

2023 WASSCE ANIMAL HUSBANDRY 2 SOLUTION

(Alternative A)

1. (a) (i) Six ways in which animal production is important:

1. **Source of Food:** It provides high-quality protein for human consumption in the form of meat, milk, and eggs.
2. **Source of Income:** Selling animals and their products (like wool, hides, and skin) generates income for farmers and contributes to their livelihood.
3. **Employment Opportunities:** Animal production creates jobs for many people, including farmworkers, veterinarians, feed producers, and processors.
4. **Source of Raw Materials:** It supplies essential raw materials for various industries, such as leather for shoes and bags, wool for textiles, and manure for fertilizer.
5. **Draught Power:** In many agricultural systems, animals like cattle and donkeys are used for ploughing fields, transporting goods, and other farm operations.
6. **Cultural and Social Significance:** Livestock plays a vital role in cultural ceremonies, festivals, and social status in many communities.

(a) (ii) Differentiate between rangeland and artificial pasture:

Rangeland	Artificial Pasture
Naturally occurring vegetation.	Deliberately planted and cultivated by humans.
Consists of indigenous grasses, legumes, shrubs, and trees.	Typically consists of selected, high-yielding, and nutritious forage species.
Usually managed extensively with minimal inputs.	Managed intensively with inputs like fertilizers, irrigation, and weed control.
Productivity is generally lower and depends on natural conditions.	Productivity is generally higher due to improved species and management.

1. (b) (i) Definition of Lactation:

Lactation is the process by which female mammals produce and secrete milk from their mammary glands to feed their young after giving birth.

(b) (ii) Two hormones associated with milk letdown:

1. **Oxytocin:** This hormone is primarily responsible for the contraction of myoepithelial cells in the mammary glands, which forces milk out of the alveoli into the ducts, making it available to the suckling young.
2. **Prolactin:** This hormone is essential for the synthesis and secretion of milk by the mammary glands.

1. (c) (i) Two sources of protein concentrate for poultry production:

1. Fish meal
2. Soybean meal

(c) (ii) Four nutritional diseases in cattle:

1. **Milk Fever (Hypocalcemia):** Caused by a deficiency of calcium in the blood, especially after calving.
2. **Bloat:** Caused by the excessive accumulation of gas in the rumen, often from consuming lush leguminous pastures.
3. **Grass Tetany (Hypomagnesemia):** Caused by a deficiency of magnesium, common in cattle grazing on rapidly growing, lush pastures.
4. **Ketosis (Acetonemia):** A metabolic disorder caused by a negative energy balance, where the body breaks down fat too rapidly.

2. (a) Discussion of Newcastle disease:

- **(i) Causal Organism:** A virus (Avian paramyxovirus type 1).
- **(ii) Mode of Transmission:** It is highly contagious and spreads through direct contact with infected birds' droppings and respiratory secretions. It can also be transmitted through contaminated feed, water, equipment, and clothing.
- **(iii) Two Symptoms:**
 1. Respiratory signs like gasping, coughing, and sneezing.
 2. Nervous signs such as twisted necks, paralysis of wings and legs, and tremors.
- **(iv) Two Control Measures:**
 1. **Vaccination:** Regular vaccination of the flock with appropriate vaccines (e.g., LaSota, Hitchner B1).
 2. **Biosecurity:** Implementing strict biosecurity measures, such as restricting access to the farm, disinfecting equipment, and quarantining new birds.

(b) Six ways of controlling parasites in animal production:

1. **Dipping/Spraying:** Regularly treating animals with approved acaricides to control external parasites like ticks and mites.
2. **Drenching/Deworming:** Administering anthelmintics (dewormers) to control internal parasites like roundworms and tapeworms.
3. **Rotational Grazing:** Moving animals between different pastures to break the life cycle of parasites found on the pasture.
4. **Proper Sanitation:** Keeping animal housing, feeders, and waterers clean to reduce the buildup of parasite eggs and larvae.
5. **Quarantine:** Isolating new animals before introducing them to the main herd or flock to prevent the introduction of new parasites.
6. **Biological Control:** Using natural predators (e.g., birds that eat ticks) or other organisms to reduce parasite populations.

(c) Explanation of terms:

- **(i) Culling:** The process of selectively removing unproductive, old, sick, or undesirable animals from a herd or flock to improve the overall quality, health, and productivity of the remaining stock.
- **(ii) Quarantine:** The practice of isolating animals that are new to a farm or suspected of being sick for a specific period. This is done to observe them for signs of disease and prevent the potential spread of infection to the existing healthy stock.

(d) Two factors to consider when formulating a diet for farm animals:

1. **Age and Physiological State of the Animal:** The nutritional requirements of an animal change with its age (e.g., young vs. adult) and physiological state (e.g., pregnant, lactating, or growing).
2. **Species and Breed of the Animal:** Different species (e.g., poultry vs. cattle) and even different breeds within a species have unique dietary needs.

3. (a) Definition of Artificial Insemination (AI):

Artificial insemination is the technique of deliberately introducing semen, which has been collected from a male animal, into the reproductive tract of a female animal by means of instruments, rather than by natural mating, for the purpose of conception.

(b) Completed Punnett Square for the cross RRDd x RrDd:

	RD	Rd	rD	rd
RD	RRD D	RRDd	RrDD	RrDd
Rd	RRDd	RRdd	RrDd	Rrdd

(c) Ratio of the genotype obtained from the crossing in (b):

By counting the genotypes from the completed Punnett square above:

- RRD D: 1
- RRDd: 2
- RRdd: 1
- RrDD: 1
- RrDd: 2
- Rrdd: 1

Genotypic Ratio = 1 : 2 : 1 : 1 : 2 : 1 (for RRD D : RRDd : RRdd : RrDD : RrDd : Rrdd)

(d) Three equipment used in bee keeping:

1. **Beehive:** The structure where the bee colony lives.
2. **Smoker:** Used to puff smoke to calm the bees during hive inspection.
3. **Hive Tool:** A metal tool used to pry open hive bodies and frames.

(e) Three ways of reducing worm infestation in farm animals:

1. Regular deworming with appropriate anthelmintics.
2. Practicing rotational grazing to break the worms' life cycle.
3. Maintaining clean housing, feeding, and watering areas to prevent ingestion of worm eggs.

4. (c) Distinguish between a gene and a genotype:

Gene	Genotype
A specific segment of DNA that codes for a particular trait or protein. It is the basic unit of heredity.	The complete set of genes or the genetic makeup of an organism for a particular trait or set of traits.
The gene for coat color.	The specific alleles present for coat color, e.g., BB, Bb, or bb.

(d) Four disadvantages of introduction as a practice in animal improvement:

1. **Introduction of Diseases:** Imported animals may carry new diseases and parasites to which the local stock has no immunity.
2. **Poor Adaptability:** Animals introduced from a different environment may struggle to adapt to the local climate, feed, and management conditions, leading to poor performance or death.
3. **High Cost:** The process of importing animals is often very expensive, including purchase price, transportation, and quarantine costs.
4. **Loss of Genetic Diversity:** Over-reliance on a few introduced breeds can lead to the neglect and potential extinction of valuable, well-adapted local breeds, thereby reducing the overall genetic diversity.

5. (a) Four benefits of providing water to grazing livestock:

1. Aids in digestion and absorption of nutrients.
2. Helps regulate body temperature, especially in hot weather.
3. Facilitates metabolic processes and waste excretion.
4. Essential for milk production in lactating animals.

(b) Four factors to consider when buying gilts (young female pigs) for rearing:

1. **Health Status:** The gilt should be healthy, active, and free from any signs of disease or physical defects.
2. **Conformation:** She should have good body structure, with at least 12-14 well-spaced teats, strong legs, and a good frame.
3. **Genetic History/Breed:** Choose a gilt from a reputable breeder with good genetic records for traits like litter size, mothering ability, and growth rate.
4. **Age and Weight:** The gilt should be of the appropriate age and weight for breeding to ensure successful conception and farrowing.

(c) Two ways a farmer could differentiate male and female grasscutters:

1. **Anogenital Distance:** The distance between the anus and the genital opening is significantly longer in males than in females.
2. **Genital Observation:** The male has a visible penis that can be extruded with gentle pressure, while the female has a vulva.

(d) Five characteristics of a suitable sheep pen:

1. **Good Ventilation:** To ensure fresh air circulation and prevent respiratory problems.
2. **Adequate Space:** Enough room for the sheep to move, lie down, and access feed and water comfortably.
3. **Dry and Clean Bedding:** The floor should be well-drained and covered with dry bedding to prevent foot rot and maintain hygiene.
4. **Proper Fencing:** The enclosure must be secure and strong enough to contain the sheep and protect them from predators.
5. **Provision of Feeders and Waterers:** Easily accessible and clean troughs for feed and water.

(e) Five advantages of the battery cage system of rearing chicken:

1. **Higher Egg Production:** More eggs are produced per bird as less energy is wasted on movement.
2. **Easier Management:** It simplifies tasks like feeding, watering, egg collection, and culling.
3. **Better Hygiene and Disease Control:** Droppings fall through the wire floor, reducing contact with birds and minimizing the spread of diseases.
4. **Increased Stocking Density:** More birds can be housed in a smaller area, maximizing space.
5. **Protection from Predators:** Birds are safe from ground predators.

6. (a) Drawing and labeling of a hen's egg:

(A description is provided in place of a drawing)

- **Shell:** The hard, protective outer layer, which is porous.
- **Shell Membranes:** Two thin membranes (inner and outer) just inside the shell, providing a barrier against bacteria.
- **Air Sac (Air Cell):** A pocket of air, usually at the large end of the egg, formed between the two shell membranes.
- **Albumen (Egg White):** The clear, thick fluid surrounding the yolk, rich in protein.
- **Yolk:** The yellow, central part of the egg, which is a major source of vitamins, minerals, and fat.
- **Chalazae:** Two rope-like structures that hold the yolk in the center of the albumen.
- **Germinal Disc (Blastoderm):** A small, whitish spot on the surface of the yolk where fertilization occurs and the embryo develops.

(b) Four examples of equipment used in a brooder house:

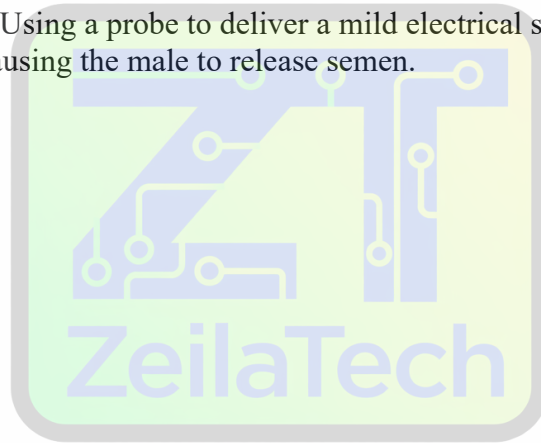
1. **Heat Source (Brooder Lamp/Stove):** To provide warmth for the young chicks.
2. **Chick Feeders:** Shallow troughs or pans for feed.
3. **Chick Drinkers (Founts):** To provide clean water.
4. **Brooder Guard/Chick Guard:** A circular barrier made of cardboard or metal to keep chicks close to the heat source.

(c) Completed table of vaccination for poultry:

Age of bird at vaccination	Disease/Type of vaccine	Route of administration
Day old	(i) Marek's Disease	Subcutaneous
1-7 days	(ii) Infectious Bronchitis (IB) / Newcastle (ND)	Intraocular/Eye drop
10-12 days	(iii) Gumboro (Infectious Bursal Disease - IBD)	Water
(iv) 2-3 weeks	Lasota New Castle disease	(v) Drinking water / Eye drop
(vi) 4-5 weeks	Fowl pox vaccine	(vii) Wing-web stab
6th week	(viii) Gumboro (Booster)	Intramuscular or water

(d) Two artificial methods of semen collection:

1. **Artificial Vagina (AV):** A device that simulates the natural vagina of the female, causing the male to ejaculate into a collection vial.
2. **Electro-ejaculation:** Using a probe to deliver a mild electrical stimulus to the nerves that control ejaculation, causing the male to release semen.



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