

Date : October 7, 2023
Total Marks : 100
Writing Time : 150 minutes (2.5 hours)
Reading Time : 15 Minutes (prior to examination time)

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of 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 **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts:

Part I - 30 Multiple Choice Questions

Part II - 4 Short Answer Questions

All questions under SECTION A are COMPULSORY.
 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study 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 in 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 **8 printed pages**, including this instruction page.

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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 organ in ruminants is responsible for the breakdown of cellulose and other complex carbohydrates?
 - a) Liver
 - b) Rumen
 - c) Small intestine
 - d) Large intestine
2. What is the causative agent of bovine spongiform encephalopathy (BSE), also known as "mad cow disease"?
 - a) Prion
 - b) Virus
 - c) Bacteria
 - d) Fungus
3. Which hormone is responsible for stimulating milk ejection during nursing in mammals?
 - a) Progesterone
 - b) Prolactin
 - c) Oxytocin
 - d) Estrogen
4. Mule is an offspring of
 - a) male and female mule.
 - b) stallion and mare.
 - c) donkey and mare.
 - d) male and female donkey.
5. In dogs, which parasite causes "heartworm disease" a potentially fatal condition affecting the heart and lungs?
 - a) Mosquitoes
 - b) Fleas
 - c) Tape worm
 - d) *Dirofilaria immitis*
6. The following are the zoonotic viral diseases **EXCEPT**
 - a) SARS-CoV-2
 - b) Highly Pathogenic Avian Influenza
 - c) Nipah Virus
 - d) Lumpy Skin Disease

7. Which avian disease is caused by the bacterium *Chlamydia psittaci* and can be transmitted to humans, causing flu-like symptoms?
 - a) Avian influenza
 - b) Newcastle disease
 - c) Psittacosis
 - d) Fowl cholera
8. The typical zebra stripes in the lining of large intestine are seen in
 - a) FMD infection
 - b) Bovine tuberculosis
 - c) Johne's disease
 - d) Bovine viral diarrhea
9. In poultry, which vitamin deficiency causes the condition known as "curled toe paralysis"?
 - a) Vitamin A
 - b) Vitamin D
 - c) Vitamin E
 - d) Vitamin B2
10. Which endo-parasite is commonly known as the "barbers' pole worm" due to its appearance under a microscope?
 - a) *Trichuris spp.*
 - b) Strongyle group
 - c) *Strongyloides stercoralis*
 - d) *Haemonchus contortus*
11. Which term describes the practice of transferring embryos from a genetically superior female to a surrogate mother?
 - a) Cloning
 - b) Insemination
 - c) Embryo transfer
 - d) Artificial insemination
12. What is the primary function of the gallbladder in animals' digestive systems?
 - a) Producing digestive enzymes
 - b) Storing bile
 - c) Absorbing nutrients
 - d) Regulating blood sugar
13. In pigs, what is the term for the process of giving birth called?
 - a) Calving
 - b) Kidding
 - c) Farrowing
 - d) Parturition

14. Which vitamin is synthesized by animals when they are exposed to sunlight and is important for bone health?
- a) Vitamin A
 - b) Vitamin D
 - c) Vitamin E
 - d) Vitamin K
15. The two transboundary animal diseases that caused major outbreaks in Bhutan recently are
- a) FMD and PPR
 - b) CSF and PCV-2
 - c) HPAI and IBD
 - d) ASF and LSD
16. What is the primary function of the thyroid gland in animals?
- a) Regulation of blood sugar
 - b) Regulation of calcium levels
 - c) Regulation of metabolism
 - d) Regulation of heart rate
17. In cattle, which structure stores feed for further breakdown in the digestive process and is often referred to as the "true stomach"?
- a) Rumen
 - b) Omasum
 - c) Abomasum
 - d) Reticulum
18. Pawing repeatedly with a front foot, looking back at the flank region, curling the upper lip and arching the neck, repeatedly raising a rear leg or kicking at the abdomen, lying down, rolling from side to side, sweating, stretching out as if to urinate, straining to defecate, distention of the abdomen, loss of appetite, depression, and a decreased number of bowel movements are common signs observed in horses due to
- a) Strangles
 - b) Equine infectious anemia
 - c) *Gasterophilus* infestation
 - d) Colic
19. Tigroid Heart is seen in cattle affected with
- a) Bovine malignant catarrhal
 - b) Botulism
 - c) Bovine viral diarrhea
 - d) *Foot and mouth disease*.
20. In cats, what is the common term for the hairball that is formed in intestinal tract due to grooming habits?
- a) Trichobezoar
 - b) Coccidium
 - c) Phytobezoar
 - d) Silicobezoar

21. Which equine disease is caused by a mosquito-borne virus and is characterized by neurological symptoms such as paralysis and fever?
- a) West Nile virus
 - b) Equine herpesvirus
 - c) African horse sickness
 - d) Equine influenza
22. "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.
23. Which is the appropriate site for blood collection in chicken?
- a) Wing vein
 - b) Jugular vein
 - c) Femoral vein
 - d) Caudal vein
24. Which one of the following is the most effective anthelmintic for treatment of Fascioliasis in cow?
- a) Fenbendazole
 - b) Albendazole
 - c) Praziquantel
 - d) Triclabendazole
25. Which of the following is not a serotype of FMD virus?
- a) Serotype A
 - b) Serotype B
 - c) Serotype C
 - d) Serotype O
26. Button ulcers in internal organs including intestinal linings is a common lesion seen in
- a) Classical swine fever
 - b) African Swine Fever
 - c) Swine dysentery
 - d) FMD
27. Migratory water fowls are implicated for the long-distance transmission or spread of which disease?
- a) Infectious bursal disease
 - b) Avian influenza
 - c) Infectious bronchitis
 - d) Avian leucosis

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. Intermediate host of Fasciola parasite is
- Earthworm
 - Tick
 - Snail
 - Beetle
30. The observable traits of an organism that is influenced by environment and genetics is
- Genotype
 - Allele
 - Gene
 - Phenotype

PART II – Short Answer Questions [20 marks]

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

1. You received a report of a cow that is acting very aggressively. Upon reaching the site, the cow was continuously bellowing, butting objects, and also salivating profusely. Upon interviewing, the owner informed you that other than the cow sustaining a dog bite a month ago, there were no significant event that has occurred.
- What is the disease suspected? (1 mark)
 - What is the causative agent for this disease? (1 mark)
 - What is the best method to control this disease? (1 mark)
 - What would you advise to the owner of the farm? (1 mark)
 - Other than clinical signs and post-mortem findings, what laboratory test will you use to diagnose this disease? (1 mark)
2. Staining technique is one of the important preliminary steps in identifying pathogenic organisms. Based on the staining of organism, answer the following questions.
- Under the microscope, what color will you observe the bacteria if you stain them with methylene blue? (1 mark)
 - Write three differences between gram positive and gram-negative bacteria with examples each (2 marks)
 - Which organisms the following technique relates to; name the most relevant one: (2 marks)
 - Mac Fadyean reaction -
 - Ziehl-neelsen stain -
 - Seller stain -
 - Schaeffer-Fulton method -

3. You were involved in an investigation of African swine fever outbreak in Sarpang. The following were the data collected by the investigation team. You have been asked to summarize the information and report to the Director of the Department of Livestock as per the question provided in the subsequent sections. (1x5=5 marks)

Outbreak parameters	Values
Total population in the locality	35,000
Total boar	20,000
Total sow	15,000
Total pigs affected	2000
Total boar affected	200
Total sow affected	1800
Total deaths	23
Daily cases since the outbreak started	50

- What is the incidence rate for this outbreak?
 - What is the mortality rate?
 - What is the morbidity rate?
 - What is the case fatality rate?
 - Do you think there is the differences in risk of getting ASF in sows and boars? Justify your statement.
4. Penicillin class of antibiotics are commonly used to treat infection with gram positive organisms.
- Name two commonly used Penicillin class of antibiotics. (1 mark)
 - Describe the mode of action of Penicillin class of antibiotics. (3 marks)
 - Name two bacterial infection in livestock for which Penicillin class of antibiotic are indicated. (1 mark)

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

In an established commercial poultry farm, about 45% of the layer birds died due to infectious disease outbreak. The outbreak was reported to the veterinary authority and investigation found the involvement of Infectious Bursal Disease (IBD). Answer the following in the investigation process:

- Describe the details of Clinical investigation. The Clinical investigation should include description on clinical signs and symptoms of sick bird, post-mortem findings from dead birds and any other clinical information. (10 marks)
- Describe the details of Epidemiological investigation. The Epidemiological investigation should include description on: (10 marks)
 - Farm location, Residential population around the affected farm, Records of other farms around the affected farm, Number of birds in affected farm, Numbers died, Numbers at risk and Source of stock.
 - History of similar outbreak in the past, History of vaccination and Any other epidemiological information.

3. Describe the details of Laboratory investigation. The Laboratory investigation should include descriptions on: (15 marks)
 - a) Sample collection-various samples
 - b) Sample packing
 - c) Sample transport
 - d) Sample testing at laboratory - various tests
 - e) Test diagnosis and interpretation
4. Describe in details the different control measures to control such outbreak including vaccination and farm biosecurity. (15 marks)

CASE II

You are attending a case of dystocia in a cow. All other maneuvers have failed to remove the dead fetus and now you have decided to undertake a caesarean section.

Describe the procedure (25 marks), indications (5 marks), considerations (5 marks), and potential benefits of performing a caesarean section (C-section) in a cow due to dystocia (5 marks).

Provide insights into post-operative care, possible complications, and the overall significance of C-section as a lifesaving measure in bovine obstetrics **(10 marks)**.

Note: Describe the procedure for standing left paralumbar celiotomy – Marks will be provided for description of any other caesarean section methods

TASHI DELEK