

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. The act of mating in sheep is called as:
 - a) Topping
 - b) Serving
 - c) Covering
 - d) Coupling

2. The castrated male horse is known as:
 - a) Gelding
 - b) Donkey
 - c) Steer
 - d) Pony

3. The gestation period of a cow is
 - a) 12 months
 - b) 3 months
 - c) 7 months
 - d) 9 months

4. The vitamin which is associated with sterility in male is
 - a) Vit A
 - b) Cyanocobalamin
 - c) Vit B6
 - d) Vit E

5. Nucleated RBC is seen in
 - a) Dog
 - b) Cat
 - c) Cow
 - d) Poultry

6. Cart wheel appearing cell is also known as
 - a) RBC
 - b) Neutrophil
 - c) Sertoli cell
 - d) Plasma cells

7. "Veal" refers to
 - a) Meat of a young pig
 - b) Meat of a young goat
 - c) Meat of local chicken
 - d) Meat of a calf

8. Vaccination of animals younger than 3 months are usually not recommended due to
 - a) interference from maternal antibody.
 - b) natural immunity present till three months.
 - c) not susceptible to infection.
 - d) immune system is strong.

9. "Caviar" is a rare, expensive and cherished delicacy. Which fish is this product obtained from?
 - a) Artic salmon
 - b) Rainbow trout
 - c) Golden mahseer
 - d) Sturgeon

10. In poultry, the primary function of gizzard is
 - a) Carbohydrate digestion
 - b) Lipid digestion
 - c) Protein digestion
 - d) Mechanical grinding of food

11. The observable traits of an organism that is influenced by environment and genetics is
 - a) Genotype
 - b) Allele
 - c) Gene
 - d) Phenotype

12. Which of the following parasites is responsible for causing demodectic mange in animals?
 - a) Fleas
 - b) Ticks
 - c) Mites
 - d) Lice

13. Which hormone is associated with stress response in animals and is often referred to as the "fight or flight" hormone?
 - a) Insulin
 - b) Adrenaline
 - c) Thyroxine
 - d) Estrogen

14. Which of the following livestock production systems allows animals to roam freely in a natural environment?
 - a) Intensive system
 - b) Extensive system
 - c) Concentrated system
 - d) Confined system

15. Which hormone is responsible for milk ejection during breastfeeding in mammals?
 - a) Insulin
 - b) Progesterone
 - c) Prolactin
 - d) Oxytocin

16. In breeding, what is the term for the mating of closely related individuals?
- Outbreeding
 - Hybridization
 - Inbreeding
 - Crossbreeding
17. The process of removing female reproductive organs to control reproduction is called:
- Castration
 - Spaying
 - Insemination
 - Fertilization
18. Process by which complex nutrients are broken down into simpler substances for absorption is
- Assimilation
 - Digestion
 - Fermentation
 - Absorption
19. Which structure connects the middle ear to the pharynx and helps equalize air pressure on both sides of the eardrum?
- Eustachian tube
 - Cochlea
 - Semicircular canal
 - Tympanic membrane
20. In the respiratory system, which structure prevents food and liquids from entering the trachea?
- Epiglottis
 - Alveoli
 - Bronchi
 - Pharynx
21. Removal of a dog's tail in part or whole for cosmetic reasons or to prevent possible injury is called
- Tail cutting
 - Docking
 - Dehorning
 - Culling
22. Which animal welfare principle emphasizes the need to provide animals with environments that allow them to express natural behaviors?
- Five Freedoms
 - Animal rights
 - Utilitarianism
 - Bioethics
23. When should the chicken receive Marek's vaccine?
- Day old chick
 - 3 days of age
 - 7 days of age
 - 14 days of age

24. Best crop for making silage in sub-tropical area is
- Wheat
 - Buckwheat
 - Maize
 - Paddy
25. Intermediate host of Fasciola parasite is
- Earthworm
 - Tick
 - Snail
 - Beetle
26. In animal husbandry, FCR is the efficiency measurement with which the bodies of livestock convert feed into the desired output. What is the full form of FCR?
- Feed Consumption Rate
 - Feed Conversion Ratio
 - Feed Concentrate Reserve
 - Feed Capacity Rate
27. Intermediate host of Taenia saginata (beef tapeworm) is
- Dog
 - Cattle
 - Humans
 - Horse
28. What is often referred to as the "queen of fodder grass," valued for its exceptional nutritional content and suitability as livestock fodder?
- Hybrid napier
 - Rye grass
 - Alfalfa
 - Gautemala
29. The Kjeldahl method is commonly employed in animal nutrition to:
- Assess the energy content of feed ingredients.
 - Determine the fiber content in animal feeds.
 - Analyze the mineral composition of animal tissues.
 - Measure the protein content in feed samples.
30. Proximate analysis in animal nutrition involves the determination of various components in feedstuffs to assess their nutritional value. Which of the following is NOT a component typically analyzed in proximate analysis?
- Protein
 - Carbohydrates
 - Lipids (Fats)
 - Vitamins

PART II – Short Answer Questions [20 marks]

This part has 5 Short Answer Questions. Answer ALL the questions. Each question carries 4 marks. Mark for each sub-question is indicated in the brackets.

1. What is proximate analysis? What components of the feed are measured using this method?
2. What is the purpose of "crossbreeding" in livestock production? Describe two advantages of crossbreeding and provide an example of a successful crossbred animal?
3. Discuss the concept of "biosecurity" in livestock farming. Provide three key biosecurity measures that producers can implement to prevent disease outbreaks and maintain herd health?
4. Define or explain the following terms used in livestock research (4 marks)
 - a) p-value of less than 0.5% (2)
 - b) 95% Confidence level (1)
 - c) Hypothesis testing (1)
5. Write the extended form of the following: (5 marks)
 - a) Disease – LSD and IB
 - b) Nutrient – CP and EE
 - c) Vaccine - ARV and BCG
 - d) Hormone - PG and FSH
 - e) Diagnostics – PCR and ELISA

SECTION B: CASE STUDY [50 marks]

Choose either Case I or Case II from this Section. Each case carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Poultry rearing is considered a lucrative livestock venture by numerous individuals in Bhutan. A young and aspiring entrepreneur has sought your expertise to provide guidance in setting up a layer farm that can accommodate 5000 birds. Leveraging your background in animal science, provide your expertise to the entrepreneur within the following thematic areas:

1. Describe in detail the cost of constructing poultry shed and other associated infrastructure. **(15 marks)**
2. Describe in detail the production and marketing: feed, salary, sale of egg, other associated costs and show the net profit. For calculating the net profit, do not include the cost of housing and other associated infrastructure. Include only the cost starting from the receipt of pullets (6 weeks at Nu. 200). **(15 marks)**
3. Describe the different approaches to check the egg quality. **(10 marks)**
4. The average cost of an egg in Bhutan is approximately Nu. 12 per egg. However, it's possible to import eggs at a significantly lower cost, about 50% lower, at around Nu. 6 per egg. What do you think are the reasons behind this price disparity? Please share your insights on how Bhutan can address this price difference and support its domestic egg production industry for long-term sustainability. **(10 marks)**

CASE II

In the operation of a model livestock farm, giving equal consideration to animal nutrition, animal health and biosecurity, and production is essential. However, the livestock farming practices in Bhutan at present require a significant transformation to align with this comprehensive approach. Keeping this approach and the need in mind, answer the following questions:

1. Describe running a broiler farm with 2000 broilers, one cycle: rearing, slaughtering and selling chicken. Enlist the different farm biosecurity aspect that will be taken care during establishment as well as while operating the farm, including the different vaccines used and their schedule. Assume housing is available on full subsidy from government. **(20 marks)**
2. Where would be your potential market for chicken in Bhutan? **(10 marks)**
3. What are the options that you will adopt as a strategy to export your products? **(10 marks)**
4. Describe the use of non-meat ingredients for value addition of the meat products **(10)**

TASHI DELEK