MINISTRY OF EDUCATION AND HIGHER EDUCATION

GRADE 12 EXAMS, 2023

BIOLOGY

2023

P/LAND NATIONAL EXAMINATION BOARD

SomExams

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Name of Student			
Roll Number			
Name of School			
Region:		**District:**	

FORM FOUR EXAMINATION, 2023
TIME: 2 HOURS AND 10 MINUTES FOR READING

BIOLOGY

Instructions to candidates

- Answer all the questions
- This paper consists of 11 pages, count it and if any is missing inform your invigilator
- Write your **name and roll number** on the exam paper
- No extra paper is allowed.
- If you make a mistake, **cross out the incorrect** answer and **write your correct answer.**

This exam paper consists of following Parts

Parts	Marks
Part one: Multiple choice	20 marks
Part two: Structured Questions	80 marks
Total:	**100 Marks**

For the markers only

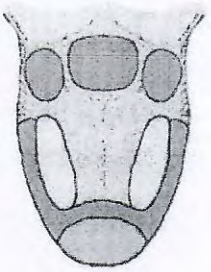
PARTS	MARKS
Part one:	
Part two:	
Total:	

Use this page for rough work. It will NOT be marked.

PART ONE: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Sternum is one of the human bones which protects the organs
A. Heart and spinal cord
B. Spinal cord and lungs
C. lungs and heart
D. Brain and lungs

2. This is a diagram of the human tongue labeled with colours. The blue area can taste by



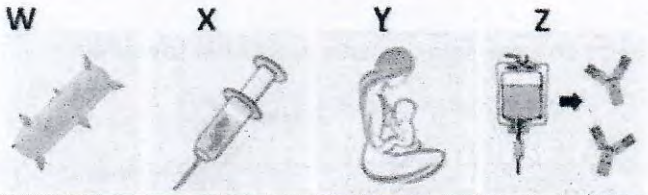
A. Salt
B. Sweet
C. Bitter
D. Sour

3. Which of the following glands are examples of exocrine glands?
A. Salivary and thyroid glands
B. Sweet and pituitary glands
C. Thyroid and sweat glands
D. Sweet and salivary glands

4. Identify the correct examples of stimulus and effector
A. Touch and eye
B. Light and ear
C. Light and muscle
D. Light and brain

5. The hormone that accelerates the conversion of glycogen into glucose is:
A. Insulin
B Adrenaline
C. Thyroxine
D. Glucagon

6. Identify the labeled part that can be natural active immunity
A. W
B. X
C. Y
D. Z



INFECTION	VACCINATION	MATERNAL ANTIBODIES	MONOCLONAL ANTIBODIES

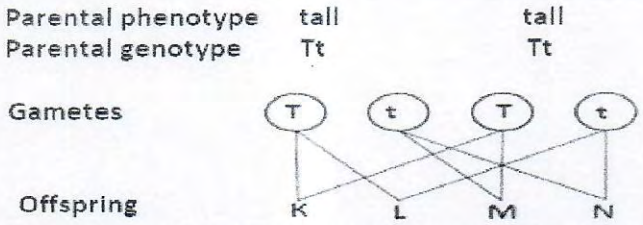
7. Four different segments of a DNA molecule are represented below.

Segment 1	Segment 2	Segment 3	Segment 4
T-A-G-G-C	C-G-T-G-A	G-A-T-T-A	C-A-A-T-G
A-T-C-C-G	G-C-A-C-T	C-T-A-A-T	C-T-T-A-C

Find the segment which is **an ERROR** paired.

A. Segment 1
B. Segment 2
C. Segment 3
D. Segment 4

8. The diagram shows a cross diagram between two tall pea plants

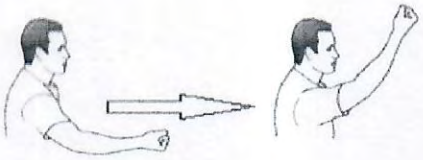


Which of the following statements is **NOT** correct?

A. K and N are both homozygous
B. L and M are both heterozygous
C. K, L, and N are all homozygous
D. The phenotypic ratio is 1:1

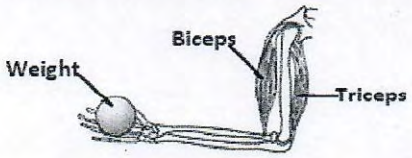
9. Look at the diagram that shows an arm movement.

Identify the joint that allows this movement



A. Ball and socket joint at the elbow
B. Ball and socket joint at the shoulder
C. Hinge joint at the shoulder
D. Hinge joint at the elbow

10. What happens to the muscles as the weight is lowered.



	Biceps	Triceps
A.	Lengthens	Lengthens
B.	Lengthens	Shortens
C.	Shortens	Lengthens
D.	Shortens	Shortens

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PART TWO: STRUCTURED QUESTIONS (80 MARKS)

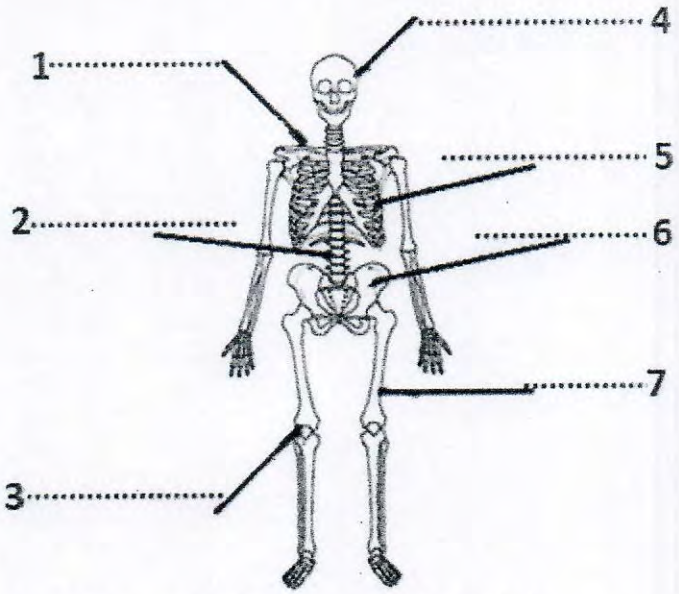
Answer all the following questions

QUESTION ONE : SUPPORT AND MOVEMENT (12 MARKS)

A. label the skeletal system using the bones in the box **(7marks)**

Ribs, Thigh bone, Skull, Kneecap, Backbone, Collarbone, Pelvis

1. .....
2. .....
3. .....
4. .....
5. .....
6. .....
7. .....

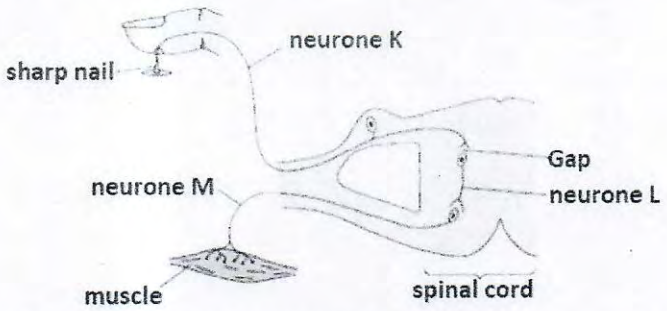


B. Complete the table about types of muscles found in the human body **(5marks)**

Type	Illustration	Voluntary or Involuntray	Where is found in human body
Cardiac		i.	ii.
Smooth		Voluntary	iii.
Skeletal		iv.	V.

QUESTION TWO: NERVOUS SYSTEM AND SENSE ORGANS (17 MARKS)

A. The diagram below shows the pathway of reflex action



I. What types of neurons are neurons **K, L,** and **M**

K.....
.....(1mark)

L.....
.....(1mark)

M.....
.....(1mark)

II. There is a gap between neuron **K** and neuron **L**

a) Name this gap

.....
.....(1mark)

b) The information passes across this **gap** by

.....
.....(1mark)

c) Use an arrow on the diagram to show how the impulse travels in neuron **k.**

.....
.....(1mark)

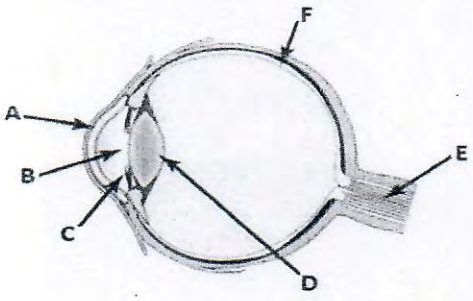
d) State the stimulus of this reflex action

.....
.....(1mark)

e) Give any two examples of involuntary actions

.....
.....(2marks)

B. The diagram shows a horizontal section through the human eye.



I. Name the structures **A, D, and E.**

A. .....
..... (1mark)

D.....
..... (1mark)

E. .....
.....(1mark)

II. Briefly explain what happens to the structures labeled **C** and **B** if this eye faces a very bright light

C.....
.....(2mark)

B.....
.....(1mark)

III. Match the letters **A to E** in the parts of the eye with their correct functions. **(2marks)**

One has been done for you.

Part of the eye	Answer	Function
A		1. Controls the amount of light entering the eye
C	1	2. Refracts light rays
D		3. Contain light receptors
E		4. Carries impulses to the brain
F		5. Focuses light

QUESTION THREE : ENDOCRINE SYSTEM AND HOMEOSTASIS (11 MARKS)

A. The given table below is the endocrine system.

i. Complete the following table by filling in the blank spaces (7 marks)

Name of gland	Hormone produced	One important function
Pancreas (islets)	.....	Lowers blood glucose concentration in the body
Thyroid	.....	.....
.....	Adrenaline	.....
Testis	.....	Regulates the development of male secondary sexual characteristics
.....	Estrogen	Regulates the development of female secondary characteristics

ii. Briefly explain why the pituitary gland is called the master gland

.....

.....(2marks)

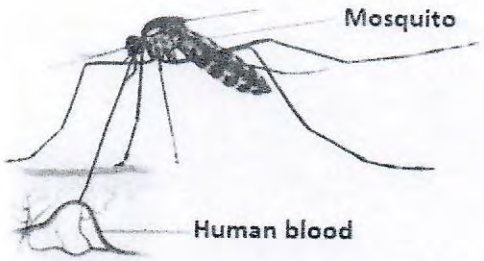
iii. Define the term **homeostasis** and give one example

.....

.....(2mark)

QUESTION FOUR : DISEASE AND IMMUNITY (17MARKS)

A. The diagram shows a mosquito feeding on human blood.



Mosquitoes can carry transmissible diseases such as malaria.

i) Define the term **disease**.

.....

.. ..(1mark)

ii) The human body has several defenses against diseases.

State the name of two chemical barriers in the body.

1. .....

.....(1mark)

2. .....(1mark)

iii) Typhoid is one of the bacterial diseases.

a) Name the pathogen that causes this disease

.....

.....(1mark)

b) Explain how this disease can be treated (cured).

.....

.....(1mark)

iv) Treponema pallidum is a pathogenic bacterium

a) Name the disease that this pathogen causes

.....

.....(1mark)

b) State the way of transmission of the disease in your answer **(i)**

.....

.....(1mark)

v) Mosquito is an insect vector that transmits malaria.

Give two other insect vectors

1. .....
.....(1mark)
2. .....
.....(1mark)

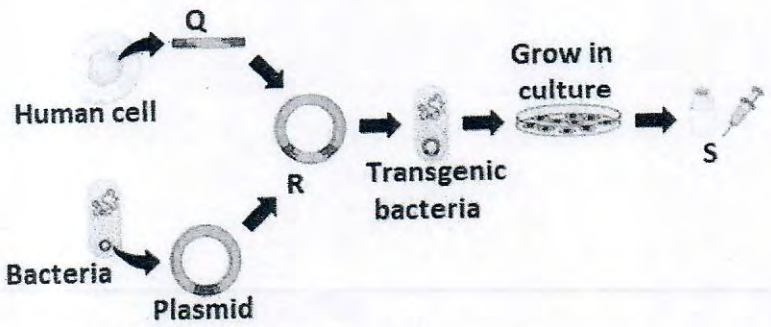
vi) Classify the diseases in the box by their transmission modes, by using the table below. (8 marks)

Common cold, Ringworms, Tuberculosis, Rabies, Cholera, Gonorrhea, Cystic fibrosis, Syphilis.

Air-borne disease	Contagious Disease	Pet-borne disease	Water/food -borne diseases	STDs	Inheritance

QUESTION FIVE: BIOTECHNOLOGY **(7MARKS)**

The diagram below shows the steps in insulin production



A. Name the labeled parts **Q, R,** and S

Q.....(1mark)

R.....(1mark)

S.....(1mark)

B. State what is in **Bottle S** and what is used for

.....

.....(2mark)

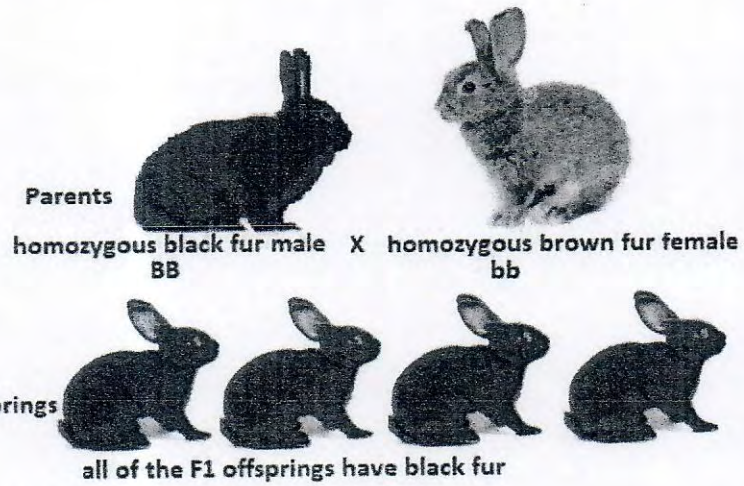
C. Explain why milk is pastoralized when making yogurt or cheese.

.....

.....(2marks)

QUESTION SIX : ADVANCED GENETICS (16MARKS)

A. Organisms pass on their genetic information in their gametes
A homozygous rabbit for black fur was crossed with homozygous a rabbit for brown fur. All of their offsprings had black fur.



i) Define these terms

Homozygous.....

.....(1mark)

Heterozygous.....

.....(1mark)

ii) State the dominant allele for fur colour and give a reason for your answer.

Dominant allele

.....

..... (1mark)

Reason.....

.....(1mark)

iii) A rabbit with brown fur is mated with one of the **F1** rabbits with black fur.

i. Complete the genetic diagram to show the possible fur colours that could occur from this mating. (7 marks)

Parental phenotypes	Brown fur	X	Black fur
Parental genotypes	bb	X	Bb

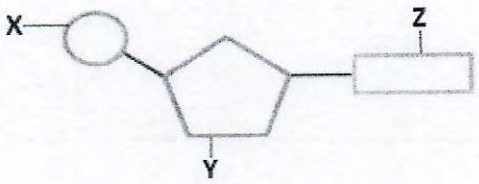
Gamete 1..... 2..... 3..... 4.....

offspring genotypes 1..... 2..... 3..... 4.....

offspring phenotypes 1..... 2..... 3..... 4.....

Ratio .....brown: ..... black

B. Look the **Figure** below.



i. Name **figure.**

.....(1mark)

ii. Name the parts **X, Y, and Z**

X.....(1mark)

Y.....(1mark)

Z.....(1mark)

iii. If the part labeled **Z** is **Uracil** write down its base pairing.

.....(1marks)

END