, nasal mucus discharge, twitching of head and neck, breathing difficulties, paralysis and sudden death. Mortality rate (death rate) is high. There is no treatment for infected birds. Young chicks should be vaccinated. Sanitary measures such as using a footbath, and cleaning and disinfecting poultry pens, feeders and waterers should be adopted. Dead birds should be buried or burned.</p> <p>Aspergillosis is caused by a fungus. High mortality rates can be seen in chicks and poults that inhale large numbers of fungal spores during hatching or when placed on bedding contaminated with mold spores. In older birds, infection is caused primarily by inhalation of spore-laden dust from contaminated litter, feed, or dusty range areas. In facilities with reoccurring infection, the air handling system(s) should also be investigated as a source of contamination.</p> <p>Feather loss is a symptom of disease, not a disease itself.</p> <p>Impacted crop (crop bound) is a condition in which the crop does not empty. In the sultry digestive system, the crop stores food temporarily. In impacted crop, this does not happen, leading to the crop swelling and becoming hard. Symptoms are lethargy (lack of energy), weight loss (birds do not eat when their crops are full), and strange head movements due to the discomfort caused by the impacted crop.</p>
<p>57. Bees are of economic importance to a citrus farmer because they</p> <p>(A) test fruit for ripeness (B) biologically control pests (C) prevent praedial larceny (D) increase fruit production</p>	<p>Answer: D</p> <p>Bees pollinate flowers. Most citrus trees grown indoors or outdoors are self-pollinating. However, cross-pollination by insects such as bees increases pollination, leading to increased fruit production.</p>
<p>58. Which of the following processes is used MAINLY to kill harmful bacteria in milk?</p> <p>(A) Separation (B) Clarification (C) Pasteurisation (D) Homogenisation</p>	<p>Answer: C</p> <p>Fresh milk is subjected to three post-milking processes: pasteurization, homogenization and sterilization.</p> <p>Pasteurization destroys pathogenic organisms (organisms that cause disease, therefore organisms that are harmful) in milk, thus protecting public health. It prolongs the storage life of milk and maintains the nutritional value, taste and color. It is achieved by heating the milk to 63 °C for 30 minutes or to 72 °C for 15–20 seconds. The milk is then rapidly cooled to about 3 °C.</p> <p>In homogenization, butterfat globules are broken up into minute particles. The milk is heated to 72 °C for 15–20 seconds to pasteurize it. It is then subjected to high pressure and forced through a valve. Cream formation on the surface is prevented.</p> <p>In sterilization. Sterilization is used to produce ultra-high temperature (UHT) milk. The milk is heated to 140 °C for 3–5 seconds. This destroys all the micro-organisms in the milk but maintains the taste, color and nutritional value of the milk. This process extends the storage life of the milk considerably.</p>

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<p>59. Harvesting immature honey from uncapped cells can result in</p> <p>(A) easier extraction of honey          (B) increased honey production          (C) greater profit for the farmer          (D) fermenting and spoilage of honey</p>	<p>Answer: D</p> <p>In managed hives, honey is stored in the cells of the combs in the supers in a hive. Supers are removable sections of a managed beehive that are used to hold frames of combs that contain mostly honey. The supers are usually at the top of a managed hive. When honey is the right consistency, bees cap (close off) the cells with wax. Any uncapped cells are likely to contain 'unripe' or 'immature' honey.</p> <p>Unlike ripe honey, immature honey is subject fermentation and spoilage due to its relatively high water content compared to ripe honey.</p>
<p>60. Which of the following activities BEST describes the grading process of eggs?</p> <p>(A) The collection of eggs from nesting boxes          (B) The separation of eggs according to shape and size          (C) The separation of good eggs from bad eggs          (D) The use of various mechanisms to enhance the appearance of eggs</p>	<p>Answer: B</p> <p>Eggs are fragile so care needs to be taken when handling them. Eggs are collected from nest boxes and battery cages and placed into an egg basket. Care should be taken to prevent eggs from rolling, colliding and cracking. The number of eggs collected is recorded each day. Eggs are then cleaned by simply wiping them with a damp cloth. They should not be immersed in water as this destroys the protective coating on the outside of the eggs.</p> <p>Eggs are graded according to color, size, weight and level of damage. Grading is separating produce according to some criterion e.g. size, shape or color. Grading is necessary for quality control, consumer satisfaction and pricing (Larger eggs command higher prices than smaller eggs). Graded eggs are packed into crates holding 6, 12 or 30 eggs, with their larger ends uppermost to reduce pressure on the membrane and air space in the egg. The crates are the stored in a cool, clean room, free from unpleasant odors.</p> <p>Eggs are supplied wholesale to supermarkets and middlemen for pricing, labelling and retailing to consumers.</p>