MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2018

BIOLOGY

2018

P/LAND NATIONAL EXAMINATION BOARD

MINISTRY OF EDUCATION AND HIGHER EDUCATION
PUNTLAND NATIONAL EXAMINATIONS BOARD

Code Number

Form four EXAMINATION 2018
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
- Do not write your **name and roll number** on the exam paper
- Make sure that **student's profile** is attached to the exam paper, if not, inform you invigilator.
- 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 sections

Parts	Marks
Section one: Multiple choice questions	10 marks
Section two: Structural questions	90 marks
	Total: 100 Marks

For the markers only

PARTS	MARKS
Section one	
Section two	
TOTAL	%

SECTION ONE: MULTIPLE CHOICE QUESTIONS (10 MARKS)

CIRCLE THE CORRECT ANSWER

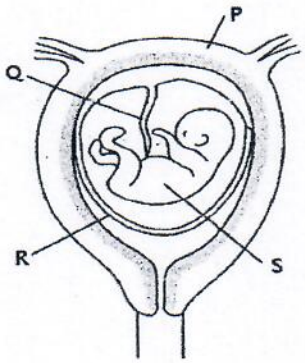
1. Which one of the following is **NOT** limiting factors of photosynthesis
   A) Light
   B) Water
   C) Oxygen
   D) Carbon dioxide
2. Which line in the table below correctly matches the food group to its use?

	Food Group	Use
A	Fats	Growth and repair of cells
B	carbohydrates	energy
C	proteins	protection against deficiency disease
D	vitamins	energy

3. Which one of the following does **NOT** belong to order arachnid?
   A) Scorpions
   B) Ticks
   C) Centipedes
   D) Spider
4. The diagram on right represents human fetus in a uterus.

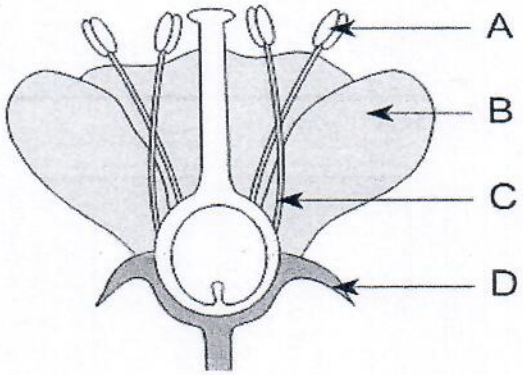
Which labeled letter represents where the fetus gets its nutrients and gets rid off wastes

A) Q
B) P
C) S
D) R



5. The diagram on the right shows parts of a flower.

In which structure does meiosis occur?



6. Genes make up chromosomes in the nuclei of cells. Which is the correct description of a gene?
   A) A section of a protein
   B) A section of an enzyme
   C) A collection of enzymes
   D) A section of DNA

7. A child suffering from anemia should be given a diet rich in
   A) Calcium
   B) Magnesium
   C) Nitrogen
   D) Iron

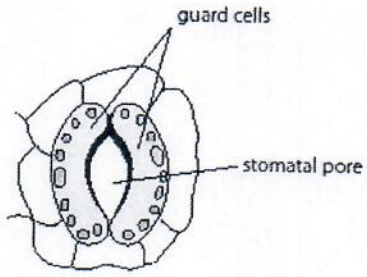
8. Which disease is **NOT** likely to be passed directly from parents to child?
   A) cholera
   B) malaria
   C) sickle cell anaemia
   D) tuberculosis

9. Why could only 4 % of the energy from sunlight be fixed by producers during photosynthesis?
   A) A lot of energy is lost as energy passes from one trophic level to the next in food chains.
   B) A lot of sunlight reflects off clouds, is absorbed by pond water or does not strike chloroplasts.
   C) Some energy passes from dead plants to decomposers such as bacteria and fungi.
   D) Some parts of plants are not eaten or cannot be digested by herbivores.

10. The deficiency of vitamin B in the diet will result in
   A) Scurvy
   B) Beri beri
   C) Night blindness
   D) Weak bones

SECTION TWO: STRUCTURAL QUESTION **(90 MARKS)**
ANSWER ALL THE FOLLOWING QUESTIONS IN SPACE PROVIDED.
QUESTION ONE: PLANTS **(13 MARKS)**

Stomata are pores found mainly on the underside of leaves.



a) Explain the role of the stomata in
   i) transport in plants

_____

_____ 2 Marks

   ii) gas exchange in plants

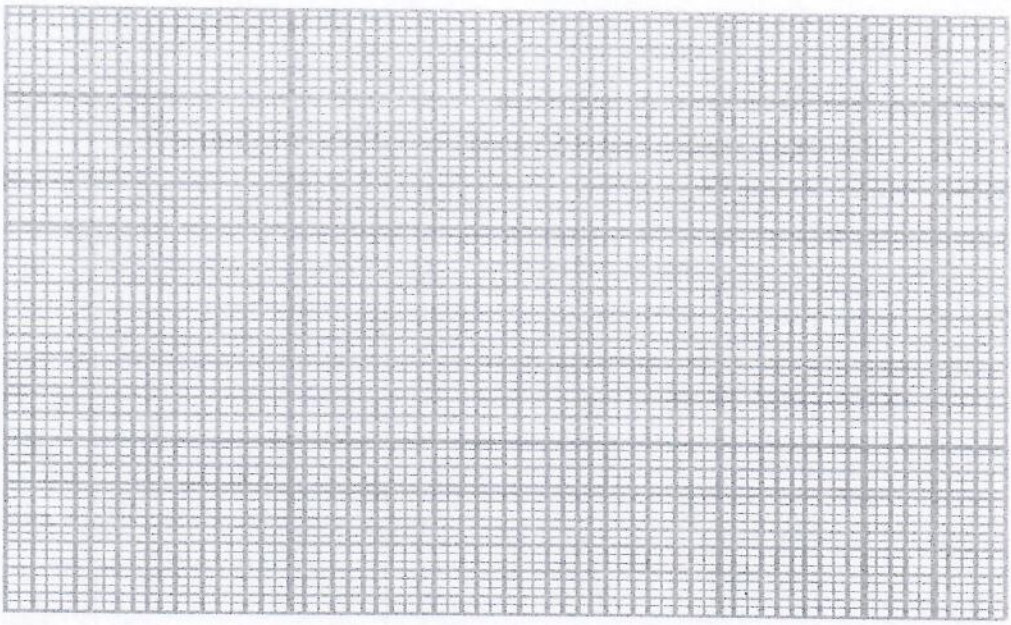
_____

_____ 2 Marks

b) An experiment is carried out to examine the effect of the size of stomatal pores on the rate of transpiration.
The data were collected in still air and in moving air.

Size of stomatal pore in µm	rate of transpiration in mg / m² / s	
	still air	moving air
0	0	0
4	22	38
8	46	140
12	48	165
16	50	210
20	50	248
24	50	264

i) Plot a graph to show the effect of stomatal pore size on transpiration rate in still and moving air.
Use a ruler to join your points with straight lines. (4 Marks)



i) Use the graph to compare the effect of increasing stomatal pore size on transpiration rate in still and moving air.

_____

_____ 2 Marks

c) Plants obtain their nutrition by photosynthesis.

i) Write the balanced chemical symbol equation for photosynthesis.

_____

_____ 2 Marks

ii) Explain how very high temperatures might reduce the growth of plants?

_____

_____ 2 Marks

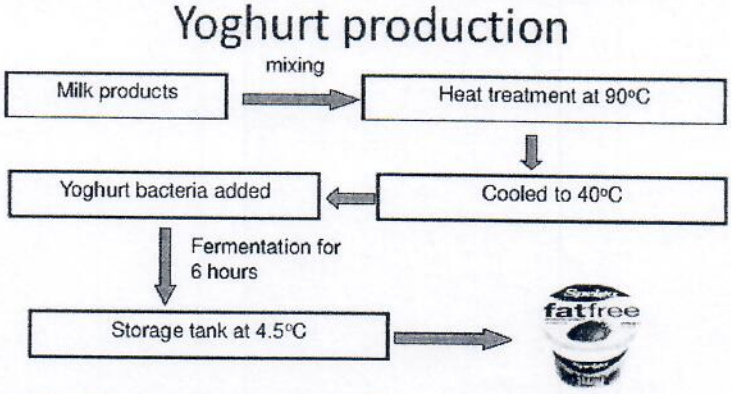
QUESTION TWO: DISEASES **(6 MARKS)**

Match the following description in Column A with its terms in Column B

Description	Answer	Terms
1. Resistance to infection by a particular pathogen obtained by having the disease or being injected with a weakened pathogen		A) Lymphocytes
2. A Long lasting type of immunity		B) Active-immunity
3. A type of white blood cells that produce antibody		C) Phagocytes
4. Resistance to infection by a particular pathogens by acquiring antibodies from another organism		D) Antibody
5. A type of white blood cell that ingests and digests bacteria		E) Passive immunity
6. A protein produced by lymphocytes, which attaches specific antigen		F) Memory cells

QUESTION THREE: BIOTECHNOLOGY (8 MARKS)

The Chart below shows commercial yogurt manufacturing processes.



a) Suggest how the fresh milk is sterilized?

_____

_____ 2 Marks

b) Suggest why it is necessary to sterilize the fresh milk?

_____

_____ 2 Marks

c) Explain why the mixture in the fermentation tank is kept at 40 ^{0}C?

_____

_____ 2 Marks

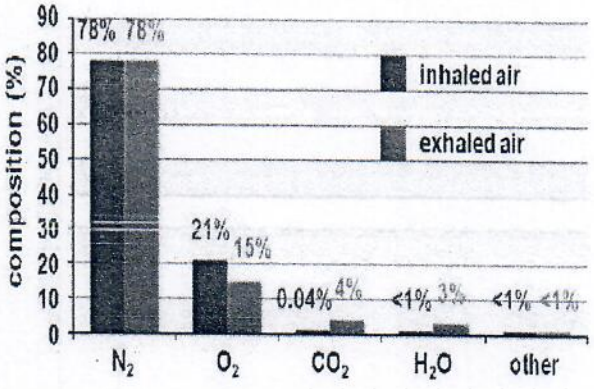
d) In the cooler, the yoghurt is cooled to 4.5 ^{0}C. Suggest why this is done?

_____

_____ 2 Marks

QUESTION FOUR: HUMAN PHYSIOLOGY -RESPIRATION (5 MARKS)

The bar chart compares the percentage of certain gases In Inhaled and exhaled.



a) What are the main differences between inhaled and exhaled air?

_____

_____

_____

_____2marks

b) Where in the lungs does gaseous exchange takes place?

_____

_____ 1 Mark

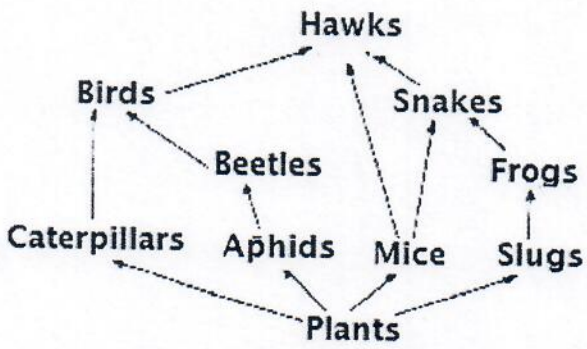
c) How the alveoli are adapted for an efficient exchange of gases in the lungs?

_____

_____ 2 Marks

QUESTION FIVE: ECOSYSTEM **(6 MARKS)**

Study the food web shown below and answer the questions that follow.



a) What is the other name for the second trophic level?

_____

_____ 1 Mark

b) Write down two food chain from the food web that ends with

i) Tertiary consumer

_____

_____ 2 Marks

ii) Quaternary consumer

_____

_____ 2 Marks

c) Suggest another group of organism NOT shown in the food web but are of great importance in the ecosystem.

_____

_____ 1 Mark

QUESTION SIX: CELLS (7 MARKS)

The diagrams show a bacterium, a virus, and an animal.

1  = 1µm

2  = 10µm

Scale:
1nm = 1/1000µm

3  = 50 - 100nm

a) Give two features found in both bacteria and animal cell. 2 Marks

1. _____
2. _____

Arrange the three types of cell in order of size, starting the smallest one. 3 Marks

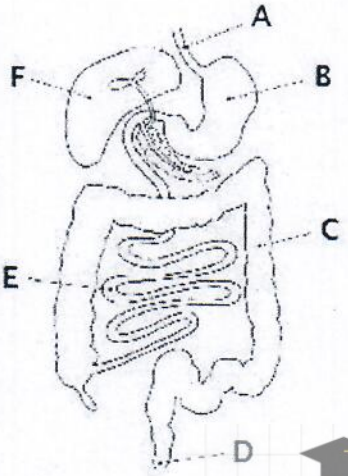
a) Give an evidence that virus is living organism or not?

_____

_____ 2 Marks

QUESTION SEVEN: HUMAN PHYSIOLOGY -DIGESTIVE (5 MARKS)

The diagram below shows the main region of alimentary canal in human.



a) In which labeled structures

i) Are where fatty acid and glycerol absorbed?

_____

_____ 2 Marks

ii)Is most water absorbed?

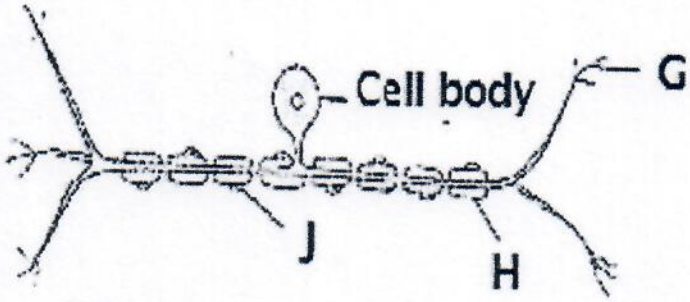
_____ 2 marks

QUESTION EIGHT: HUMAN PHYSIOLOGY -NERVEOS (5 MARKS)

The diagram illustrates a nerve cell.

a)

ii) Name the type of nerve cell illustrated above.



_____

_____ 1 Mark

iii) Give a reason your answer in (a) (i) above

_____

_____

_____ 2 Marks

b) Using an arrow indicate on the diagram the direction of movement of an impulse in the cell. 2 Marks

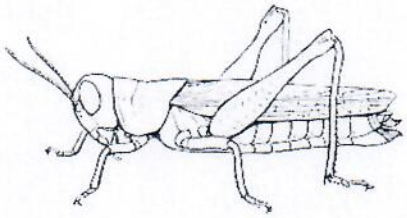
QUESTION NINE: INTRODUCTION TO BIOLOGY (6 MARKS)

Living organisms share some basic characteristics.
Match these characteristics with their descriptions 6 Marks

Characteristic	Answer	Description
1. Sensitivity		A. production of new organism
2.Respiration		B. respond to the surroundings
3.Excretion		C. taking in of food
4. Reproduction		D. Increase in number of cells
5.Growth		E. release of energy in cells
6. Nutrition		F. removal of metabolic waste

QEUESTION TEN: TAXONOMY **4 MARKS**

The diagram below represents a member of the kingdom animalia.



a) Identify the phylum to which the organism above belongs.

_____ 1 Mark

b) Using observation features, give three reasons for the answer in (a).

_____

_____

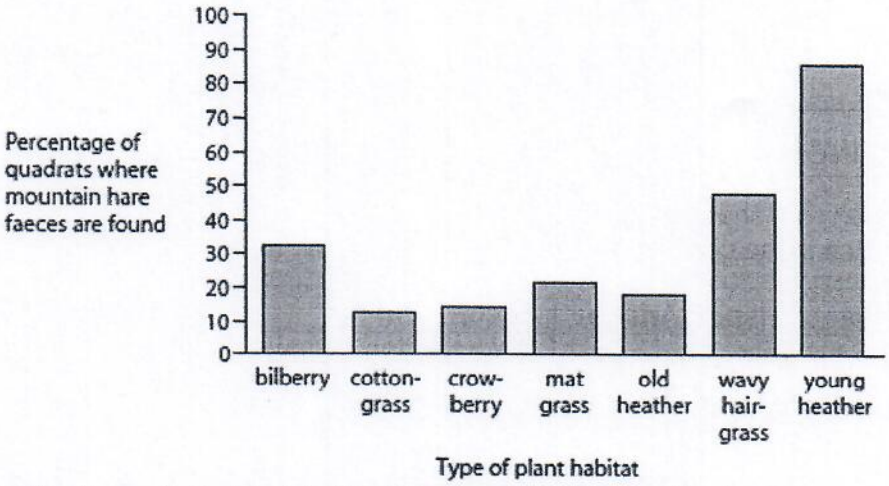
_____

_____ 3 Marks

QUESTION ELEVEN: DIVERSITY **(7 MARKS)**

Scientists want to find out which type of plant Habitat Mountain hares prefer. They use quadrats to sample seven habitats. Each habitat contains a different type of plant. The scientists calculate the percentage of quadrats in each habitat where mountain hare faeces are found.

The graph shows the results.



a) Name the type of plant habitat that the mountain hares like best.

_____ 1 Mark

b) The scientists use 700 quadrats in one plant habitat and find that 224 quadrats contain mountain hare faeces.

i) Calculate the percentage of quadrats containing mountain hare faeces in this habitat.
Show your working. 2 Marks

Percentage of quadrats = ...
%

ii) Name the type of plant habitat where the scientists collected these results
_____ 1 Mark

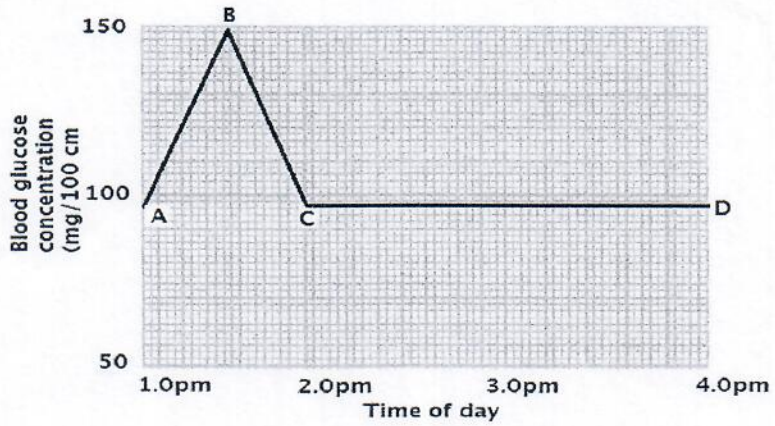
c) Calculate the range between the highest percentage plant habitat and lowest plant habitat. Show your working. 2 Marks

Percentage =
..... %

d) Mountain hares eat plants. Give the name used to describe animals that eat plants.
_____ 1 Mark

QUESTION TWELVE: ENDOCRINE SYSTEM 8 MARKS

The graph below shows the changes in concentration of blood after a meal containing carbohydrates.



a) Explain why body cells need a constant supply of glucose?

_____

_____ 2 Marks

b) Give a reason, why the concentration of glucose in the blood rises between A and B?

_____

_____ 2 Marks

c) Give a reason, why the concentration of glucose in the blood falls between B and C?

_____

_____ 2 Marks

d) In healthy humans, blood normally contains about 90 mg of glucose per 100 cm^3 of blood.

I. Name two hormones that control blood glucose levels.

_____ 1 Mark

II. Name the gland that secret the hormones that help to keep this concentration fairly constant.

_____ 1 Mark

QUESTION THIRTEEN: GENETICS **(10 MARKS)**

A breeder has several black rabbits and white rabbits. He knows that black fur in rabbits is caused by a dominant allele B and white fur is caused by the recessive allele b.

a) Workout the phenotypes and genotypes of F1 rabbits. Use this Punnet Square (4 Marks)

female / male		

b) Write down the parental phenotype

_____

_____ 2 Marks

c) If the F1 Rabbits were crossed.

i) Write down the phenotypic ratio of F2 generation

_____

_____ 2 Marks

ii) Write down the genotypic ratio of F2 generation

_____

_____ 2 Marks