

**ANH – Anatomy, Physiology and  
Artificial Insemination**

**T125**

**Wednesday, 09/11/2016**

**08:30 – 11:30**

**WORKFORCE DEVELOPMENT AUTHORITY**



**P.O. BOX 2707 Kigali, Rwanda Tel: (+250) 255113365**

**ADVANCED LEVEL NATIONAL EXAMINATIONS, 2016,  
TECHNICAL AND PROFESSIONAL STUDIES**

**EXAM TITLE:**

**ANATOMY, PHYSIOLOGY AND ARTIFICIAL INSEMINATION**

**OPTION: ANIMAL HEALTH (ANH)**

**DURATION: 3 hours**

**INSTRUCTIONS**

The paper is composed of **two (2) main Sections** as follows:

**Section I:** Attempt **any SIX (6)** out of TEN questions. **30 marks**

**Section II:** Attempt **any SEVEN (7)** out of TEN questions. **70 marks**

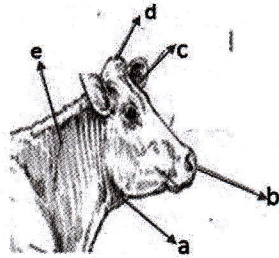
**Note:**

***Every candidate is required to carefully comply with the above instructions. Penalty measures will be applied on their strict consideration.***

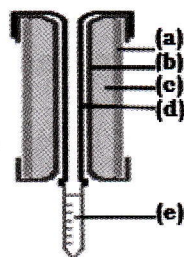
**Section I. Choose and answer any six (6) questions**

**30 marks**

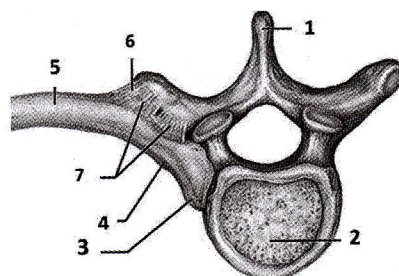
- 01.** Use the following list of anatomical regions to name correctly the parts (a, b, c, d and e) of the figure below: the Forehead, Eyes, Muzzle, Mouth with lips, Horns, Ears, Poll, Jaw, Throat, neck are the main parts of the head and neck in the cow. **5marks**



- 02.** During the dissection, how many pairs of salivary glands do you find in goats and dogs? Name those pairs of salivary glands in those two species. **5marks**
- 03.** Five muscles of the abdomen are most interesting in the dissection for a clinical anatomist. Name and locate them chronologically from the skin to the peritoneum. **5marks**
- 04.** Sensory receptors within each organ enable it to respond to particular stimuli. What are the five general categories of sensory receptors? **5marks**
- 05.** During the evisceration at the abattoir, two strange things have been seen from three different parts of the large ruminant stomach (an undigested plastic sac and a 5cm long nail)
- In which parts usually those materials were clinically located before the opening of the stomach?
  - What is their origin to the stomach?
- 5marks**
- 06.** What are the disadvantages of artificial Insemination in cattle? **5marks**
- 07.** Name the five showed parts of the artificial vagina generally used in bovine semen collection. **5marks**



- 08.** What is the most useful information to appear on a straw of semen? **5marks**
- 09.** The following figure is showing seven parts of the thoracic skeleton (neck of the rib, spinous process, head of the rib, shaft, ligaments, body of thoracic vertebra and tubercle of the rib). Using this list, name parts 1,2,3,4 and 5 of the figure below.



**5marks**



10. Name and give two examples of the three primary groups of products used to synchronize estrus or ovulation in cattle.

5marks

**Section II. Choose and Answer any seven (7) questions**

**70 marks**

11. In a veterinary school laboratory, the following bones of the skull were found packed in a big box: Frontal bones (2), Incisive bones (2), Interparietal bones (2), Lacrimal bones (2), Mandible (1 or 2), Occipital bone (1), Parietal bones (2), Maxillary bones (2), Nasal bones (2), Ethmoid bone (1), Zygomatic bones (2), Palatine bone (2), Temporal bones (2), Vomer bone (1), Sphenoid bone (1), Pterygoid bones (2), Turbinates (2).

When the technician will decide to build up only the crane, which bones will belong to the facial skeleton of a cow?

10marks

12. Teeth are part of the masticator apparatus, located in the alveolar sockets of the upper and the lower jaws, and animals are different in terms of dentition formulation.

- What are the five main parts of a normal tooth?
- Fill in the gaps (in the table below) according to the given species.

Dentition formulation in dog, ox, Horse and pig

Type of teeth	.....	Cattle	.....	.....
Incisors	3/3	.../...	3/3	3/3
Canines	1/1	.../...	1/1	1/1
Pre-molars	4/4	4/4	.../...	4/4
Molars	.../....	3/3	3/3	3/3

10marks

13. The technique used to collect semen depends on the species being collected and the disposition of the individual male.

10marks

- What are the three commonly-used techniques for collecting semen?
- Which artificial vagina temperature do the bulls require for semen collection?
- Give the advantages and disadvantages for semen collection by trans-rectal massage.

10marks

14. There are four complementally exams for the evaluation of the semen.

- List those exams and describe the cheapest one in terms of required equipments.
- Semen is packaged in plastic straws of two different volumes. Which are they?

10marks

15. On 10<sup>th</sup> September, 2016, early morning, a farm technician registered the temperature, respiratory rate and Pulse-rate and filled the following table.

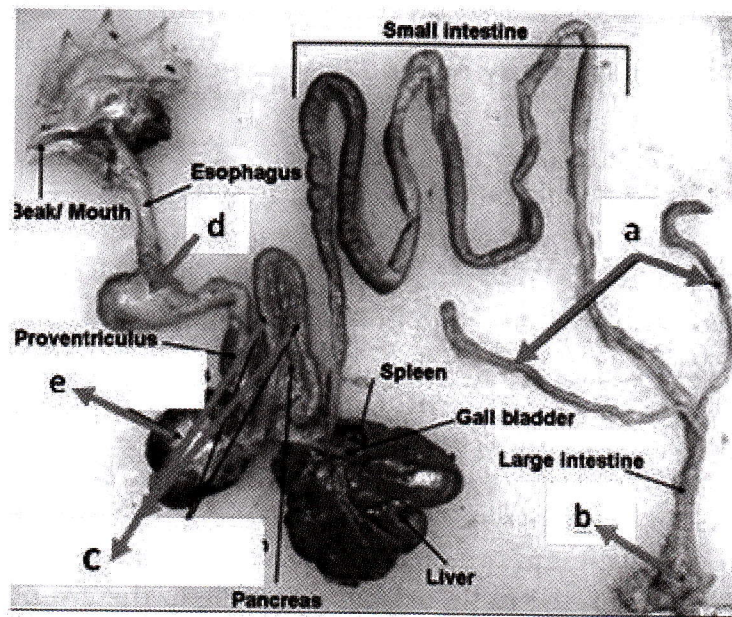
Animal Species	Temperature (°C)	respiratory rate/minute	(Pulse-rates / min.)
Ox	38.4	20	69
Sheep	36	25	80
Large dog	37.9	25	75
Rabbit	40	25	130
Cat	40.1	35	80

- Which animals appear to be out of the accepted range?
- What is the normal range for each parameter for the suspected animals?
- Which one is the unhealthiest candidate according to the showed record? Why?

10marks



16. (a) Name a, b, c, d, e, parts of the digestive tube of the fowl (chicken) here below:



(b) What are the three important ducts opened in part number b of the given figure?

(c) Name the parts of number b that are corresponding to those openings. **10marks**

17. In bovine artificial insemination, there is a set of important physiologic factors to keep in mind such as: duration of standing estrus, life span of the sperm, time of ovulation compared to the onset of the estrus, life span of the oocyte, advised time to inseminate if the estrus was observed in morning or in afternoon.

If you judge important these factors:

- What is the duration of standing estrus?
- What is the life span of the sperm?
- What is the time of ovulation comparatively to the onset of estrus?
- What is the life span of the oocyte?
- What is the advised time to inseminate if the estrus was observed in the morning (AM)?

**10marks**

18. Using the protocol of one injection of PGF(Prostaglandin) during the insemination after PGF,

- How much Prostaglandin F<sub>2</sub> Alfa solution will you purchase to synchronize heat in 100 cycling beef cows?
- How many cows do you expect to be inseminated at this induced heat?
- On which day would you get your cows in standing heat if PGF is injected on the 1<sup>st</sup>/ January/2016?
- How will you know that your cows are normally cycling if you choose the recto-palpatation procedure?

**10marks**

19. Liver is one of the homeostasis organs of the body and plays main functions. Enumerate the functions of the liver.

**10marks**

20. After giving the commonly used extenders for semen dilution, state the characters that should have a desirable extender.

**10marks**