THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENE

NAME: BWALYA LUMPA

COMPUTER NUMBER: 2016133418

LAB REPORT 1: Study of a Compound Microscope

DUE DATE: 5th APRIL 2019

ATTENTION: Ms. A. Malufi

TITLE: Compound microscope.

AIMS: To study the parts of a compound microscope
: To Calibrate the magnification used in observing an object on a slide

8/10

INTRODUCTION

A microscope is a piece of instrument that is used in a laboratory to observe very small objects that can not be observed by using an unaided eyes. It is made of many different parts that have different functions that help in achieving observing small objects that are put on a slide. (Smith, (1992).

In addition, a microscope has to be properly calibrated in order to have a clear view of a specimen under observation. Furthermore, a microscope should be handled carefully before, during and after using it. One hand should support the base while the other should support the arm of a microscope when transporting it from one point to the other and placed on a flat work table. it was with the above precautions that the practical was successfull done. (Surinder, (2012)

Currently, there are different types of microscopes on the market depending on the manufacturers as listed below. Bright field microscopy, Dark field microscopy, phase contrast, electron microscopy and oil immersion lenses.

Source

Dark field microscopy

The effect produced by the dark field technique is that of a dark background against which objects are brilliantly illuminated. This is accomplished by equipping the light microscope with a special kind of condenser that transmits a hallow cone of light from the source. Most of the light directed through the condenser does not enter the objective, the field is essentially dark. light rays will be scattered (diffracted) if the transparent medium contains objects such as microbial cells.

Phase Contrast Microscopy

useful for studying living unstained living cells. It is a conventional light microscope fitted with a phase contrast objective and a phase contrast condenser. This special optical system makes it possible to distinguish structures within a cell which differ slightly in their refractive indices or thickness. Light passing through one material into the another material of a slightly different refractive index or thickness will undergo a change in phase.

oil immersion

Has the same index of refraction as glass slide, preventing light loss from refraction. In light microscopy, oil immersion is a technique used to increase the resolving power of a microscope. This is achieved by immersing both the objective lens and the specimen in a transparent oil of light refractive index, thereby increasing the numeral aperture of the objective lens.

Electron microscopy

is a technique for obtaining high resolution images of biological and non-biological specimens. It is used in biological research to investigate the detailed structure of tissues, cells, organelles and macromolecular complexes.

Bright Field microscopy

Most widely used instrument for routine microscopic work. (Compound microscope).

In bright field microscopy, the microscopic field (the area observed) is brightly lighted and the microorganisms appear dark because they absorb some of the light.

Ordinary microorganism do not absorb much light, but staining them with a dye increases their light absorbing ability resulting in greater contrast and color differentiation.

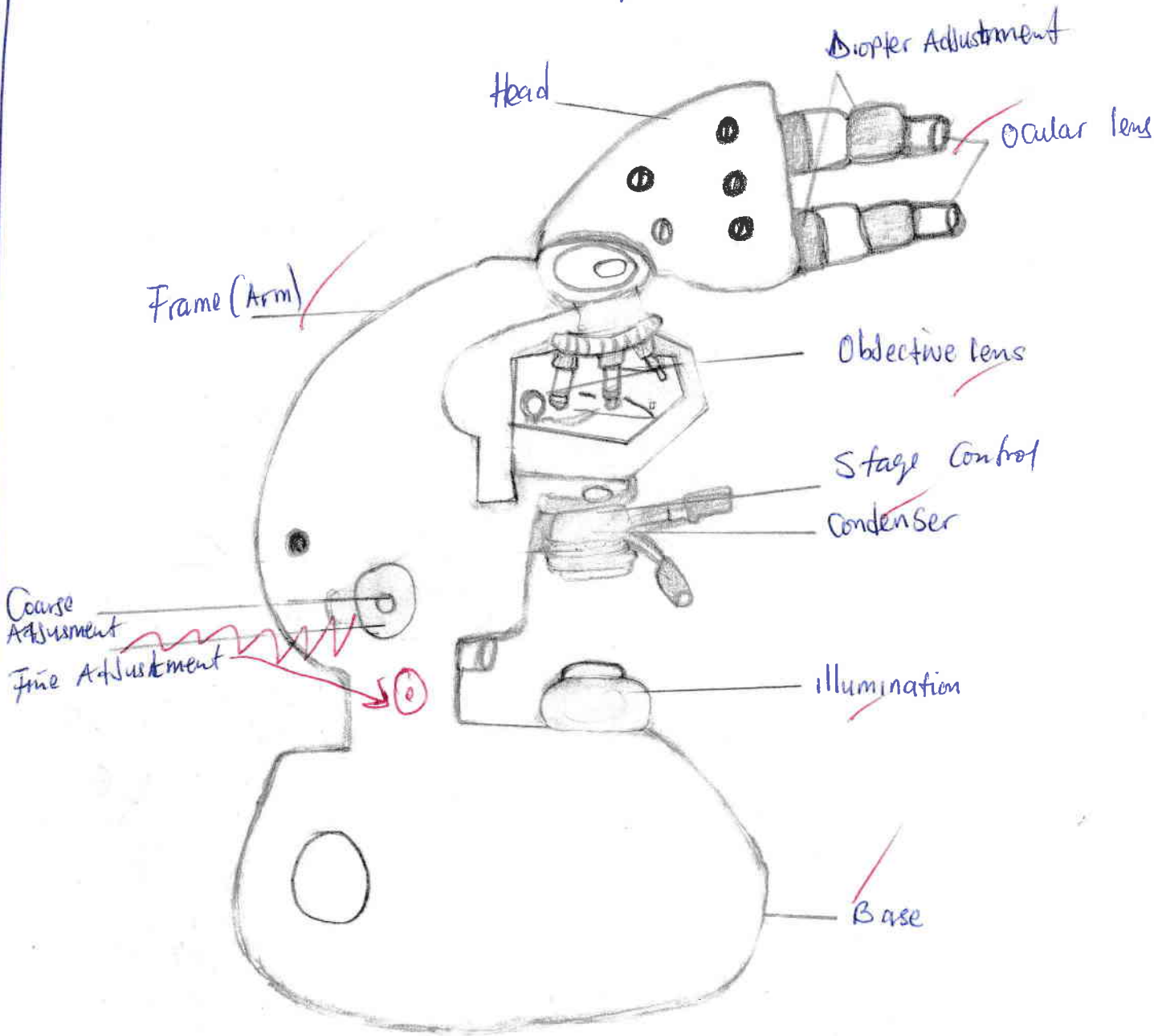
Materials

- Razor blade.
- Pencil
- Microscope. (compound)
- Plane paper
- Rubber
- Sharpener
- Ruler
- A compound microscope and all necessary materials used available.

Procedure.

All parts of the microscope were identified and labelled as shown on the diagram under results and observation.

Experiment 1: Below shows the Compound microscope and the labelled parts.



29/8/19

Discusion

A Compound microscope uses convex lenses to produce an enlarged or magnified image of very small objects.
The following are the parts of Compound microscope and their functions.

Eye piece (Ocular)

This is the upper set of lenses in the tube through which a specimen is viewed.

Pointer

This is a hair glued - like part after an ocular and appears as a black line extending to the centre of the field of the vision.

Diopter Adjustment

Useful as a means to change focus on one eyepiece so as to correct for any difference in vision between your two eyes.

Body tube (Head)

The body tube connects the eyepiece to the objective lenses.

Arm

The arm connects the body tube to the base of the microscope.

Coarse adjustment

Brings the specimen into general focus.

Fine adjustment.

The fines the focus and increases the detail of the Specimen.

Nosepiece

A rotating turret that houses the objective lenses. The viewer spins the nosepiece to select different objective lenses

Objective lenses

One of the most important parts of a Compound microscope, as they are the lenses closest to the specimen.

Specimen or Slide

The specimen is the object being examined. Most specimens are mounted on Slides, flat rectangles of thin glass.

Stage

The flat platform where the slide is placed.

Stage clips

Metal clips that hold the slide in place.

Iris diaphragm

Adjusts the amount of light that reaches the specimen.

Condenser

Gathers and focuses light from the illuminator onto the specimen being viewed.

Base

The base supports the microscope and its where illuminator is located.

Aperture

The hole in the middle of the Stage that allows light from the illuminator to reach the specimen.

Stage control

These knobs move the stage left and right or up and down.

All of the parts of a microscope work together - The light from the illuminator passes through the aperture, through the slide, and through the objective lens, where the image of the specimen is magnified.
The magnified image continues up through the body tube of the microscope to the eyepiece, which further imagnifies the image the viewer then sees.

Conclusion

A compound microscope should be handled carefully before, during and after use. This would allow the specimen to be magnified properly as a true picture.

THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCE

NAME : BWALYA LUMPA

COMPUTER NUMBER : 2016133418

COURSE CODE : AGA 2110

GROUP NO : 2

LAB NUMBER : 2

TITLE : MICROSCOPIC EXAMINATION OF SOFT ORGANS AND TISSUES

ATTENTION : MS MALITI

TITLE: MICROSCOPIC EXAMINATION OF SOFT ORGANS AND TISSUES

7.5/10

AIM: To examine soft organs and tissues under the microscope, showing their detailed structures and Functions.

INTRODUCTION

Organs are a group of cells working together while soft tissues are tissues that connect, support and surround other organs of the body such as bones which supports the movement of an organism while tissues like cylindrical muscle fibres long from 1-40mm in length and 50-100m in thickness. The fibres are contained in a membrane. The fibres contains many myofibrils which are stranded. In this experiment the liver cell, kidney, cardiac muscle, spleen, large intestine and striated muscle are going to be examined under the microscope and shown clearly in their structures (Hadson, 1972)

Cardiac muscle is one of three types of vertebrate muscles, with the other two being skeletal and smooth muscles. It is an involuntary, striated muscle that constitutes the main tissue of the walls of the heart.

Kidneys are a pair of bean-shaped organs on either side of the spine, below the ribs and behind the belly. Each kidney is about 4 to 5 inches long, roughly the size of a large fist. The kidney's job is to filter the blood. They remove waste, control the body's fluid balance, and keep the right levels of ~~lots~~ electrolytes

An major organ of the respiratory system, each lung houses structures of both the conducting and respiratory zones. The main function of the lungs is to perform the exchange of oxygen and carbon dioxide with air from the atmosphere. (Stephen, C 2004)

The spleen is an organ found in virtually all vertebrates. Similar in structure to a large lymph node, it acts primarily as a blood filter. The human spleen is located in the upper left abdomen, behind the stomach. The spleen plays important roles in regard to red blood cells (erythrocytes) and the immune system. It removes old red blood cells and holds a reserve of blood, which can be valuable in case of hemorrhagic shock, and also recycles iron. (Health, E 1985).

Materials / methods

All the muscle tissues were provided on different slids, and was placed under the microscope and the image of specimen was drawn and labeled all the viewed structures. All the provided specimen was viewed under the microscope and their different structures were seen and labelled in the following diagrams bellow. The total magnification of all of the six specimens were x140.

Materials

- slids
- microscope
- pencil
- plane paper
- rubber
- different muscle tissues and organs (specimens)

Observation

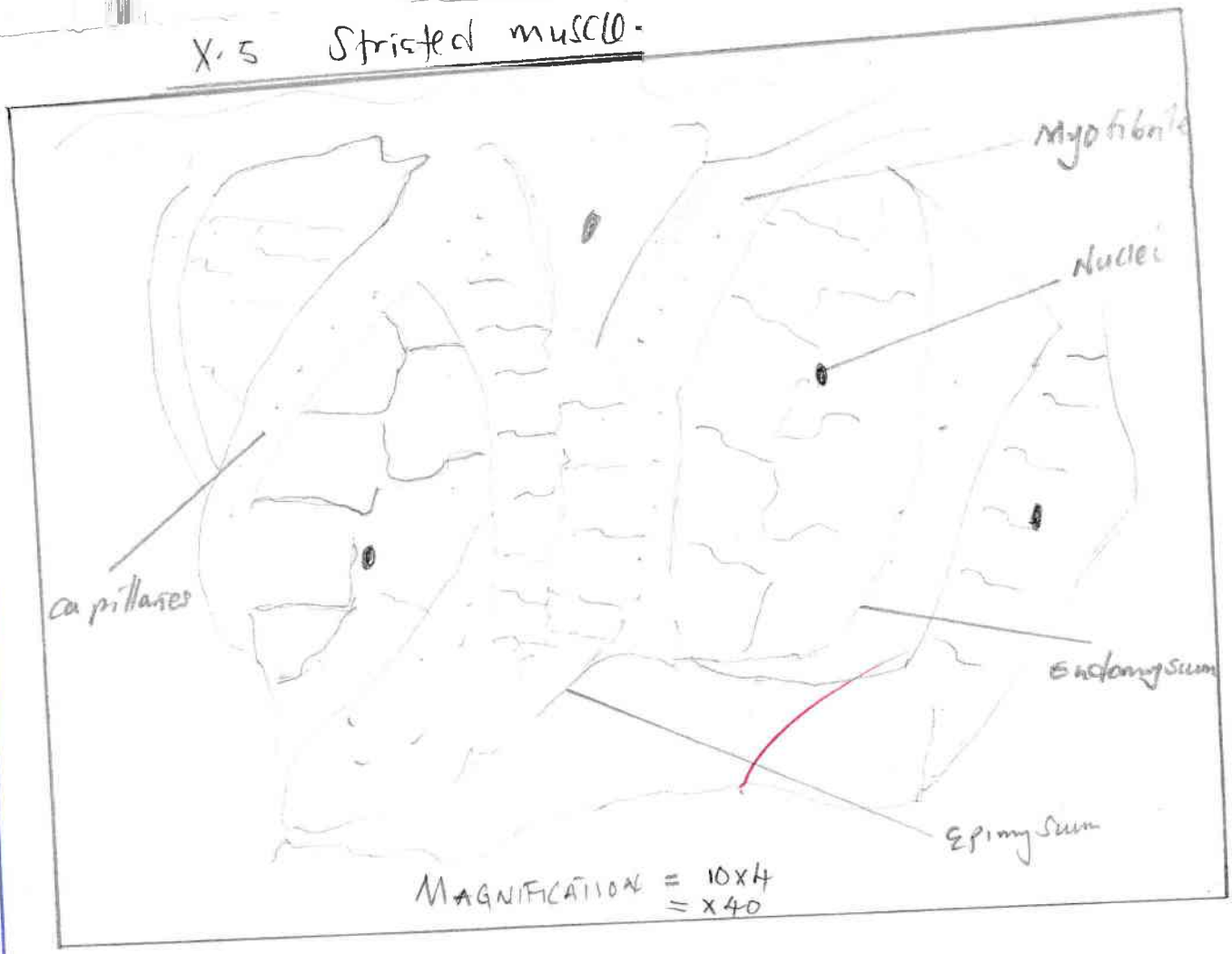
During the experiment of the heart tissue it was observed that the heart tissue has fibres which are made up of separate cellular units joined end to end by special surface specialization called intercalated disc that run transversely across the fibre.

Kidney during the experiment under low power two different areas was able to be identified, the cortex and medulla. The cortex contained the nephrons. The Glomerulus was clearly seen as sections of the convulated tubules

Liver tissue was viewed under low power magnification and was seen that it composed of many lobules, and the structures of the liver and parts were drawn in the diagram shown below.

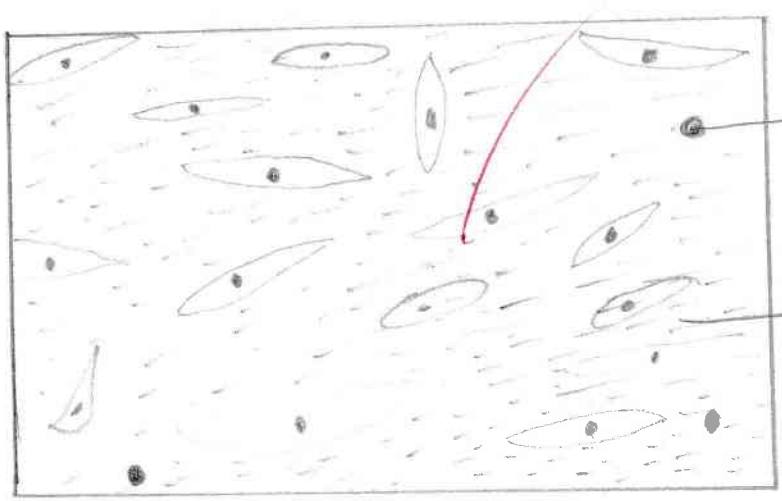
Smooth muscle and Striated muscle tissues all well done like other tissues including Skeletal muscle and well drawn with their labelled structures.

X.S Striated muscle.



MAGNIFICATION = 10x4
= x40

HEART MUSCLE



MAGNIFICATION = 10 x 4
= x 40

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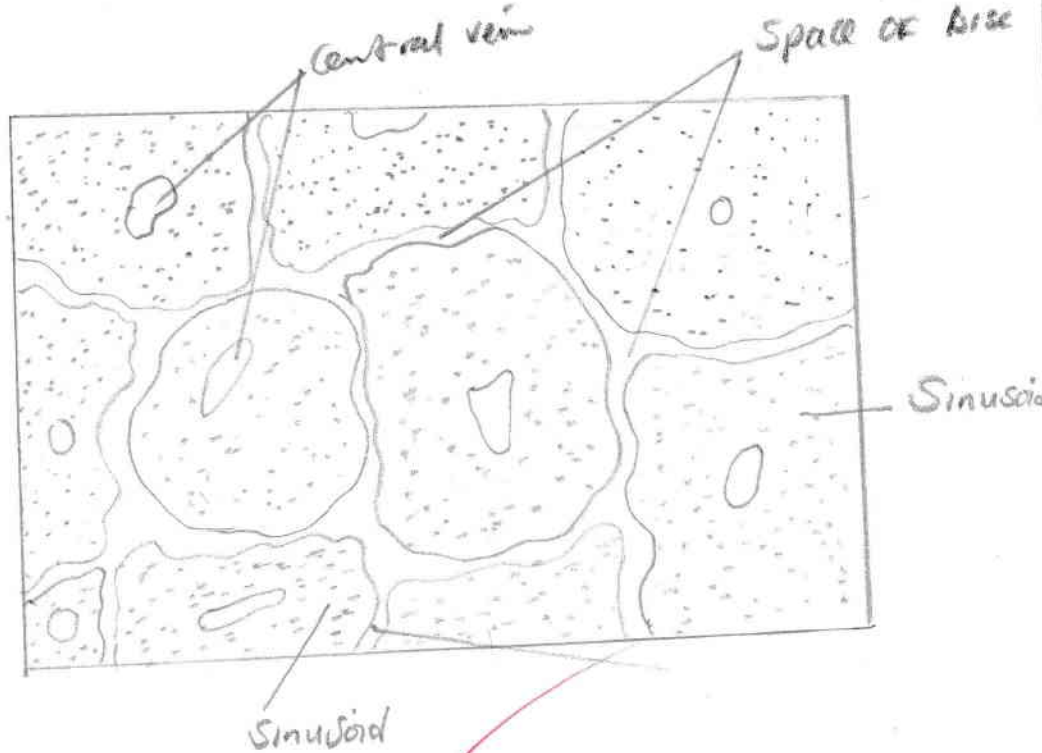
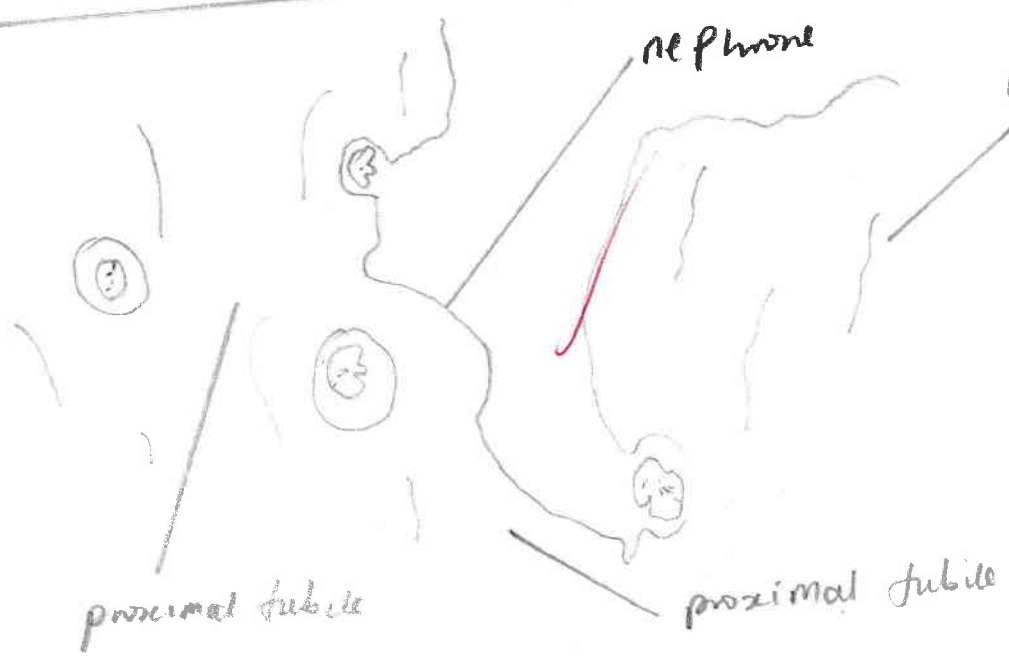
LIVER. ✓



MAGNIFICATION = 10 x 4
= x 40

Kidney ✓



MAGNIFICATION = 10 x 4
= x 40

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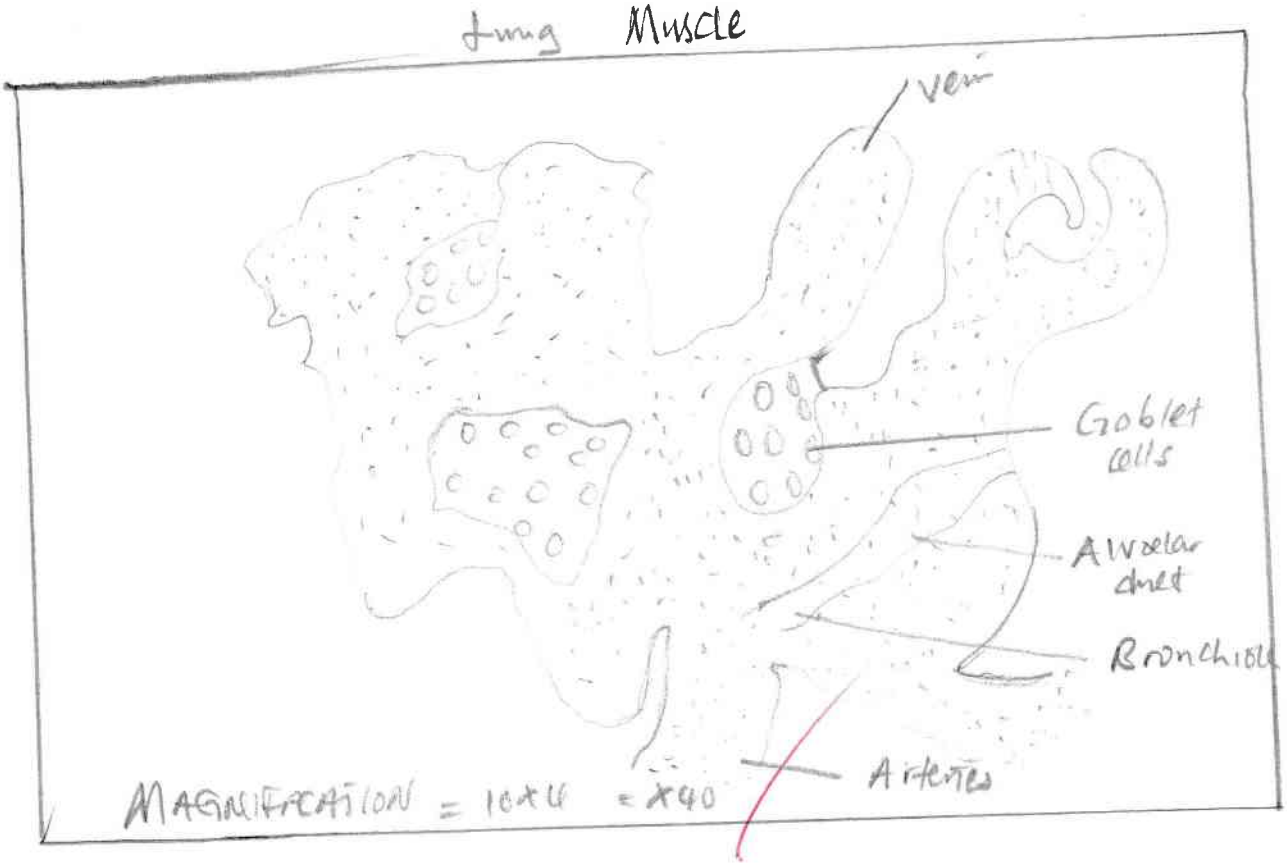
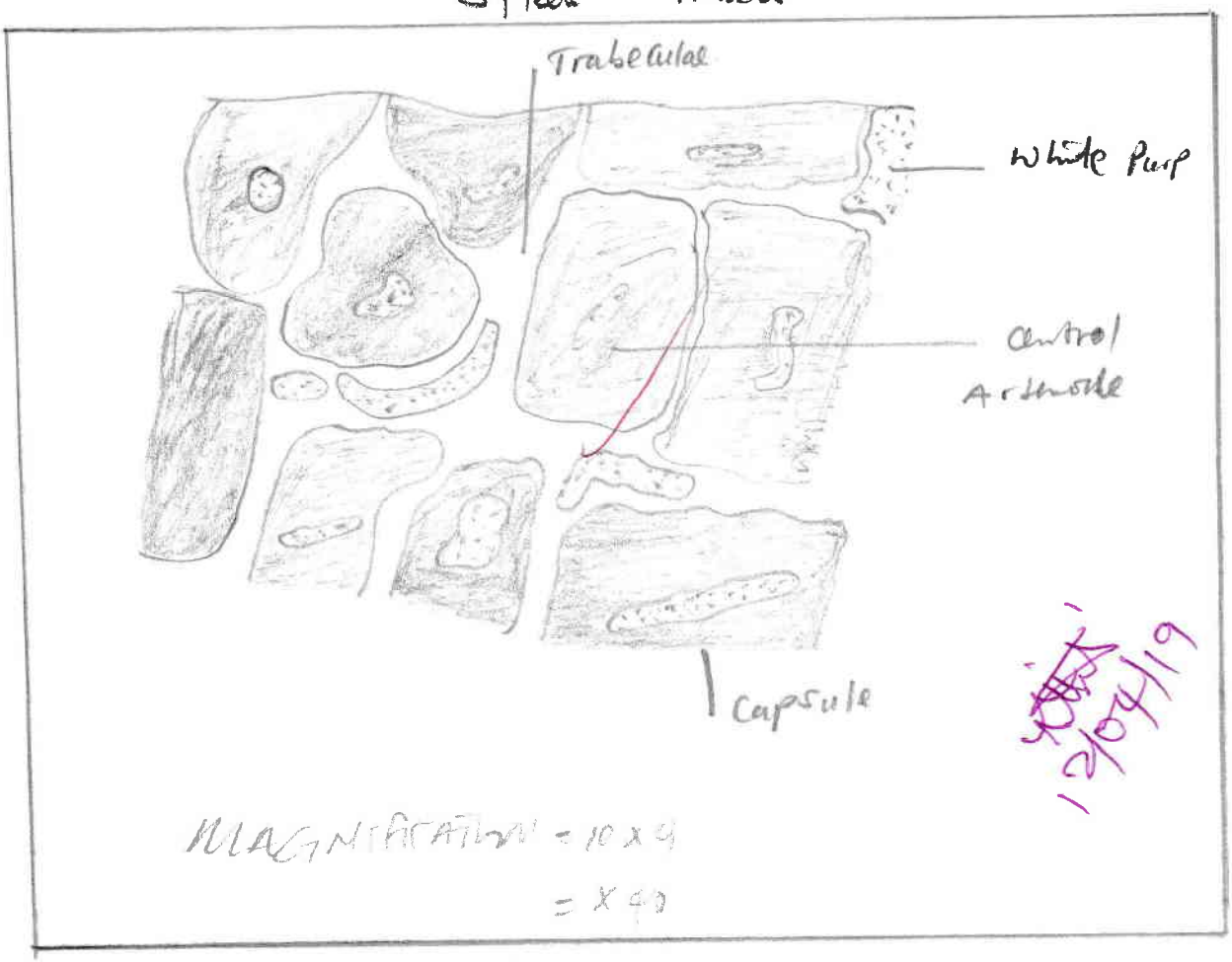
Lung Muscle



MAGNIFICATION = 10 × 4 = ×40

Spleen Muscle



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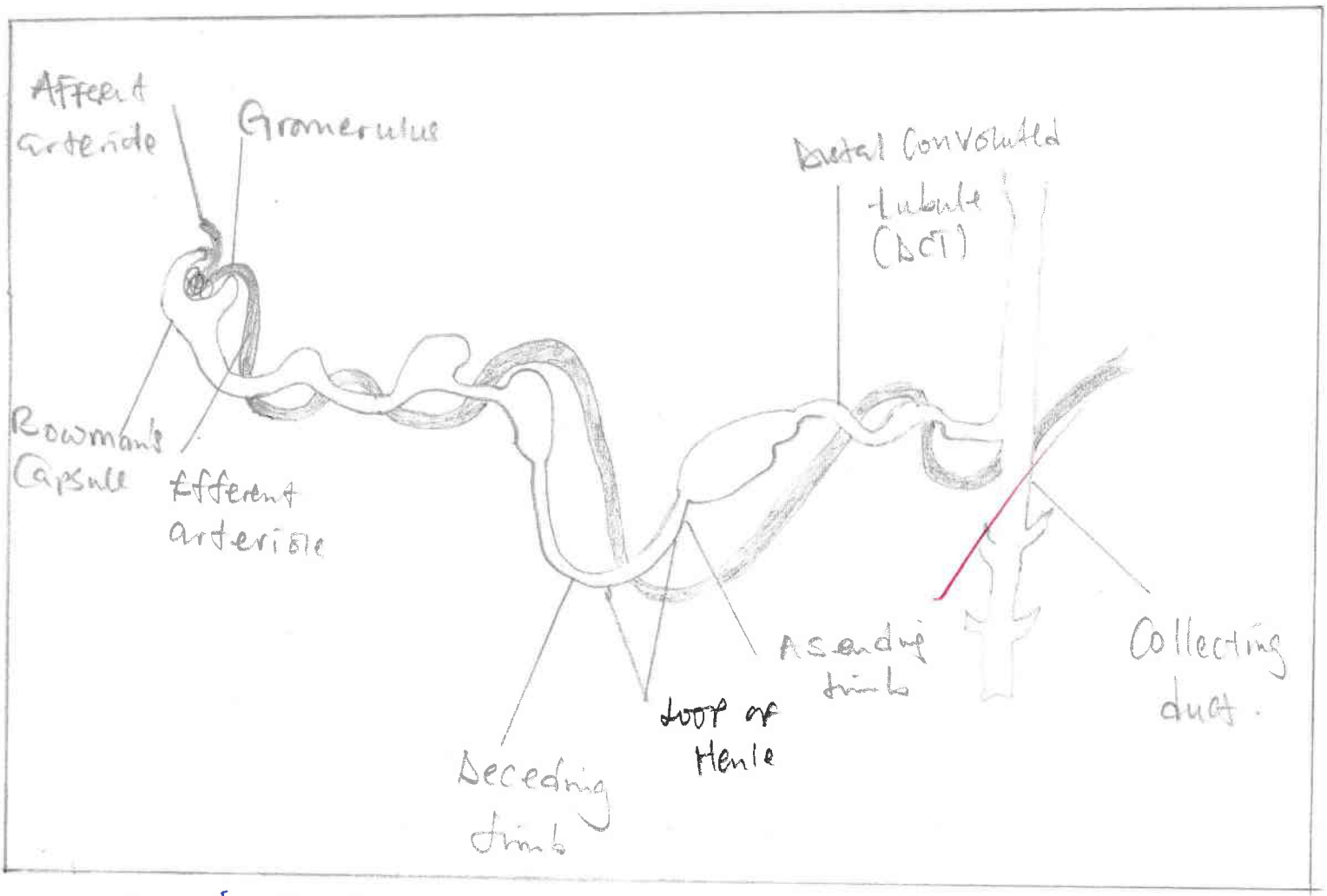
MAGNIFICATION = 10 × 4

= ×40

Results.

Title : Structure of the nephrone



A nephron is the basic unit of structure in the kidney.

A nephron is used to separate water, ions and small molecules from the blood, filter out wastes and ~~hormones~~, and return needed molecules to the blood. The nephron functions through ultrafiltration. Ultrafiltration occurs when blood pressure forces water and other small molecules through tiny gaps in capillary walls. This substance, lacking the blood cells and large molecules in the bloodstream, is known as an ultrafiltrate.

Short notes

* ultrafiltration
* glomerulus

Discussion

presented a number of fibrils. These assist in heart's function of pumping blood.

Heart (cardiac) muscle tissue, slide, is an exclusively specialised form of muscle tissue that was evolved to pump blood throughout the body. It is only found in the heart. The cells that comprise the cardiac muscles are called myocardiocytal muscles cells are multinuclear compared to smooth muscle cells which are mononuclear. Coordinated contraction of the cardiac muscle cells in the heart propel blood out of the atria and ventricles to the blood vessels of the left and right pulmonary circulatory system. This phenomenon is understood as systole of the heart. They rely on an ample blood supply to deliver oxygen and nutrients and to remove waste products such as carbon dioxide (CO_2). (Tenny, (2004)

The liver, slide, presented, arranged, stages, transcript, in, liver, function, is the largest solid organ in the body weighing about 1.5 kg in the adult. The liver is responsible for producing enzymes and solutions necessary for digestion. This includes the production of bile, which helps with the breakdown of fat from our food. The liver is also responsible with the storage of sugars for energy use example is glucose, a simple sugar used by the body for energy is stored as glycogen in the liver until it is needed for use. The other function of the liver is to detoxify and remove harmful substances in the blood stream (Fredson, 1972).

The kidney's, slide, presented, transcript, job is to filter the blood. They remove wastes, such as ..... the body's fluid balance, and keep the right levels of electrolytes. Blood comes into the kidney, waste gets removed, and salt, water, and minerals are adjusted, if needed. The filtered blood goes back into the body.

presented & number of spaces which ... function to allow gaseous exchange

The lungs (side) are pyramid-shaped, paired organs that are connected to the trachea by the right and left bronchi; on the inferior surface, the lungs are bordered by the diaphragm. The blood supply of the lungs plays an important role in gas exchange and serves as a transport system for gases throughout the body. In addition, innervation by the both the parasympathetic and sympathetic nervous systems provides an important level of control through dilation and constriction of the airway. (John, 2004)

presented ... which assist in function of

The Spleen (side) plays important roles in regard to red blood cells (erythrocytes) and the immune system. It removes old red blood cells and holds a reserve of blood, which can be valuable in case of hemorrhagic shock, and also recycles iron.

Could have done better

Conclusion

During the practical it was learnt that, the body is made up of tissues and organs namely the liver, Kidney, cardiac, long striated and smooth muscle were examined and studied under using a microscope at ×4 to ×10 magnification for all of the specimen. The experiment was successful.

References

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SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCES

NAME: KALIMBA. BRIGHT. B

COMP NO: 20181546 30

COURSE CODE: AGA 2110

GROUP NO: 1

LAB NO: 1 and 2

TITLE: COMPOUND MICROSCOPE AND MICROSCOPIC EXAMINATION OF SOFT TISSUES:

ATTENTION: MS MALITI

TITLE: COMPOUND MICROSCOPE AND MICROSCOPIC EXAMINATION OF TISSUES

AIMS: To Study the parts of a Compound microscope

To Calibrate the magnification used in observing an object on a slide

To Study, examine and observe histological Sections of tissues through a Compound microscope

To draw and Label observed Structures

7.5/10

INTRODUCTION

A microscope is a piece of instrument that is used in a laboratory to observe very small objects that cannot be observed by using unaided eyes. It is made of different parts that have different functions that help in achieving observing small objects that are put on a slide (Smith, 1992).

In addition, a microscope has be properly calibrated in order to have a clear view of a specimen under observation Furthermore, a microscope should be handled carefully before, during and after using it. One hand should support the base while the other should support the arm of a microscope When transporting it from one point to the other and placed on a flat work table. It was with the above precautions that the practical was successfully done. (Surinder, 2012).

Currently, there are different types of microscopes on the market depending on the manufacturers which includes electron microscope, Compound light microscope Scanning electron microscope and high voltage microscope. Another one is oil immersion (Fradson 1972).

Election microscopy

Is a technique for obtaining high resolution images of biological and non-biological specimens. It is used in biological research to investigate the detailed structure of tissues, cells, organelles and macromolecular complexes. (Heath, 1985).

Bright field microscopy

Mostly widely used instrument for routine microscopic work (Compound).
In bright field microscopy, the microscopic field (the area observed) is brightly lighted and the micro organisms appear dark because they absorb some of the light. Ordinarily micro organism do not absorb much high, but staining them with a dye increases their absorbing ability resulting in greater contrast and color differentiations. (Stephen, 2004).

Dark field microscopy

The effect produced by the dark field technique is that of a dark background against which objects are brilliantly illuminated. This is accomplished by equipping the light microscope with a special kind of a condenser that transmits a hallow cone of light from the source. Most of the light directed through the condeser doest not enter the objective, the field is essentially dark. (Taylor, 1977).

Oil Immersion

Has the same index of refraction as glass slide, preventing light loss from refraction. In light microscopy, oil immersion is a technique used to increase the resolving power of a microscope. This is achieved by immersing both the objective lens and the specimen in a transparent oil of light refractive index, thereby increasing the numeral aperture of the objective lens. (Solomon, 1995).

A cell is a smallest unit of a living organism. Specialised cells with similar structures and functions are called body tissues. Soft tissues are tissues that connect, support and surround other organs of the body such as bones which supports the movement of the organisms. In this experiment the liver cell, kidney and ovary follicle ~~has~~ are going to be examined under the microscope and shown clearly on their structures (Bradson, 1972).

Kidneys are pair of bean-shaped organs on either side of the spine, below the ribs and behind the belly. Each kidney is about 4 to 5 inches long, roughly the size of a large fist. The function of kidney is to filter blood, remove wastes, control the body fluid balance and keep the right levels of electrolytes (Heath, 1985).

Ovarian follicles are small sacs filled with fluid that are found inside a woman's ovaries and they secrete hormones which influence stages of the menstrual cycle. Each has the potential to release an egg for fertilization. (Darnell, 1986).

MATERIALS

(1) Compound Microscope and Soft tissues

- Razer blade
- pencil
- Microscope (Compound)
- plain paper
- Rubber
- Ruler
- Shapener
- Ruler
- A Compound Microscope and all necessary materials was available.
- Slids
- different muscle tissues (Specimen).

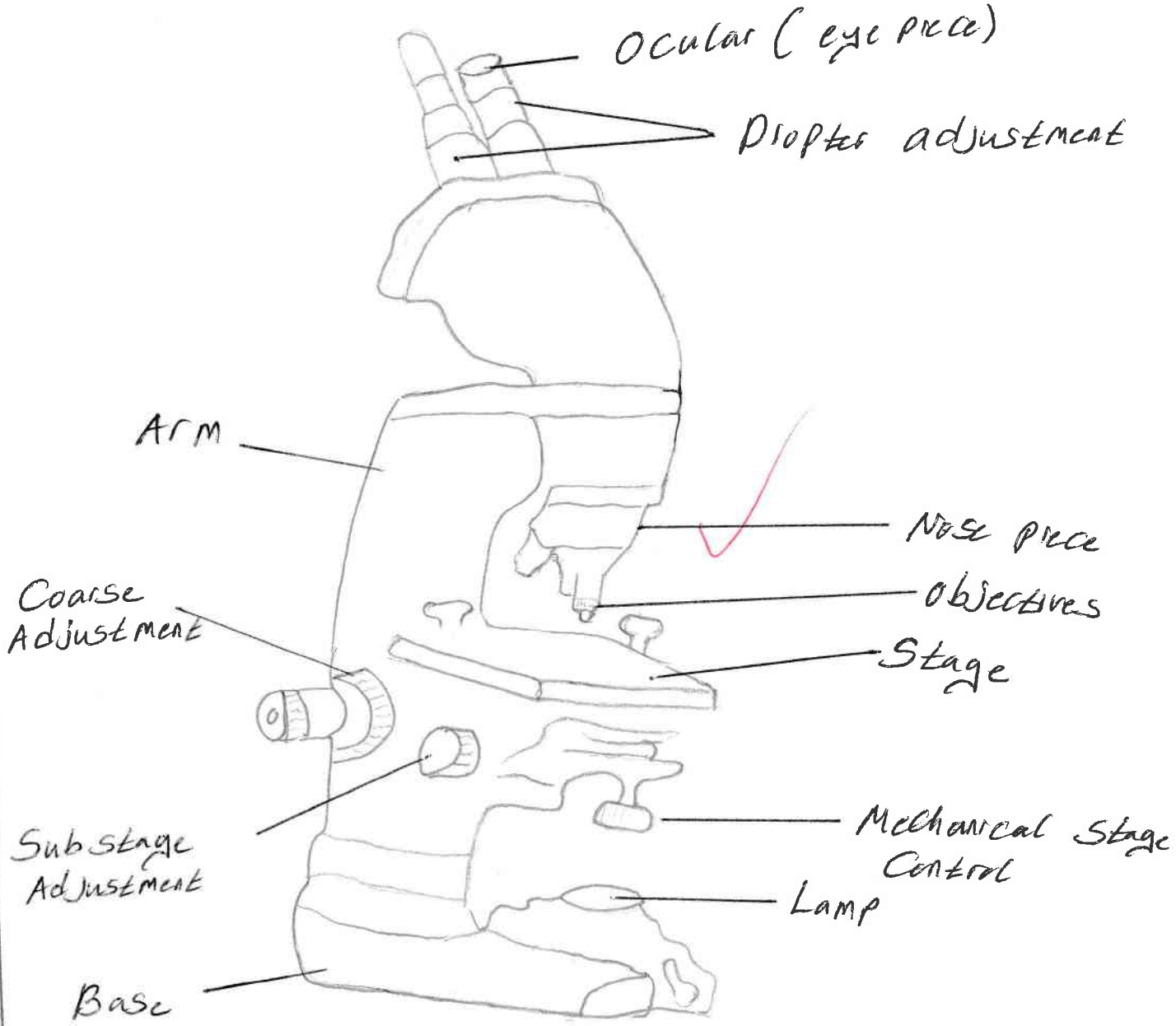
PROCEDURE

All parts of the microscope were identified and labelled as shown on the diagram under results and observation.

All muscle tissues were provided on different slids, and was placed under the microscope and the image of Specimen was drawn and labelled all the viewed Structures. All the provided Specimen was viewed under the microscope and their different Structures were seen and labelled on the diagram below. The ~~total~~ magnification of all the three (3) Specimen were different.

OBSERVATION / RESULTS

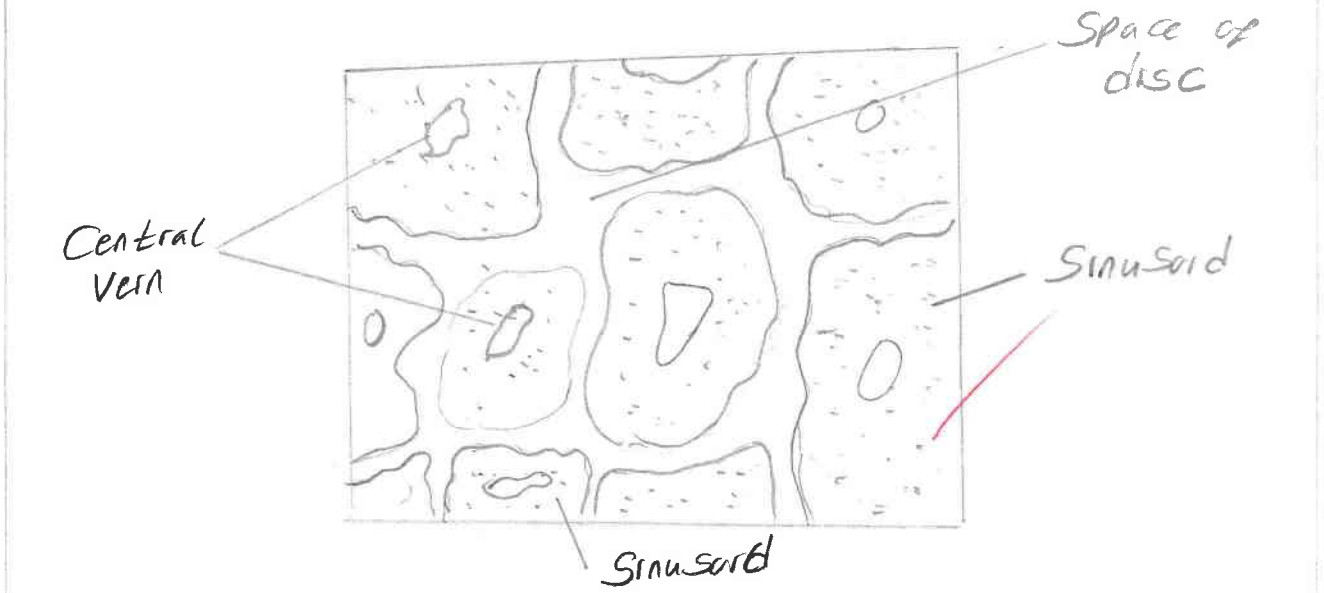
Diagram below shows the compound microscope and the labelled parts.



OBSERVATIONS OF TISSUES

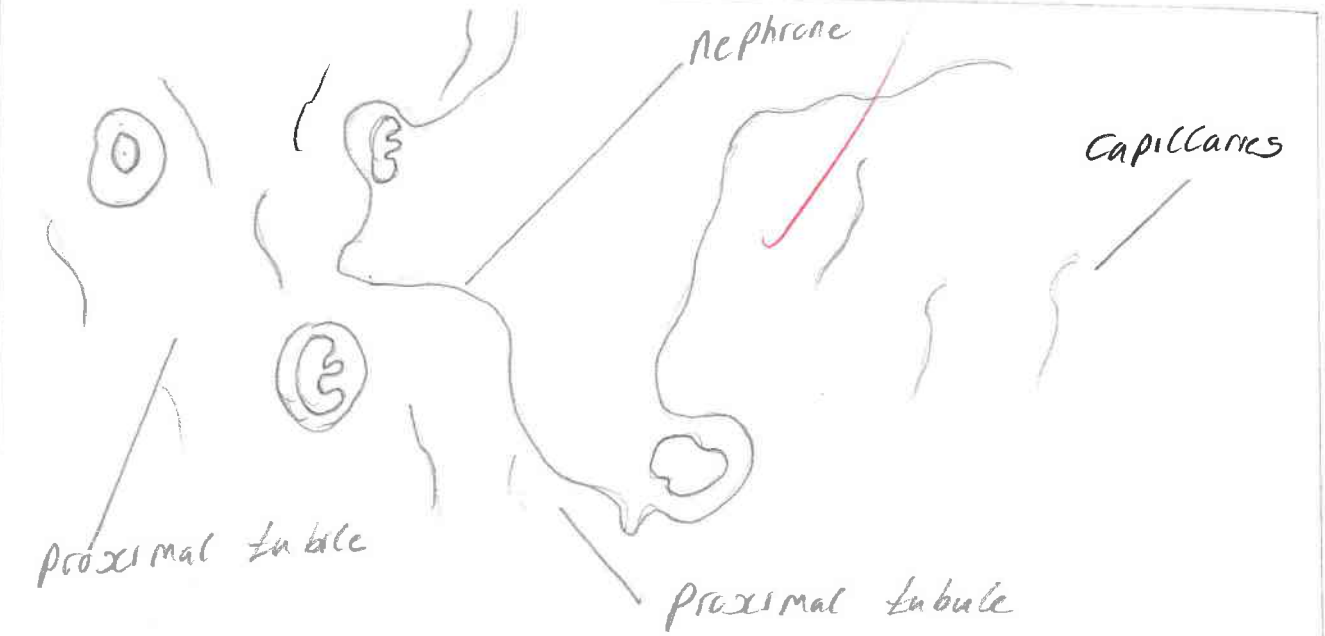
Below are the diagrams showing what was observed under a microscope for each specimen.

Liver



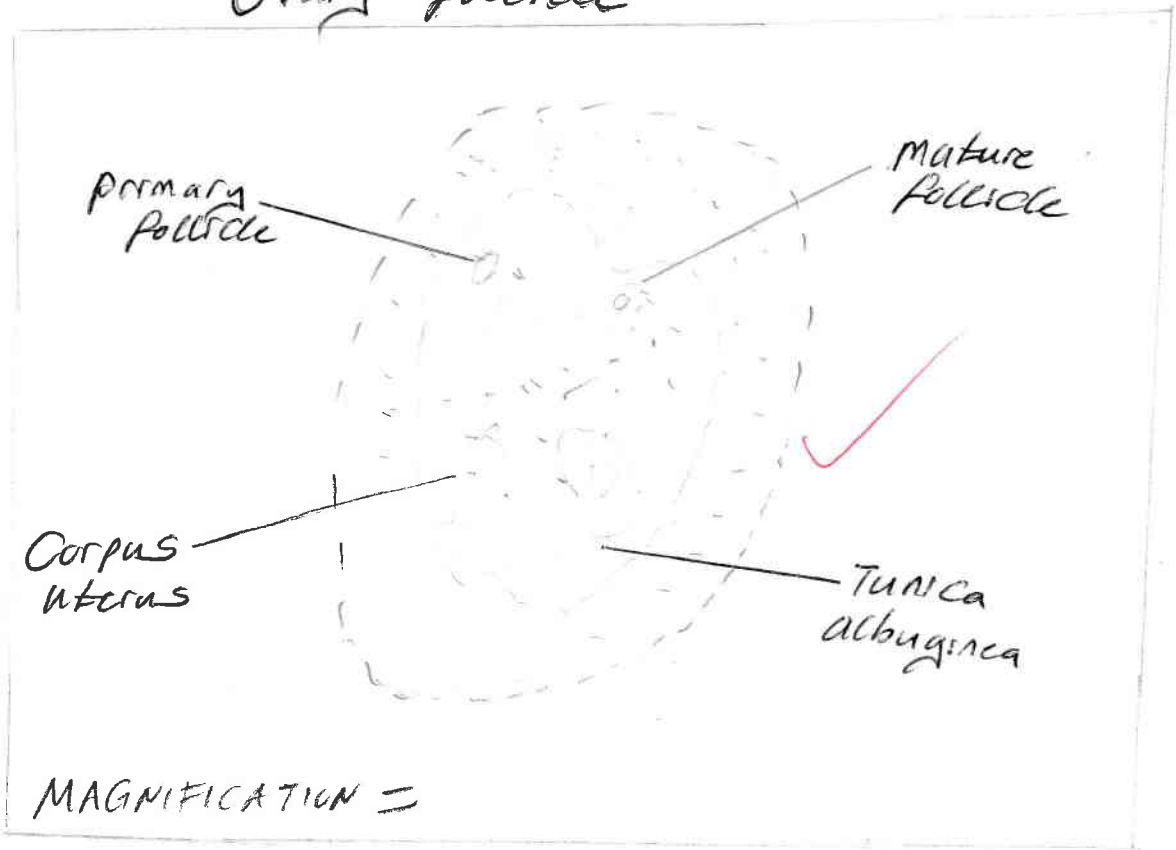
MAGNIFICATION = X4

Kidney



MAGNIFICATION = X 4

Ovary follicle



DISCUSSION

A Compound microscope uses Convex lenses to produce an enlarged or magnified image of very small objects. The following are the parts of a Compound microscope and their functions.

Eye piece (Ocular)

This is the upper set of lenses in the tube through which a specimen is viewed.

Pointer

This is a hair glued-like part after an ocular and appears as a black line extending to the centre of the field of the vision (Kent, 2000).

Diopter Adjustments

Useful as a means to change focus on one eyepiece so as to correct for any difference in vision between your two eyes.

Body tube (Head)

The body tube connects the eyepre to the objective lenses (Smith, 1992).

Arm

The arm connects the body to the base of the microscope.

~~Corse~~ Coarse Adjustment.

Brings the specimen into general focus

Fine adjustment

The tunes that focus and increases the detail of the specimen. (Taylor, 1997).

Nosepiece.

A rotating turned that houses the objective lenses. The viewer spins the nosepiece to select different objective lenses.

Objective Lenses

One of the most important parts of a compound microscope, as they are lenses closest to the specimen. (Heath, 1985).

NDIP

Specimen or slide

The specimen is the object being examined. Most specimens are mounted on slides flat rectangles of thin glass.

Stage

The flat platform where the slide is placed

Stage clips

Metal clips that hold the slide in place

Iris diagram

Adjusts the amount of lights that ~~reduces~~ reaches the specimen.

Condenser

Gathers and focusses light from the illuminator onto the specimen being viewed.

Base.

The base supports the microscope and its where the illuminator is located

Stage control.

This moves the stage left and right or up and down.

Aperture

The hole in the middle of the stage that allows light from the illuminator to reach the specimen.

(Gross, 1994).

All the parts of a microscope work together. The light from the illuminator passes through the aperture, through the slid, and through the objective lens, where the image of the specimen is magnified.

The magnified image continues up through the body tube of the microscope to the eyepiece, which further magnifies the image the viewer can see (Ngosa, 2004).

For magnification of soft tissues, the liver slide presented hexagoned shapes which aids in liver's function for producing enzymes and solutions necessary for digestion. This includes the production of bile, which helps with the breakdown of fat from our food. Liver is also responsible for the storage of sugar as energy when stored as glycogen in the liver until it is needed for use. It also remove harmful substances in the blood stream and detoxify them (Fradson, 1972).

The kidney slide presented, ~~show~~ collecting tubules were seen. The function of kidney is to filter the blood. Kidney removes wastes, control the body's fluid balance, and keep the right levels of electrolytes. Blood comes into the kidney, waste gets removed, and salt, water and minerals are adjusted, if needed. The filtered blood goes back into the body. (Gross, 1994).

describe these micro functions in line with the micro parts you have labelled

The ovary follicle slide presented consists the function of secreting hormones that influence stages of the menstrual cycle. Development of the follicles is stimulated by production of follicle stimulating hormone (FSH) by the pituitary gland. (Jemy, 2004).

CONCLUSION

A microscope microscope should be handled carefully before, during and after use. This would allow the specimen to be magnified properly as a true picture.

An animal is made up different cells and tissues. The three (3) slids which include liver, kidney and ovary follicle were viewed under the microscope and drawn depending on the magnification for each one. The experiment was successfully done.

REFERENCES

(1) Fradson, R. D. (1972), Anatomy and Physiology of Farm animals (2nd Ed) and Fiebizer publisher: Phyadelphia.

(2) Gross, T. (1994), Introduction microbiology (3rd Ed) Chapma and Hall: London.

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Pamoos dion

THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCE

7.5

NAME : Bwalya Lumpa

COMPUTER NO: 2016138418

COURSE CODE: AGA 2110

LAB NO : 3

ATTENTION : MR. S. MUNGILI

TITLE: SKELETAL ANATOMY 0.5

AIMS: - To study, examine and observe the skeletal systems of a pig, sheep and chicken
- To examine the histological section of a long bond (humerus)
- To draw and label the above listed specimen
- To study the functions of the skeletal system.

0.5

Introduction

A skeleton is a part of the body that forms a supporting structure of an organism. There are two types of skeletal systems namely exoskeleton and endoskeleton. (Albert, 1994)
An exoskeleton is a stable outer shell of an organism while the endoskeleton forms the inside support structure. Exoskeletons are mainly found in invertebrates. They enclose and support the soft tissues of the body and organs. Besides providing protection to an organism, exoskeletons act as surface muscle attachment and serve as a sense organ to interact with the environment. (Elias, 1952)

On the other hand, endoskeletons are composed of mineralised tissue and typical in many vertebrates. They vary in complexity such as functioning for support but often serve as attach side of muscle and also a mechanism transmitting muscular forces. (Grosse, 1990)

The bones of the skeleton has a number of functions such as supporting the structure and framework for attachment for soft

tissues and organs. They also store minerals such as Calcium and phosphate ions besides producing blood in the hollow spaces of some bones that contain red bone marrow. In addition, bones do provide protection for soft tissue and organs. The also provide leverage that changes magnitude and direction of the forces exerted by the muscles. (Smith, 1992) 1.5

parts of the endoskeleton?
types of bones?

MATERIALS

The following materials were provided in order to carry out the practical

→ Skeletal systems of pig, sheep and chicken
→ A long bone (humerus) 0.5

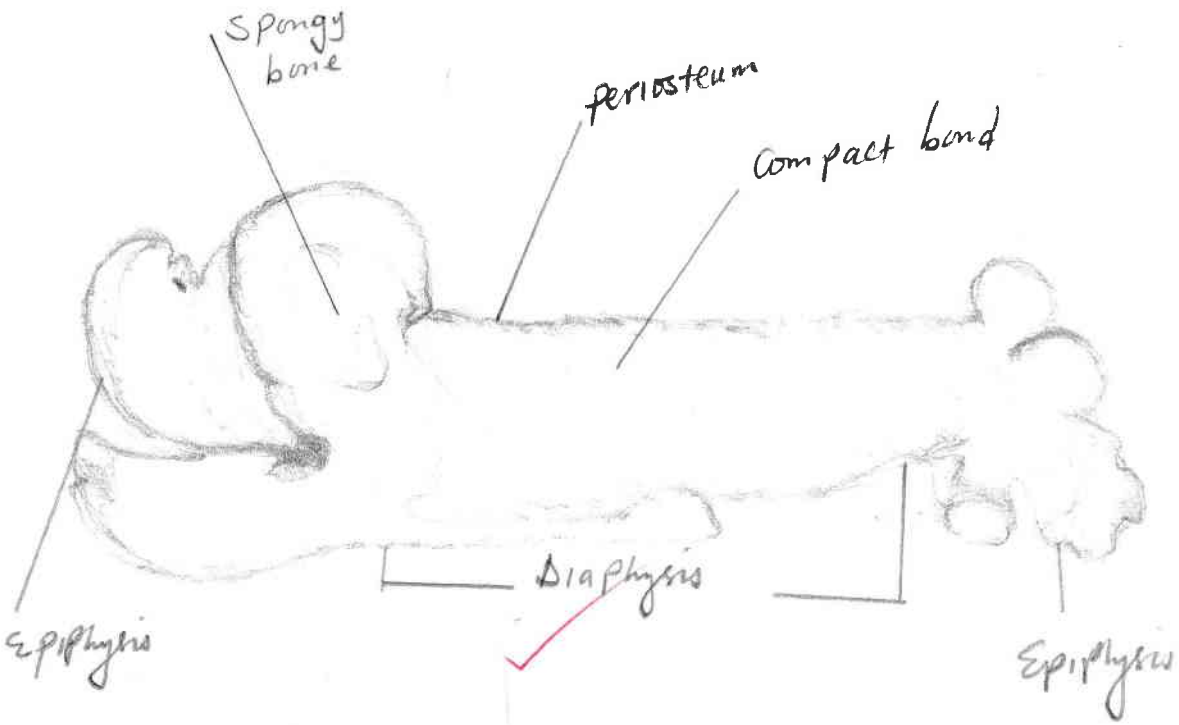
PROCEDURE 0.5

All the above specimen were observed, identified, drawn and labelled as shown on the diagrams under observations.

OBSERVATIONS

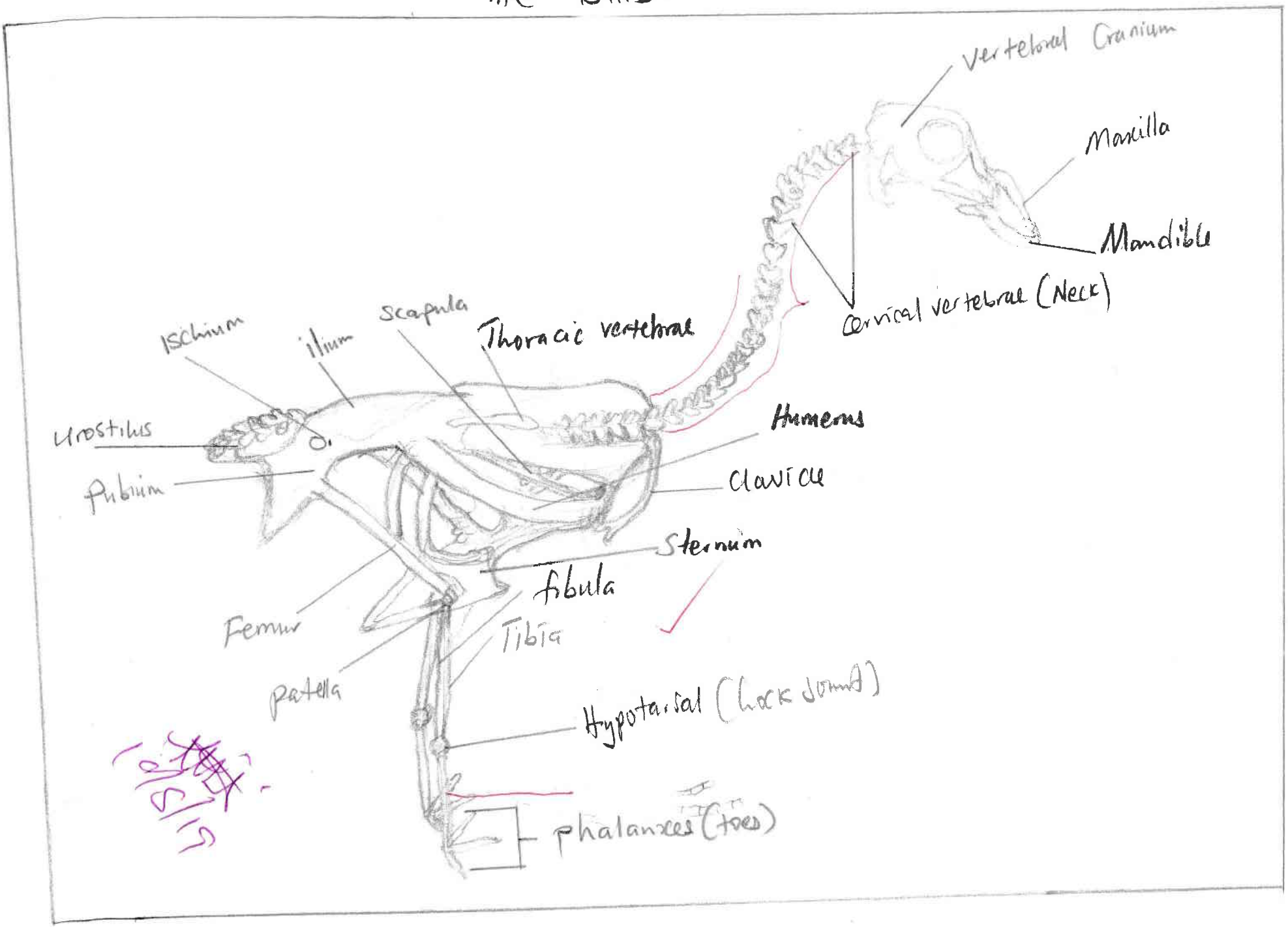
The diagrams below show each labeled specimen that was observed.

6/15/21

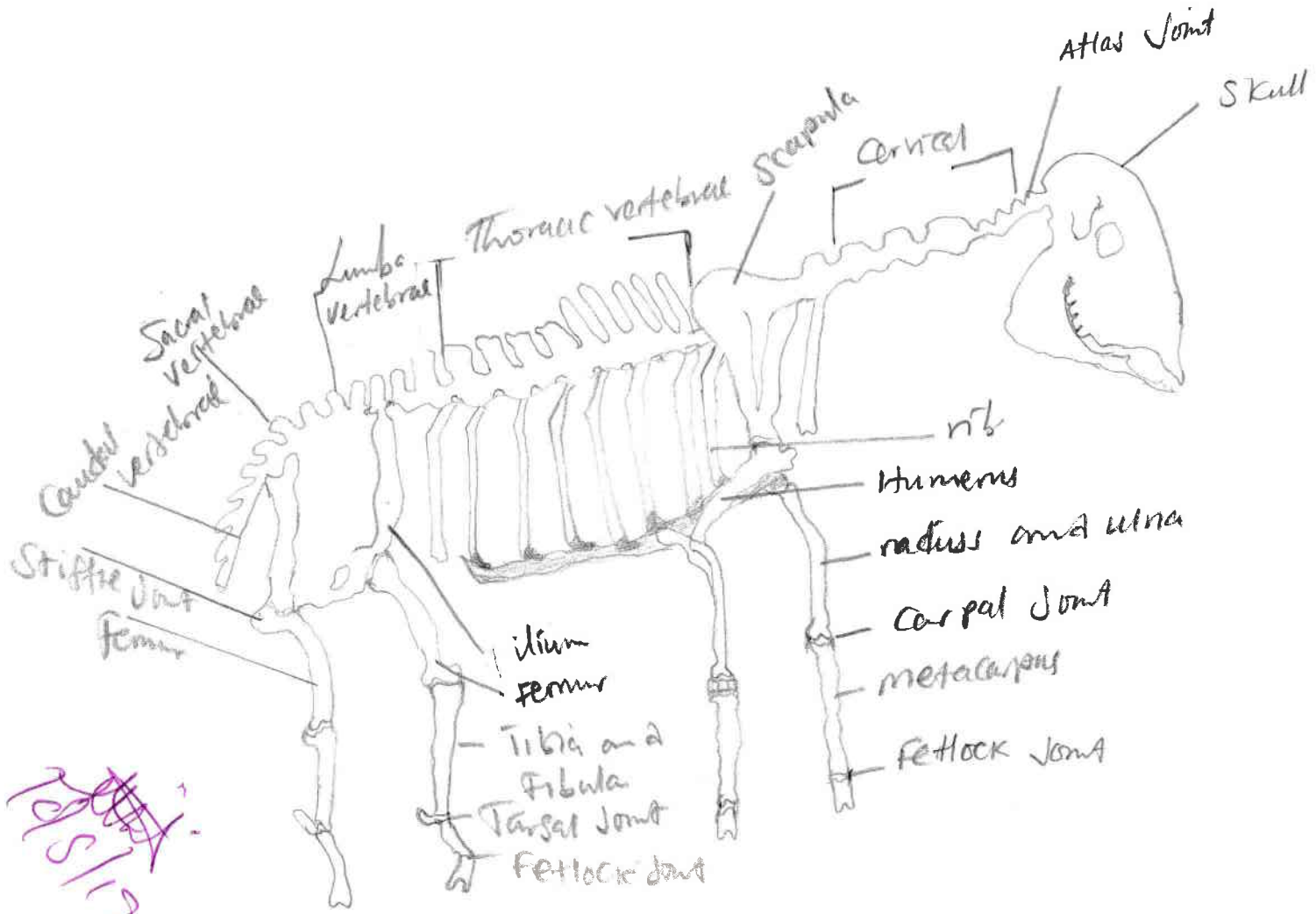


Humerus

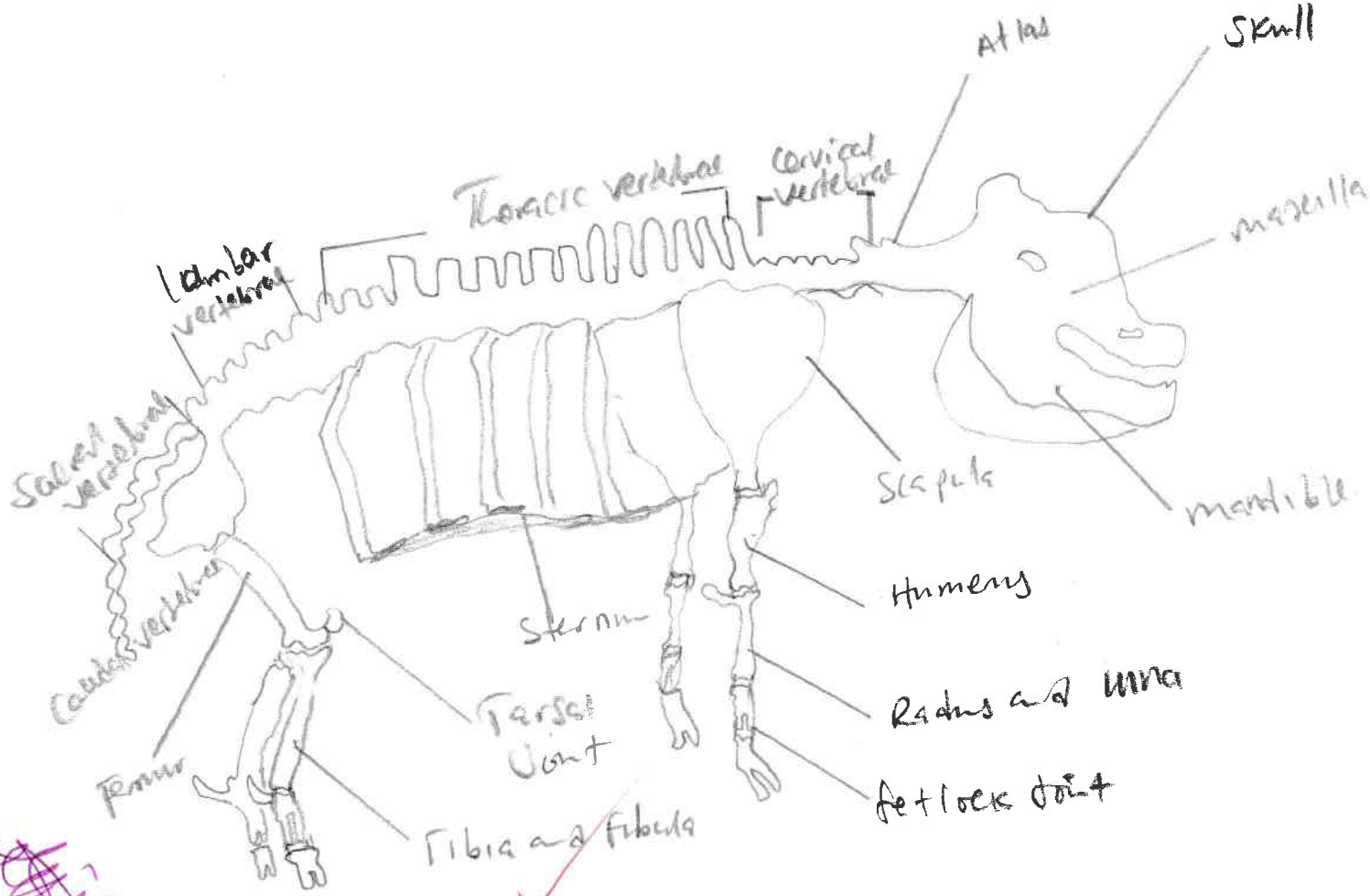
THE BIRD


Vertebral Cranium
Maxilla
Mandible
Cervical vertebrae (Neck)
Thoracic vertebrae
Scapula
Ischium
Ilium
Urostilus
Pubium
Humerus
Clavicle
Sternum
Fibula
Femur
Tibia
Patella
Hypotarsal (lock joint)
phalanges (toes)

what animal skeleton?



THE PIG

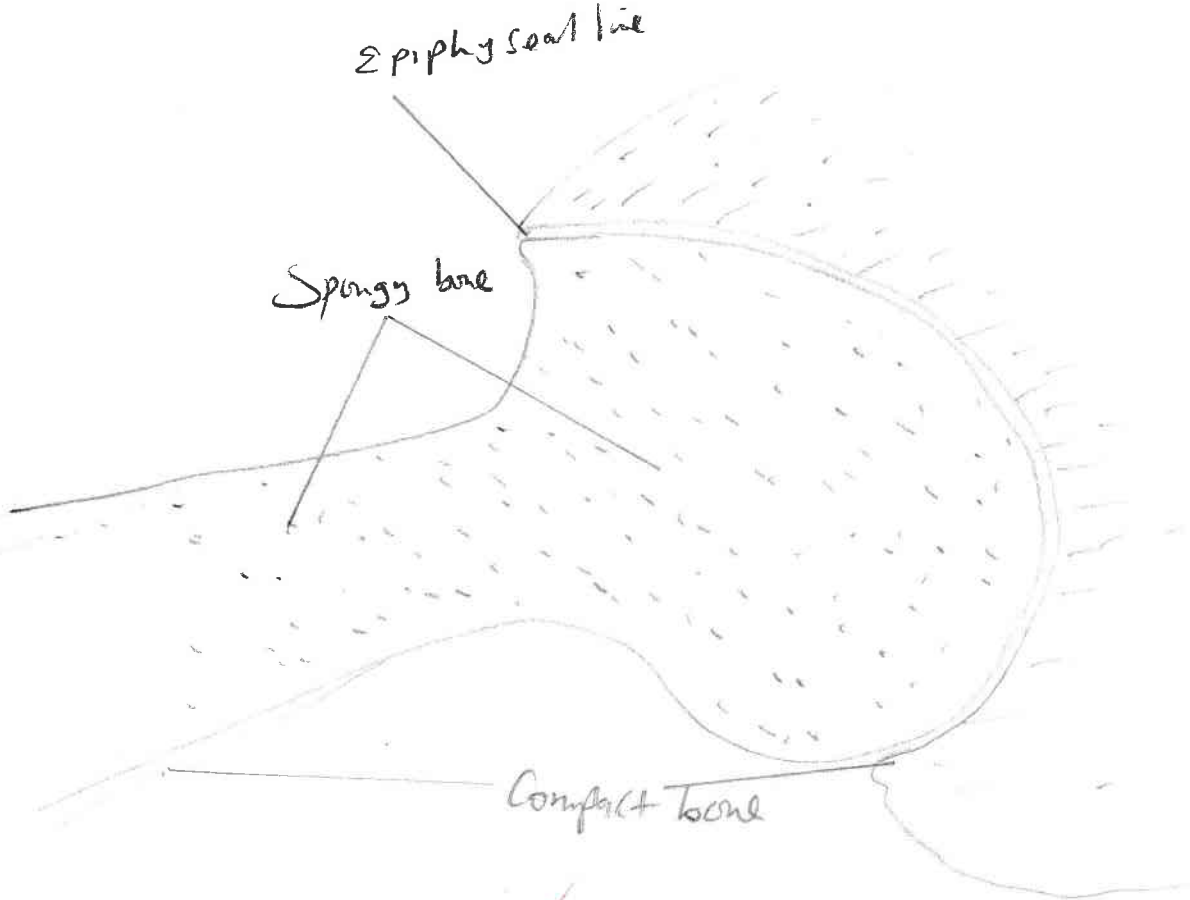

Atlas
Skull
Thoracic vertebrae
Cervical vertebrae
maxilla
Lumbar vertebrae
Sacral vertebrae
Caudal vertebrae
Scapula
mandible
Sternum
Humerus
Tarsal Joint
Radius and Ulna
Femur
fetlock joint
Tibia and Fibula

10/15

Conclusion

During the practical it was learnt that skeletal systems differ from species to the other. A bird has a long flexible cervical vertebrae, a beak for pecking and picking, two legs for supporting its weight, two wings and few bones which are lighter in weight making it possible to fly. A carnivorous and herbivorous animals on the other hand have four legs each. A carnivorous animal has sharp incisors teeth in front for tearing flesh of prey while a herbivorous animal has blunt incisors for cutting and grinding vegetation. A long bone is longer than it is wide and consists of two bulk ends. Hence, the practical was successfully done. 0.5

THE PROXIMAL END OF THE HUMERUS



✓

1.0

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0.5

THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCES.

NAME: KALIMBA. BRIGHT. B.

COMP NO: 2018154630

COURSE: AGA 2110.

TITLE: RESPIRATORY, EXCRETORY, DIGESTIVE, REPRODUCTIVE AND SKELETAL SYSTEM

LAB NO: FIVE, SIX, SEVEN AND TWO.

ATTETION: MR. S. MUNGA[redacted]I

16.0
20

NOIP

TITLE: THE STUDY OF RESPIRATORY, EXCRETORY, DIGESTIVE, REPRODUCTIVE, MUSCULAR AND SKELETAL SYSTEMS OF ANATOMY 1.0

AIM : To examine, draw and label the respiratory, excretory, digestive, reproductive, muscular and skeletal systems.

To study the system 1.0 functions.

INTRODUCTION.

Animals have different body systems that independent from the other although some slightly interdepend to one another. The main function of respiratory system is to supply oxygen to the internal body systems for metabolism and remove carbondioxide to the external environment. The respiratory has ~~2 parts~~ two (2) parts which include upper part and lower part. The upper respiratory consists of nose, nasal cavity, paranasal cavities, pharynx and larynx. The lower part respiratory consists of trachea, bronchi and alveoli (lungs). The upper respiratory system filters, warm and moistens the air before it enters the lower tract where diffusion of oxygen and carbondioxide takes place between the alveoli and blood in the capillaries (Albert, 1994).

Excretory organ include the kidney where urine is formed. After urine is formed, it is transported to the urinary bladder for temporal storage prior to elimination through the urethra.

The reproductive system consist of differentiated sex organs for reproducing of offsprings. Examples of male reproductive organs are the penis and testes while female reproductive organs are vagina, uterus, placenta, cervix, oviduct and ovaries. During copulation, the sperms are ejaculated from the testes into

the vagina through the penis. Inside the female reproductive System, the sperms swim through the fallopian tube where fertilization takes place. After fertilized, the embryo develops and later foetus which develops in the uterus until parturition. (Dukes, 1984).

The other system is digestion which mechanically and chemically breaks down food particles into the smaller ones which can be absorbed by body system in the alimentary canal that runs from mouth to the anus. In the mouth, food is ~~phys~~ mechanically digested by chewing and chemically by enzymes. It is then berny transported to the stomach where chemical digestion continues. Broken food molecules are absorbed into the blood stream where respiration occurs to produce energy which helps body tissues and organs to function well. products of digestion are excreted through the anus. (Swenson, 1984).

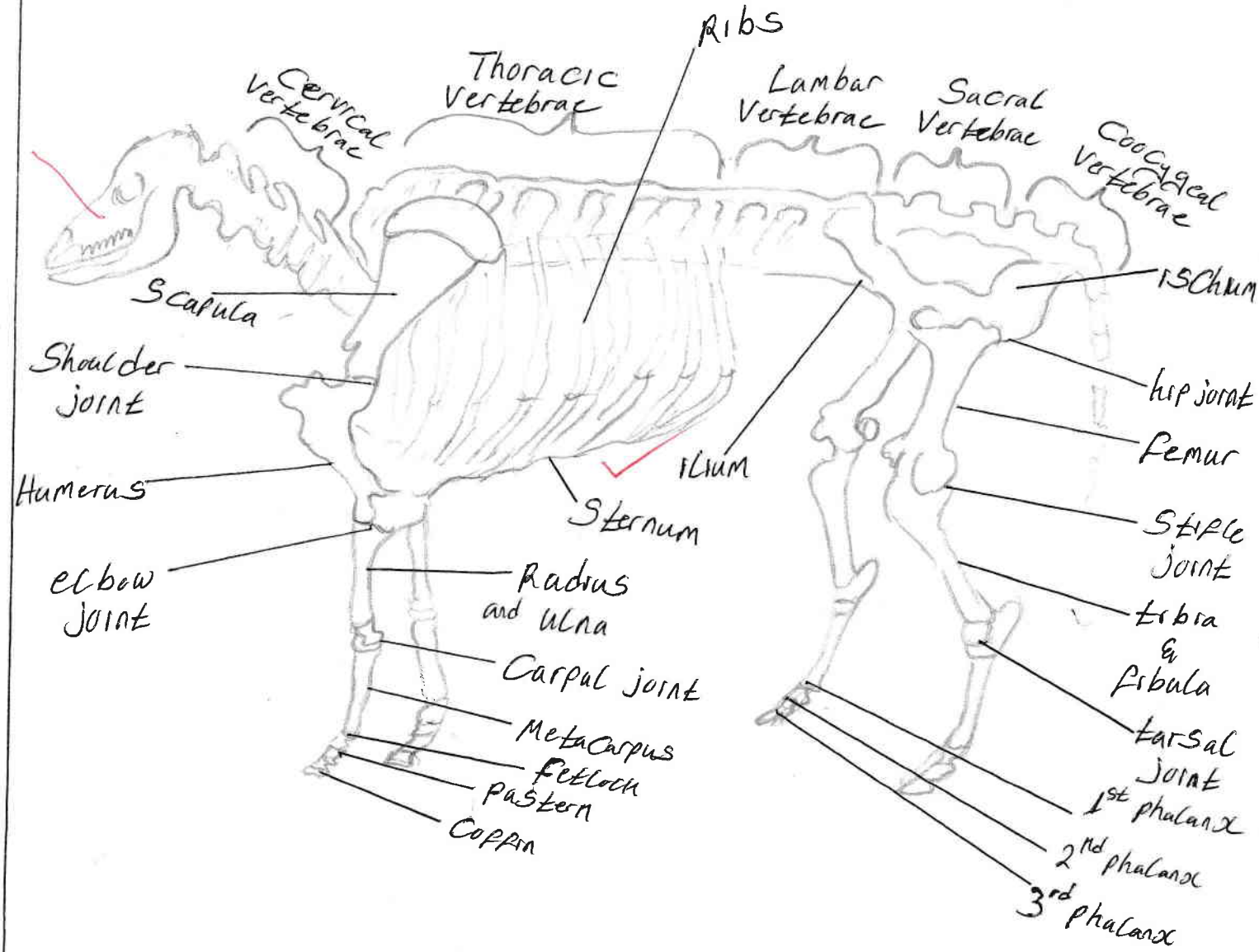
Another System is Muscular which composed of specialized cells called muscle fibers. The main function is for contractibility. The muscles attached to bones or internal organs and blood vessels are responsible for movement. Muscular System is also important for heat production in the body and it controls opening and passageways. (Fradson, 1972).

Additionally, a Skeletal is part of the body that forms a supporting Structructure of an organism. There are two (2) types of Skeletal System namely exoskeleton and endoskeleton. An exoskeleton is a stable outer shell of an organism while the endoskeleton forms the inside support Structure. Exoskeletons are mostly found in invertebrates. They enclose and support the soft tissues of the body and organs. Exoskeleton also act as surface muscle attachment and serve as a sense organ to interact with the environment and serves as a mechanism transmitting muscular forces. (Heath, 1985).

3.0

DATA ANALYSIS

THE SKELETAL MODEL OF A GOAT



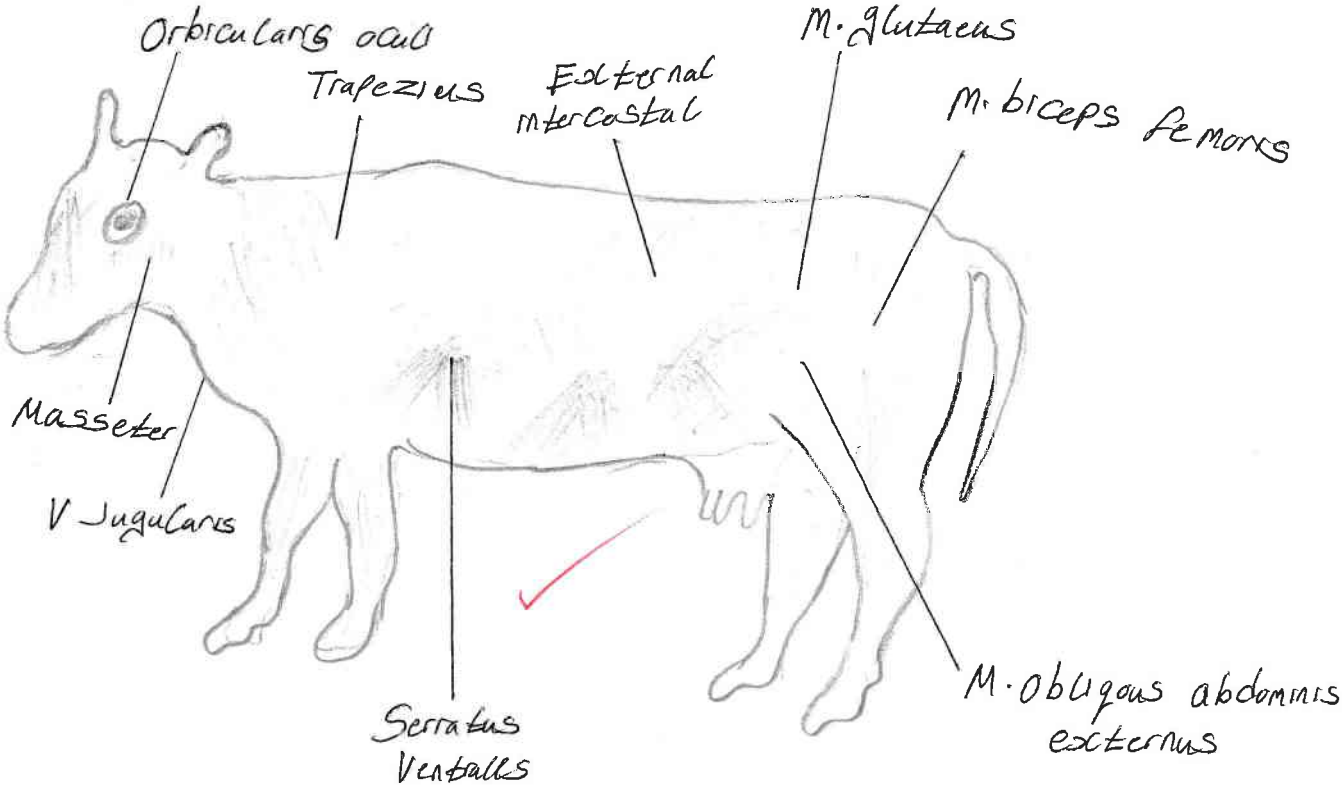
MATERIALS

- Skeleton of a goat
- A model of a cattle (cow)
- Female reproductive organs of a goat
- Organs of respiratory, digestive and excretory system of a goat. 1·0

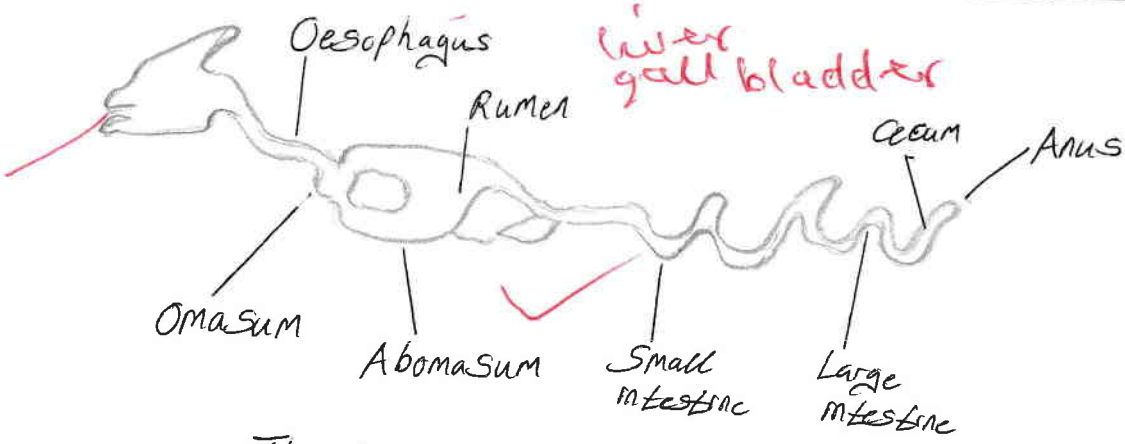
PROCEDURE

A female goat was slaughtered and dissected and ~~the~~ their respiratory, digestive and reproductive organs were examined and drawn. After that, the model of a cattle was observed, identified, drawn and was labelled. 1·0

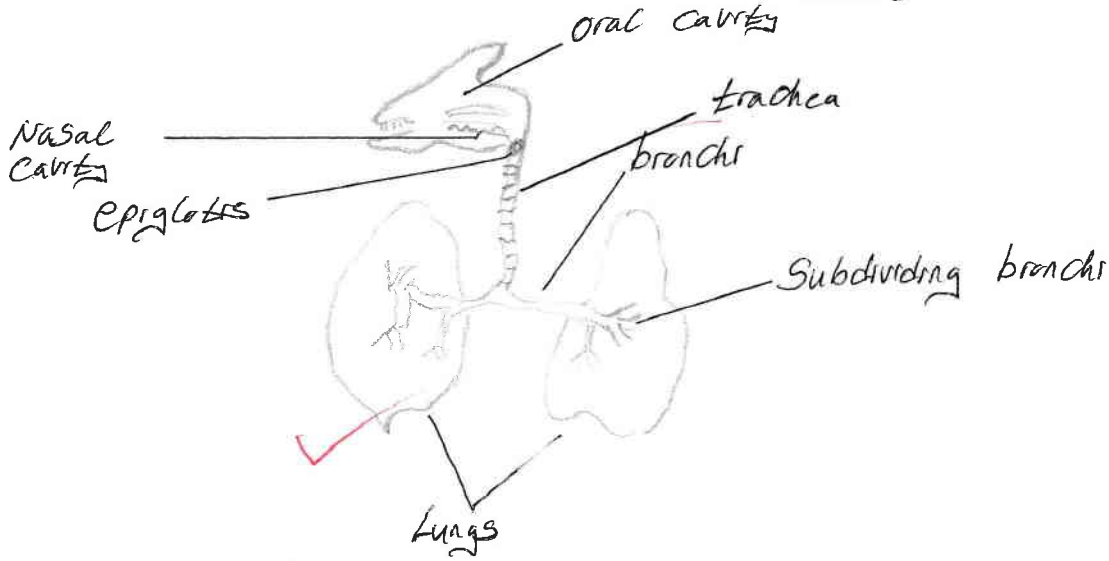
THE MUSCULAR SYSTEM MODEL OF A CATTLE



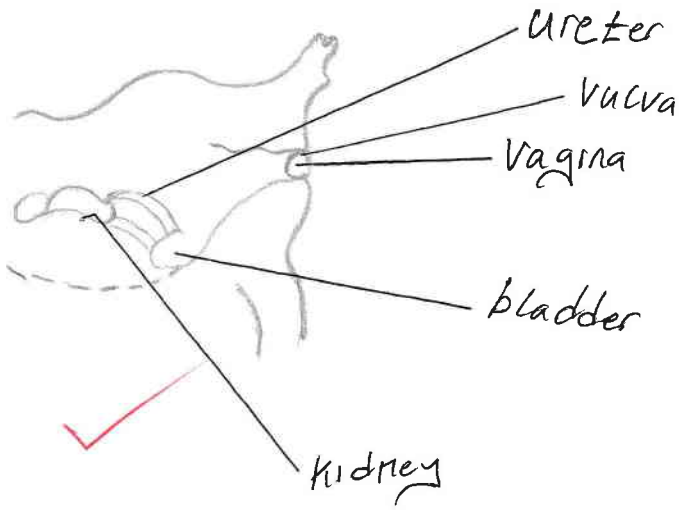
THE DIGESTIVE TRACT OF THE GOAT



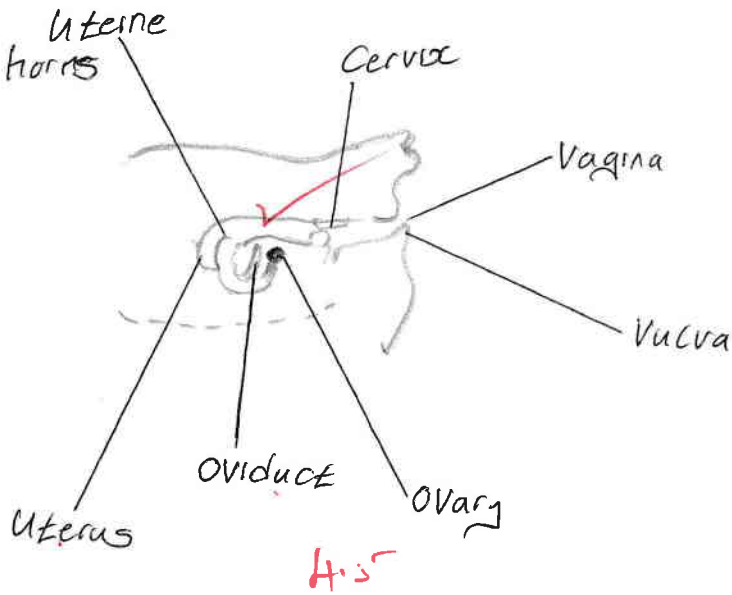
The Respratory System of Goat



THE URINARY SYSTEM OF A GOAT



THE REPRODUCTION OF A GOAT



4.5

DISCUSSION

The respiratory system comprises the upper and lower respiratory tracts. The upper tract comprises the nose, nasal cavity and pharynx while the lower tract comprises of trachea, bronchi and lungs. The inspired air is ~~inspired~~ filtered, moistened and warmed in the upper tract. Filteration is done by coarse hair that trap dust which is inhaled with the air. In pharynx, air is warmed and moistened. This is a chamber that is shared by the digestive and respiratory system at the base of the tongue. The nasal epithelium secretes mucus which also collects debris and humidifies the air. Inhaled air goes down into the lower tract to alveoli through larynx, trachea, bronchi and bronchioles. The cilia filters the air and gaseous exchange occurs in the alveoli. Oxygen diffuses from the alveoli in to the blood system and in the capillaries while carbondioxide diffuse from capillaries into the alveoli and finally deoxygenated blood becomes oxygenated. (Kent, 2000).

Excretory system has a main function of removing metabolic waste generated by cells. It also helps in the regulation of blood volume and pressure. This system comprises kidney, ureter, urinary bladder and urethra. Excretory involved in the processes that excreates and eliminates some metabolic waste such as urea, uric acid and creatine. Urine is formed in the kidney and transported by the ureter to the urinary bladder. Urinary bladder act as a temporal storage of urine through the urethra. Cortex is part of kidney where blood is filtered through the small structures called glomeruli. The medulla is where the urine concentrated through the complex system of tubules. (Philip, 1986).

Reproductive System consists of two (2) types namely male reproductive system and female Reproductive System. Male reproductive System consists of organs such as penis and testes. Penis is a male organ which is made up of erectile ~~muscles~~ tissues and its main function is to deposit semen into the female reproductive system during copulation. Testes is an oval shape which is located in the scrotum. The cremaster muscle suspends or retract to move the testes further or close to the body depending on the temperature to avoid the damage or denature of the sperm. The testes produces spermatozoa that becomes the sperm cells and testasterone which is a male hormone. Testesterone is produced under influence of leteinizing hormone from the pituitary gland. Sertoli cell produce and nurture developing sperms. (Albert, 1994).

Female reproductive System consists of organs such as ovary, ovary follicle, fallopian tube, cervix, uterus and placenta. The ovary produces two (2) hormones called estrogen and progesterone. In ovary follicle, this is where an ovum gets ready to rapture and ready to rapture in readness for fertilization. The fallopian tube begins as a funnel shaped tube that engulf the ovary and the placenta act as a place where food, oxygen and waste products exchage between the foetus and mothers blood stream. Uterus is the site for embryonic development during gestation and cervix connects the uterus and vagina. It has thick walls to allow passage of sperm at mating expulsion of the foetus at parturition. During pregnancy, the cervix is filled with a thick mucus secretion known as the cervical plug, which protects the uterus from infections from the vagina.

(Dukes, 1984).

The main function of digestive system is to break down molecules of food into smaller ones that can be easily absorbed into the body system. Different types of nutrients are digested into smaller molecules at each stage of the digestive system. Firstly, injection is done in the mouth where mechanical and chemical digestions takes place. Mechanical digestion is the physical breakdown of food by grinding and chewing so as to mix it with saliva while chemical digestion is done by enzymes such as salivary amylase which digest starch and lipase which digest lipids. After that absorption of useful nutrients into the bloodstream and excoretion of toxic substances take place. (Phelp, 1986). ruminant digestion 3.5

Conclusion

During the laboratory, the reproductive organs, respiratory digestive and a model of muscular system were examined, drawn and labbeled. For respiratory system, all the bones and joints were identified and skeleton of a goat was well drawn. There were no challenges that were experienced during practical, hence the practical was successfully done. 0.0

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1-0

THE UNIVERSITY OF ZAMBIA.

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCES.

NAME: KALIMBA. BRIGHT. B.

COMP NO: 2018154630

COURSE CODE: AGA 2110

LAB NO: 8

TITLE: ANALYSIS OF BLOOD.

ATTENTION: MS. A. MALITI

NOIP

TITLE: ANALYSIS OF BLOOD

AIMS: To observe the components of blood through a microscope.

To analyse the packed cell volume of Red blood cells and White blood cells.

To analyse the counts of Red blood cell and White blood cell in a given blood Sample.

2.5/10

INTRODUCTION

The vascular system comprises the heart and blood vessels that pump and transport blood throughout the animal body respectively. Blood contains some cells for it to function well. The cellular elements which are found in the blood include the erythrocytes (Red bloo cells), Leukocytes (White blood cells) which contains neutrophils, eosinophils, basophils, monocytes and lymphocytes and the last cellular element is thrombocytes (platelets). In addition, blood contains plasma which comprises of Serum and Fibronogen. Each blood cellular element has an optimum range that can be used as a basis to diagonise any animal for any sickness. (Fradson, 1972).

The plasma has a major function of transporting blood cells, dissolved nutrients, metablic wastes, antibodies, enzymes and hormones from one place to another. It also helps in the buffering besides helping in maintaining of the osmotic pressure of the blood. (Philip, 1986).

The erythrocytes are formed in the liver, spleen and lymph in young animals while in adults they are formed in bone marrow. They contain haemoglobin whose main function is to carry oxygen from one place to another. Such haemoglobin is called oxyhaemoglobin. However, when haemoglobin is oxidized by nitrates and carbon monoxide it is called methomoglobin and carboxy haemoglobin, respectively and is unable to transport oxygen due to lack of iron. Erythrocytes has a life span of about ninety days. After it becomes a debris, macrophase cell engulf it. Iron would be transported to places where it is needed while the remaining green colour called biliverdin is reduced to bilirum that is transported to the liver where bile is formed. (Heath, 1985).

Leucocytes are nucleated and have a life span varying from hours to years. Neutrophils, eosinophils and basophils are collectively found in the group called granulocytes. Granulocytes have grains and have a life span to hours. On the other hand, monocytes and lymphocytes make up agranulocytes and their life span is years and months. They have very few grains. Neutrophils are responsible for defence by migrating to points where intruders are and engulf them in an amoeboid-like action. After reaching a maximum engulfing capacity, neutrophil's life span end and they form pus that are accumulated in abscess. Eosinophils are responsible for detoxification of toxins. Basophils release haparin and histammes. Heparin is an anticoagulant, meaning that it prevents blood from clotting while histammes encourages muscle contraction and capillary dilation. Monocytes are largest type of leucocytes and are needed in acute conditions while lymphocytes form antibodies. (Fradson, 1972).

Thrombocytes have no nucleas but have other cell organelles such as mitochondria, Golgi apparatus and lysosomes. Thrombocytes help in the reduction of blood loss in case of an injury by releasing Serotine. (Philip, 1986).

MATERIALS

The practical to be done, the following materials were being provided.

- haemocytometer
- glass rods
- Capillary tubes
- Cattle blood
- glass Slides
- Centrifuge
- Hydrochloric acid
- Waxcy
- pippete
- Microscope
- droppers
- Giemsa Solution
- EDTA Chemical

PROCEDURE

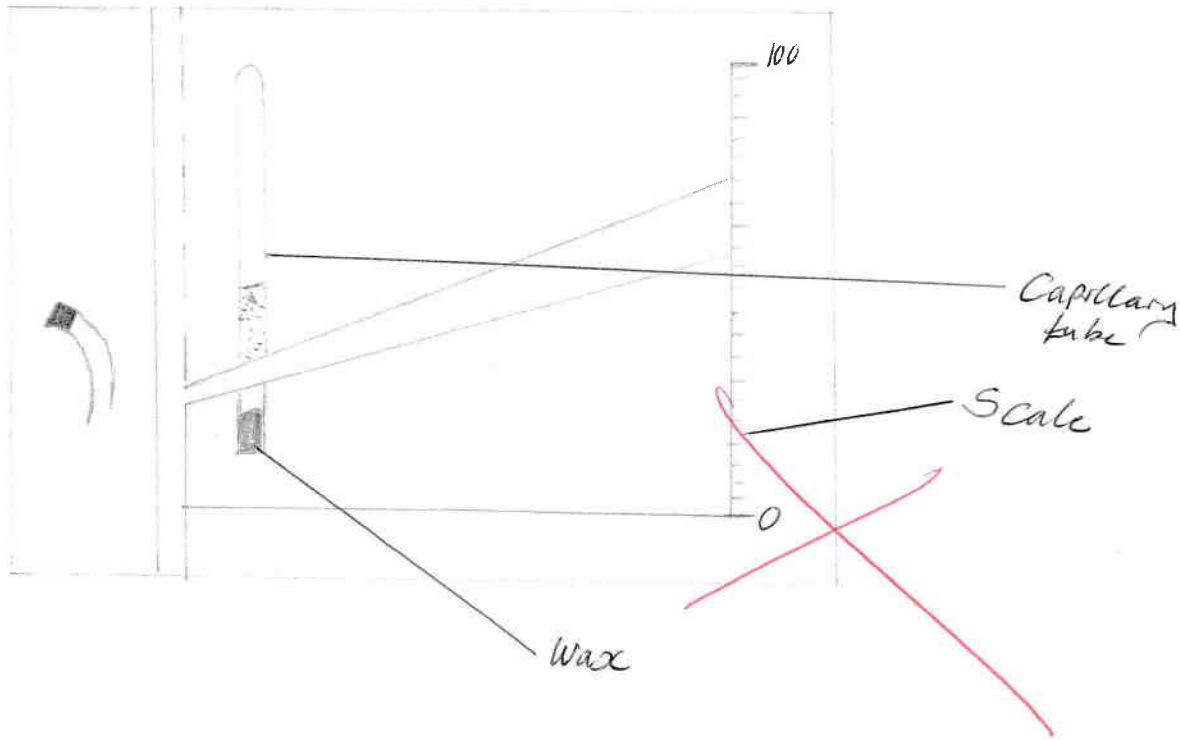
Four (4) blood Samples were provided in graduated tubes, the two (2) contained uncentrifuged blood Sample and where allowed to Settle and Observations where recorded. The other two (2) tubes had Centrifuged blood Samples and Observations were recorded as seen on the data analysis page (drawn images). Using a Capillary tube, one drop of blood was added to a glass Slide. A clean Slide was then used while holding it in an angle to push the blood carefully along the length of the first Slide to create or make a Smear of blood on the Slide.

Drops of Giemsa Solution Where added to the Slide Containing the Smear of blood and was placed on a Microscope and observations were made. (drawn images on the data analysis page).

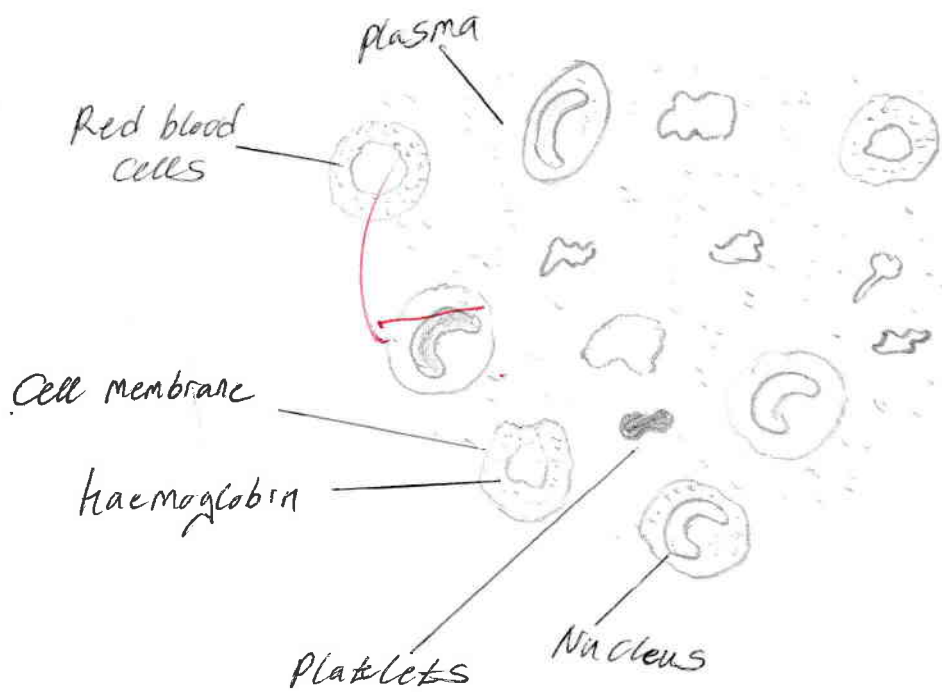
For determining. Packed cell Volume, two Capillary tubes were used to get blood with heparinised (anti Coagulant). The end of the tube ~~Should be~~ Rolled with wax and placed in the micro - Haematocrit Centrifuge. The two (2) tubes ~~MUST be~~ was on the Same level and placed on opposite Side. These tubes were centrifuge for four(4) minutes and the readings were observed and recorded using Haematocrit reader.

NOIP

The Micro Haemotocrit Scale.



Structure of blood cells observed under a microscope



Percentage of Components of blood Components observed on the Haemotocrit

Dark red = 60% read

100 - 60 = 40%

White blood cell, read was 75%

100% - 75% = 25%

Yellow (plasma), read was 87%

100 - 87 = 13%

platelets, read was 100%

100 - 100 = 0%

∴ the total volume of blood after being centrifused was

40% + 25% + 13% + 0% = 78%

DISCUSSION

Blood is a specialized body fluid and it has four (4) main components which includes; plasma, red blood cells and platelets. Blood has many different functions, it transports oxygen and nutrients to the lungs and tissues. It forms blood clots to prevent excess blood loss. Blood also carry cells and antibodies for protection against diseases, temperature is also regulated by blood. The blood that runs through the veins, arteries and capillaries is known as whole blood and the mixture is about 55% plasma and 45% blood cells. (Heath, 1985).

production of red blood cells is controlled by erythropoietin a hormone produced primarily by the kidneys. Red blood cells contain a special protein called Haemoglobin which helps to carry oxygen from the lungs to the rest of the body and then brings back carbodioxide to the lungs for expiration. Haemoglobin gives the blood colour (Grass, 1994).

White blood cells are essential blood cells which protects body against diseases. The most common type of white blood cells is the neutrophil, which is the immediate response. The other major type of white blood cell is a lymphocyte. In blood, the serum is the component that has no blood cell or clotting factor. It is the blood plasma not including the fibranogens. (Fradson, 1972).

The main challenge that was made during the practical was the counting of both the red and white blood cells. There was a lot of room for errors as it was done visually. For this problem, animal scientists should find ways and means of researching some modern technology of getting some accurate readings easily with minimal time. (Phillip, 1986).

Conclusion.

The counts for both red blood cells and white blood cells. were successfully done. The blood components were observed which includes plasma, white blood cells, red blood cells and platelets. The percentages were calculated as plasma was 13%, White bloo cell was 25% and red blood cell was 40%.

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THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCE

NAME : BWALYA Lumpa

COMPUTER #: 2016134418

LAB # : 8

TITLE : ANALYSIS OF BLOOD

ATTENTION: Ms. A. MALITI

TITLE: Analysis of Blood.

7.0/10

Aims: To analyse the given blood sample for haemoglobin Content.
: To analyse the red blood cell and white blood cell counts in a given blood sample.
To Calculate the mean Corpuscular haemoglobin Content.

Introduction.

The Vascular system Comprises the heart and blood vessels that pump and transport blood throughout the animal body respectively. Blood Contains some cells for it to function well. The Cellular elements that are found in the blood include the erythrocytes (red blood cells), leukocytes (white blood cells containing neutrophiles, eosinphils, basophils, monocytes and lymphocytes) and thrombocytes (platelets). In addition, blood contains plasma which comprises the serum and fibrinogen. Each blood cellular element has an optimum range that can be used as a basis to diagnose any animal for any sickness. (Frandson, 1972)

The plasma has a master function of transporting blood cells, dissolved nutrients, metabolic wastes, antibodies, enzymes and hormones from one place to the other. It also helps in the buffering besides helping in maintaining of the osmotic pressure of the blood. (Philip, 1986)

The erythrocytes are formed in the liver, spleen and lymph nodes in young animals while in adults they are formed in the bone marrow. They contain haemoglobin whose main function is to carry oxygen from one place to the other. Such haemoglobin is called oxyhaemoglobin. However, when haemoglobin, respectively

is oxidized by nitrates and Carbon monoxide, it is called methemoglobin and Carboxyhaemoglobin, respectively and is unable to transport oxygen due to lack of iron. Erythrocyte has a lifespan of about ninety days. After it becomes a debris, macrophase cell engulfs it. Iron would be transported to places where it is needed while the remaining green colour called biliverdin is reduced to bilirubin that is transported to the liver while bile is formed. (Health, 1985)

leucocytes are nucleated and have a lifespan varying from hours to years. Neutrophils, eosinophils and basophils are collectively found in the group called granulocytes. Granulocytes have grains and have a lifespan of hours. On the other hand, monocytes and lymphocytes make up agranulocytes and their lifespan is years and months respectively. They have very few grains. Neutrophils are responsible for defence by migrating to points where intruders are and engulf them in a amoeboid-like action. After reaching a maximum engulfing capacity, neutrophils' life end and they form my pus that are accumulated in abscess. Eosinophils are responsible for detoxification of toxins. Basophils release Heparin and histamines. Heparin is an anticoagulant, meaning that it prevents blood from clotting while histamine encourages muscle contraction and capillary dilation. monocytes are largest type of leucocytes and are needed in acute conditions while lymphocyte form antibodies. (Bradson, 1972)

Thrombocytes have no nucleus but have other cell organelles such as mitochondria, Golgi apparatus and lysosomes. Thrombocytes are needed helps in the reduction of blood loss in case of an injury by releasing serotine. (Philip, 1986)

Materials

The following materials were provided in order to carry out the practical:

- Blood sample,
- water,
- dropper,
- acetic acid,
- hydrochloric acid,
- Capillary tube,
- Pipettes,
- glass rods,
- Microscope,
- a counter,
- graduate tube,
- and a haemocytometer.

NOIP

procedures

The following are the procedures that were done on each specimen to be observed:

→ Haemoglobin Content.

A graduated tube was filled to the 20 mark with a 10% solution of hydrochloric acid. A pipette was filled with blood sample to a 20cm mark and excess blood was wiped from the outside pipette. The blood was then expelled into the hydrochloric acid and mixed thoroughly. The mixture was allowed to stand for about five minutes before water was added to it drop with an acid or a dropper. Each time water was dropped into the sample, a glass rod was used to stir the mixture from the tube. Water was dropped into the sample until it matched with the standard and the haemoglobin percentage was read. Thereafter, the formula below was used to express haemoglobin Content percentage.

$$\frac{14.8}{1} \times \frac{Hb\%}{100} = Hb \text{ grams/100ml blood}$$

NDIP

→ Red blood cell Count.

A red blood cell pipette was filled with blood sample up to 0.5 mark by suction. Excess blood was wiped off from the pipette and the pipette was then immediately immersed into the red blood cell diluting fluid and drawn up to 101 mark. The dilution of 1 to 200 was quickly done to avoid blood clotting. The pipette ends were closed and the mixture was then shaken for about two minutes in a figure of eight motion. A glass cover was then placed on the counting area of the haemocytometer with the edges resting on the glass cover supports. The mixture on the lower stem was expelled and tip was wiped. Thereafter, the tip of the pipette was exactly placed at the junction of the cover and Chamber. The Capillary action was used to fill the space with the ~~cover glass and Chamber~~ sample mixture. The haemocytometer was then placed on the microscope and allowed to settle for about two to three minutes to allow the cells settle into the focus at the bottom of the Chamber. Cells were observed and counted from the four corners and the centre of one square. The formula below therefore used to analys the data.

Corpuscles per cubic millimeter = Count × dilution × 5 × 10

→ white blood cell count.

A white blood cell pipette was filled with blood sample up to 0.5 mark by suction. Excess blood was wiped off from the pipette was then immediately immersed into the white blood cell diluting fluid and up to 101 mark. The dilution of 1 to 20 was quickly done to avoid blood clotting. The pipette ends were closed and the mixture was then shook for about two minutes in a figure of eight motion. A glass cover was then placed on the counting area of the haemocytometer with the edges resting on the glass cover supports. The mixture on the bore stem was expelled and tip was nicely wiped. Thereafter, the tip of the pipette was exactly placed at the junction of the cover glass and Chamber. Capillary action was used to fill the space with the sample mixture. The haemocytometer was then placed on the microscope and allowed to settle for about 2 to 3 minutes to allow the cells settle into the focus at the bottom of the Chamber. Cells were observed and counted from the four corner millimeters of the counting Chamber. Only the cells above and to the left were counted. The formula below was therefore used to analyse the data.

$$\text{Corpuscle per cubic millimeter} = \frac{\text{Count} \times \text{dilution} \times 10}{\text{squares Counted}}$$

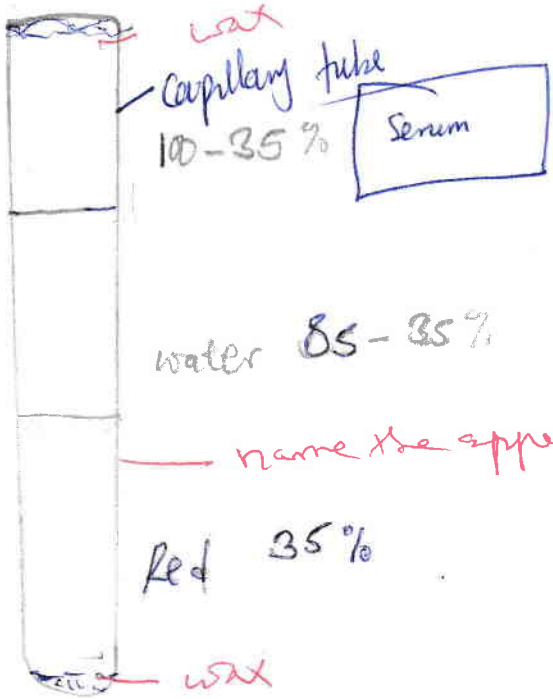
→ Leukolyte Stain.

Blood sample was mixed by use of a repeated inversion. A small drop of blood was applied at one of a clean dry slide. Thereafter, a second clean dry slide was placed at an angle of about 30° to the flat surface of the slide containing the blood sample. That slide was then brought into contact with the blood and then drawn along the slide containing blood. The slide was quickly dried by waving it in the air and fixed for about a minute in methyl alcohol. It was then placed in giemsa stain for fifteen to thirty minutes. Thereafter, the stain was washed out with water until the slide turned pinkish in colour. The slide was dried and examined under the microscope.

NOIP

Practical 8

Experiment 1 — Packed Cell Volume ✓



- these should add up to 100 %
- give nomenclature used in haematology
- where is the serum / plasma sentence?

XDIP

Experiment 2. Haemoglobin Content ✓

HB % = 21.8 %

$= \frac{14.8}{1} \times \frac{HB}{100}$

≈ 3.2264 grams / 100 ml whole blood.

Haemoglobin is essential for oxygen Carriage by the blood.

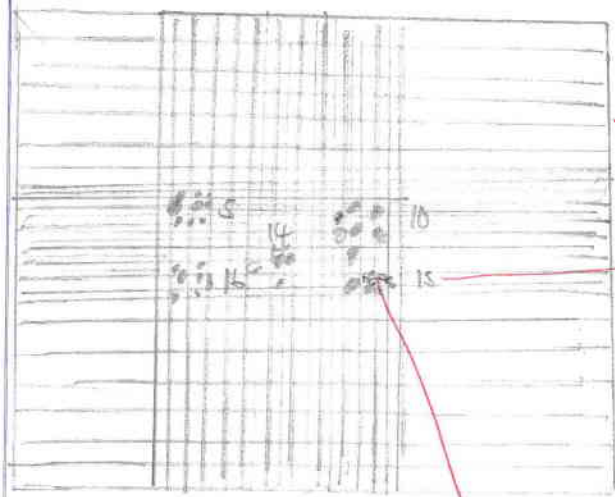
$\frac{14.8}{1} \times \frac{HB\ \%}{100\ \%}$

14.8 g/100 ml whole blood.

23.09.19

Experiment 3

Red Blood cell Count.



label apparatus
Haemocytometer

label 15 red bloods

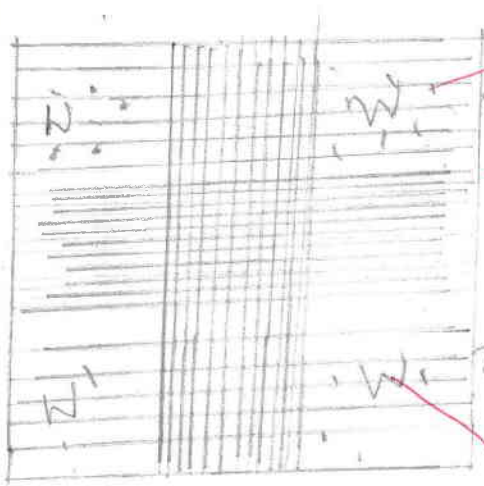
label Red blood cells

Red Blood Cell Count = 5 + 16 + 14 + 10 + 15
= 21 + 24 + 15
= 45 + 15
= 60

Corpuscles per Cubic millimeter = Count × Dilution × 5 × 10 (dilution)
= 60 × 200 × 5 × 10
= 600,000 Corpuscles per cubic millimeter.

Experiment 4

White Blood Cell. count



label white blood cells

label apparatus
Haemocytometer

label 20 white blood cells

label White blood cells per cubic millimeter

Cells per Cubic millimeter = $\frac{50 \times 20 \times 50}{64}$

$= \frac{50000}{64}$

= 781.25

23-07-17

(6) M.C.H.C = Haemoglobin in grams / litre of blood

Red cells in millions / cmm

= 3.2264 grams / 100 ml blood

600,000 corpuscles per cubic millimeter

= 3.2264 Hb grams / ltr blood

0.6 RBC millions per cubic millimeter

M.C.H.C = 5.377

(8) M.C.V = Volume of packed red cells in mls / litre of blood

Red cells in millions / cmcm

= 100% - 85%

0.6 RBC millions per cubic millimeter

= 15 / 0.6

= 25 Cubic microns

Haematocrit reader packed cell volume

Haemacytometer WBC

RBC

Experiment 7 Leukocyte Stain

(a)	Neutrophils	
(b)	Basophils	
(c)	Eosinophils	
(d)	Lymphocytes	
(e)	Monocytes	

label

fully

label

23.09.19

Discussion

Erythrocytes, Compared to leukocytes, are found in large numbers. This is simply because erythrocytes have an everyday function of Carrying oxygen via the haemoglobin for cell respiration and metabolism to take place. When haemoglobin carries oxygen it is known as oxyhaemoglobin as shown in the chemical reaction below: (Fradson, 1972)

$$Hb + O_2 \longrightarrow HbO_2$$

On the other hand, leukocytes function in engulfing of foreign materials and also prevent blood from clotting during the normal blood circulation. Thrombocytes are important for blood clotting in case of an injury. This reduces blood loss. The plasma has a major function of transporting blood cells, dissolved nutrients, metabolic wastes, antibodies, enzymes and hormones from one place to the other. It also helps in the buffering besides helping in maintaining of the osmotic pressure of the blood. (Philip, 1986)

Agricultually, the practical was very important in that a farmer can avoid deaths of their animals that may result from the formation of Carboxyhaemoglobin and Methaemoglobin by rearing them in well ventilated areas and also avoid over application of nitrate fertilizers in the grazing areas respectively. In addition, they can are also reduce anaemic conditions and haemolysis for their animals by keeping them free from parasitic insects such as ticks and also keep them away from poisonous snakes infested areas.

Above all, a farmer can diagnose their domestic animals for any sickness and treat the animals accordingly. (Health, 1985)

In blood, the serum is the component that is neither a blood cell, nor a clotting factor; it is the blood plasma not including the fibrinogens. Serum includes all proteins not used in blood clotting and all the electrolytes, antibodies, antigens, hormones and any exogenous substances. (Fradson, 1972)

The main challenge that was experienced during the practical was the counting of both the red and ~~white~~ blood cells. There was a lot of room for errors as it was done visually. With this at hand, animal scientists should find ways and means of exploring some modern technology of getting some accurate readings easily with minimal labour and on time. (Philip, 1986)

Conclusion

During the laboratory, both the red blood cell and white blood cell counts were successfully done but with difficulties as explained above. In addition, the haemoglobin content was also observed in comparison with the standard. Thereafter, the mean corpuscular haemoglobin was calculated from the data that was collected. Hence, the practical was successfully done.

References

(1) Frandson, R.D, (1972), Anatomy and Physiology of Farm Animals, 2nd ed, Lea and Frebiger publisher, Philadelphia

(2) Heath, E, (1985), Anatomy and physiology of Tropical Livestock, Longmen Singapore publishers, Singapore.

(3) Philip, W.D. and Chilton, T.J, (1986), A-Level Biology, Revised Edition, Oxford University press, UK : Oxford)

THE UNIVERSITY OF ZAMBIA

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF ANIMAL SCIENCE

NAME: BWALYA LUMPA

COMPUTER #: 2016/1334/18

LAB #: 9

COURSE CODE: AGA 2110

ATTENTION: MS. MULITI

D-5

TITLE: RED BLOOD CELL MORPHOLOGY AND BLOOD COAGULATION

Aims: To study the coagulation rate of blood sample.
: To study the materials that make the blood not to coagulate.

Introduction

Blood coagulation is important in that it prevents excess loss of blood from the circulatory system through an injury. In addition, it prevents the entrance of foreign materials into the circulatory system. This results in healing of a wound. (Gradon, 1972)

For blood to clot, there are some factors that need to be taken into consideration. The major two factors involves the thrombocytes and the protein component.

Thrombocytes are disc-shaped elements that are found in the blood are involved in blood clotting by aggregating during normal blood clotting. The other coagulating factor is the protein. Proteins are manufactured by the liver. The chemical reaction converts fibrinogen into fibrin, forming a mesh which clumps platelets and blood cells into a solid clot. This stops bleeding by plugging the hole. (Philip, 1986)

Materials

The following materials were provided in order to carry out the practical

→ Blood Sample,
→ Six test tubes,
→ 6 drops of 3% potassium citrate,
→ 2 drops of 3.7% Sodium oxalate,
→ 2 drops each of 3.7% Sodium oxalate and 3.7% Calcium Chloride
→ 4 drops of 3% Sodium fluoride and
→ a small scoopful of ethylene diamine tetra acetate (EDTA)

3%

- Sodium chloride materials ??

Procedure

One millimeter of freshly drawn blood sample was put in each of the six test tubes by using a syringe. Thereafter, specified amounts of each anticoagulant was put in the five test tubes containing the blood sample. The sixth test tube was used as a control and no anticoagulant was added to it. Each mixture was gently mixed and examined for clotting at one minute intervals for the first ten minutes, and thereafter at five minute intervals for thirty minutes

Sodium chloride procedure??

Observations and Results

The table on the next page summarizes the data that was observed and collected during the practical.

Discussion

Practical 9

Experiment A: Cell morphology using NaCl

0.55% NaCl	 X 10
0.85% NaCl	 X 10
3% NaCl	 X 10

23.09.19

Discussion

During the practical, the control blood sample coagulated while the treatment blood samples did not coagulate during the time period of study.

The treatment blood samples did not coagulate up to forty minutes when the observation ended because the anticoagulants that were added inhibited coagulation. On the other hand, the control blood sample coagulated during the fourth minute as they were no anticoagulants is added to it. (Fraser, 1972)

Answers to Questions

- Fibrin is a substance that forms a loose clot; but fibrin cannot be present in its active form in the circulating blood. Its precursor, fibrinogen (factor 1, synthesized in the liver) is present in plasma as a soluble protein. Fibrinogen is converted to fibrin by the action of an enzyme called thrombin. Clotting process

Thrombin also cannot be present in circulating blood in its active form or else coagulation would occur. It, too, has a precursor called prothrombin (factor II, formed by the liver in the presence of vitamin K). This factor is an α_2-globulin. prothrombin is acted upon by a complex called prothrombin activator, this splits off the enzyme thrombin from prothrombin clotting factors; (Phillip, 1986)

Common list of clotting factors

- factor I (fibrinogen)
- factor II (prothrombin)
- factor III (thromboplastin)
- factor IV (Calcium)
- factor V (labile factor)
- factor VII (Stable factor)
- factor VIII (Antihaemophilic factor A)
- factor IX (Christmas factor); antihaemophilic factor B
- factor X (Stuart-power factor)
- factor XI (Antihaemophilic factor C)
- factor XII (Hageman factor)
- factor XIII (fibrin stabilizing factor)

Dicoumarol is an anticoagulant that acts by inhibiting the synthesis of Vitamin K-dependent clotting factors in the liver. It is used in the prevention and treatment of thromboembolic disorders. It is produced naturally by conversion of non-toxic Coumarin in mouldy sweet clover hay, bespeezed hay or sweet Vernal hay. Eating such hay causes blood loss due to spontaneous haemorrhage. (Heath, 1985)

Therefore, the practical was very important in that one can know how to preserve blood samples properly for future analysis. Blood analysis may be done at a later time if it is collected from a long distance from the laboratory or if there is overwhelming work in the laboratory. Hence, the results got from such blood analysis can have no errors or within acceptable ranges if any. (Philip, 1986)

Conclusion

During the practical, the blood coagulation was successfully observed within the stipulated time without any challenges. In addition, the effect of adding anticoagulants to blood was observed. The treatment blood samples did not coagulate at all while the control blood sample did. Hence, the practical was successfully done.

References

(1) Frandson R.D, (1972), Anatomy and Physiology of Farm Animals, 2nd Edition, Lea and Febiger publisher, Philadelphia.

(2) Heath-e, (1985) Anatomy and Physiology of Tropical Livestock, Longmen Singapore publishers, Singapore.

(3) Philip W.D and Chilton T.J, (1986), A-Level Biology, Revised Edition, Oxford University press, ~~UK.~~ Oxford

(4) Wikipedia.org (2017) 27/05/2017 time released

(5) www.thomsonsiachuan.com (2017) ??

Leucocytes

THE UNIVERSITY OF ZAMBIA
SCHOOL OF AGRICULTURAL SCIENCES
DEPARTMENT OF ANIMAL SCIENCE

AGA 2110 ANATOMY AND PHYSIOLOGY OF FARM ANIMALS

FINAL EXAMINATION- DECEMBER 2020

INSTRUCTIONS:

- ANSWER **ANY THREE QUESTIONS**
- ANSWER **EACH SECTION** IN A **SEPARATE** ANSWER BOOKLET
- **CLEARLY WRITE THE NUMBER** OF EACH ATTEMPTED QUESTION
- **START** EACH QUESTION ON A **NEW PAGE**
- ALL QUESTIONS CARRY EQUAL MARKS (20 MARKS).

SECTION A

QUESTION ONE

A. Write short notes on the following terms as they are used in farm animals;

i. Anastomoses **(2 Marks)**
ii. Serum **(2 Marks)**
iii. ECF **(2 Marks)**
iv. Pampiniform plexus **(2 Marks)**
v. Alveoli **(2 Marks)**

B. Briefly discuss the following phenomena;

i. Lobes of the bovine lung **(3 Marks)**
ii. Anatomical components of the mammary gland **(6 Marks)**
iii. Preen gland **(1 Marks)**

QUESTION TWO

With regard to farm animals;

A. State four (4) functions of the integumentary system. **(4 Marks)**
B. Use a diagram to show the gross anatomical bovine female reproductive system **(6 Marks)**
C. Draw and clearly label the main features of a graafian follicle **(8 Marks)**
D. What constitutes a portal circulation? **(2 Marks)**

SECTION B

QUESTION ONE

A. Based on the anatomy of the digestive system, farm animals are categorised into four (04) groups.

i. Mention the four (04) groups or categories **(2 Marks)**
ii. Explain the anatomical differences in the gastrointestinal track and list one species that belongs to each category **(8 Marks)**

B. Based on the method of secretion, exocrine glands are categorised into 3 groups.

i. Define exocrine glands **(1 mark)**
ii. Mention the three (03) categories of exocrine glands **(3 marks)**
iii. Differentiate the three categories **(3 marks)**
iv. For each of the categories, mention one gland that belongs to it **(3 marks)**

QUESTION TWO

A. State the three (03) basic functions of the nervous system. **(3 marks)**

B. List any five (05) general functions of the skeletal system **(5 marks)**

C. Based on their gross appearance, an animal's body has four (4) types of bones.

i. Mention the four types of bones (2 **marks**)
ii. For each category mention one bone that belongs to that category (2 **marks**)

D. For each of the following, what is the;

i. Functional difference between a neuron and neuroglial cells **(2 marks)**
ii. Anatomical difference in location of parietal and visceral pleural **(2 marks)**
iii. Structural difference between flagella and cilia **(2 marks)**
iv. Anatomical difference in the location of serous and mucous membranes **(2 marks)**

END OF EXAMINATION
BONNE CHANCE **** GOOD LUCK