

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2024  
EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALISATION PAPER FOR ANIMAL SCIENCE**

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<b>Date</b>	: October 5, 2024
<b>Total Marks</b>	: 100
<b>Writing Time</b>	: 150 minutes (2.5 hours)
<b>Reading Time</b>	: 15 Minutes (prior to examination time)

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**GENERAL INSTRUCTIONS:**

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of the Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **THREE SECTIONS**, namely SECTION A, SECTION B & SECTION C:
  - **SECTION A** : 30 Multiple Choice Questions
  - **SECTION B** : 6 Short Answer Questions. Choose only **FIVE**.
  - **SECTION C**: 4 Long Answer Questions. Choose only **TWO** and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the correct Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part on a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **7 printed pages**, including this instruction page.

**GOOD LUCK!**

**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. Which of the following is the primary function of the rumen in ruminants?
  - a) Protein digestion
  - b) Fiber fermentation
  - c) Fat absorption
  - d) Water absorption
  
2. What is the normal gestation period for a cow?
  - a) 150 days
  - b) 280 days
  - c) 310 days
  - d) 330 days
  
3. Which of the following vitamins is essential for blood clotting?
  - a) Vitamin A
  - b) Vitamin D
  - c) Vitamin K
  - d) Vitamin C
  
4. In poultry, what is the term used to describe the process of laying an egg?
  - a) Ovulation
  - b) Ovoposition
  - c) Oviposition
  - d) Incubation
  
5. Which mineral is most important for bone development in animals?
  - a) Iron
  - b) Calcium
  - c) Sodium
  - d) Potassium
  
6. Which of the following diseases is caused by a deficiency of Vitamin D in animals?
  - a) Rickets
  - b) Scurvy
  - c) Anemia
  - d) Osteoporosis
  
7. Which hormone is primarily responsible for milk production in mammals?
  - a) Estrogen
  - b) Progesterone
  - c) Oxytocin
  - d) Prolactin

8. Which of the following is the most energy-dense nutrient?
- a) Carbohydrates
  - b) Proteins
  - c) Fats
  - d) Vitamins
9. What is the primary site of digestion and nutrient absorption in monogastric animals?
- a) Stomach
  - b) Small intestine
  - c) Large intestine
  - d) Cecum
10. Which disease in cattle is caused by *Mycobacterium bovis*?
- a) Foot-and-mouth disease
  - b) Tuberculosis
  - c) Brucellosis
  - d) Anthrax
11. Which of the following is a zoonotic disease?
- a) Rabies
  - b) Crimean Congo Hemorrhagic Fever
  - c) Avian influenza
  - d) All of the above
12. Which of the following is an example of a micromineral?
- a) Calcium
  - b) Phosphorus
  - c) Iron
  - d) Potassium
13. Which part of the chicken's digestive system is responsible for grinding food?
- a) Crop
  - b) Proventriculus
  - c) Gizzard
  - d) Cloaca
14. Which of the following is a common feed additive used to promote growth in livestock?
- a. Antibiotics
  - b. Vitamins
  - c. Enzymes
  - d. Probiotics
15. Which animal is known as the "ship of the desert"?
- a) Horse
  - b) Camel
  - c) Donkey
  - d) Mule

16. What is the main purpose of artificial insemination in livestock?
- Improve animal health
  - Increase milk production
  - Enhance genetic diversity
  - Control animal population
17. Which disease in sheep is caused by the bacterium *Clostridium perfringens*?
- Blackleg
  - Tetanus
  - Pulpy kidney disease
  - Listeriosis
18. Which of the following is a legume commonly used in animal feed?
- Corn
  - Barley
  - Soybean
  - Wheat
19. Surgical procedure in which a portion of a dog's ears is removed, typically to create an erect ear appearance.
- Docking
  - Aligning
  - Cropping
  - Erecting
20. Which of the following is NOT a function of water in the animal body?
- Temperature regulation
  - Solvent for nutrients
  - Energy storage
  - Waste removal
21. Which of the following parasites is known to cause significant economic losses in sheep farming?
- Roundworms
  - Flies
  - Mites
  - Ticks
22. Which process involves the breaking down of feed into simpler components for absorption?
- Ingestion
  - Digestion
  - Metabolism
  - Excretion

23. Which of the following feed components is most critical for optimizing the rumen microbial population in ruminants?
- a) Simple sugars
  - b) Protein concentrates
  - c) Structural carbohydrates
  - d) Fats
24. In poultry, which hormone is primarily involved in regulating oviposition?
- a) Progesterone
  - b) Oxytocin
  - c) Prolactin
  - d) Luteinizing hormone
25. Which metabolic disorder in dairy cows is commonly associated with low blood calcium levels post-calving?
- a) Ketosis
  - b) Hypocalcemia
  - c) Acidosis
  - d) Laminitis
26. What type of data in GIS is used to represent continuous surfaces, such as elevation or temperature?
- a) Vector data
  - b) Raster data
  - c) Tabular data
  - d) Point data
27. Which of the following is a primary factor contributing to infertility in dairy cattle?
- a) Excessive energy intake
  - b) Low protein in the diet
  - c) Negative energy balance
  - d) High calcium intake
28. Which of the following enzymes is essential for lipid digestion in monogastric animals?
- a) Amylase
  - b) Trypsin
  - c) Lipase
  - d) Pepsin
29. In which part of the gastrointestinal tract does microbial fermentation predominantly occur in horses?
- a) Stomach
  - b) Small intestine
  - c) Cecum
  - d) Large intestine

30. What is the function of the pampiniform plexus?
- Thermoregulation
  - Nutrient absorption
  - Immunogenicity
  - Excretion

**SECTION B: Short Answer Questions [30 marks]**

**This part has 6 Short Answer Questions. Select any five questions from the list below and provide your answers. Each question carries 6 marks.**

- Explain the concept of herd immunity and its importance in livestock populations **(6 marks)**
- Identify and describe three common methods of administering medication in livestock **(6 marks)**
- 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? **(6 marks)**
- Differentiate between probiotics and prebiotics **(6 marks)**
- Discuss the role of genetic selection in improving livestock productivity. **(6 marks)**
- What is HACCP? Explain the role of HACCP in meat inspection and how it contributes to ensuring food safety? **(6 marks)**

**SECTION C: Long Answer Questions [40 marks]**

**There are four long answer questions for 20 marks each. Select any two and provide your answers**

- In veterinary clinics, fracture is one of the most common cases we encounter. Keeping this in view, answer the following questions:
  - What is a fracture? **(1 mark)**
  - Describe different types of fracture with diagrams **(9 marks)**
  - Describe the process involved in fracture healing? **(10 marks)**
- Dairy farming is a growing enterprise in Bhutan. Besides enhancing rural livelihood and reduction of poverty, it is vital in substituting import. Considering the importance of dairy farming, answer the following questions:
  - Outline the key considerations for starting a 10-cattle dairy farm, including the necessary infrastructure, feed and health management, and labor requirements. **(10 marks)**
  - Additionally, analyze the economics of running such a farm by estimating the costs involved, potential revenue, and profitability over the first year of operation. **(10 marks)**
- Proximate analysis is a fundamental method used in animal nutrition to determine the basic composition of feed ingredients.

- a) Describe the process of proximate analysis in animal nutrition and explain the significance of each component measured **(10 marks)**
  - b) How does proximate analysis help in evaluating the nutritional value of animal feed, and what are the limitations of this method? **(10 marks)**
4. Artificial insemination is widely used breed improvement technology in Bhutan. Considering this, answer the questions below:
- a) Discuss the process of artificial insemination (AI) in livestock, including its advantages and limitations **(10 marks)**
  - b) Explain the key steps involved in the AI procedure, the factors that affect its success, and the role of AI in improving livestock genetics and productivity. **(10 marks)**

**TASHI DELEK**