MINISTRY OF EDUCATION AND HIGHER EDUCATION

FORM FOUR EXAMS, 2011

BIOLOGY

2011

P/LAND NATIONAL EXAMINATION BOARD

Name .....

School .....

Roll Number.....

Puntland State of Somalia

Ministry of Education

Puntland National Examination Board

Form 4

BIOLOGY EXAMINATION

2011

Time 2 hours

Plus 10 minutes before the exam for reading through the paper

TOTAL TIME 2 hours 10 minutes

INSTRUCTIONS TO CANDIDATES

This paper consists of 18 printed pages

Count them now. If there are any missing, inform the invigilator

There are two parts:

SECTION A – Multiple Choice Questions	**10 Marks**
SECTION B – Structured Questions	**90 Marks**
TOTAL	**100 Marks**

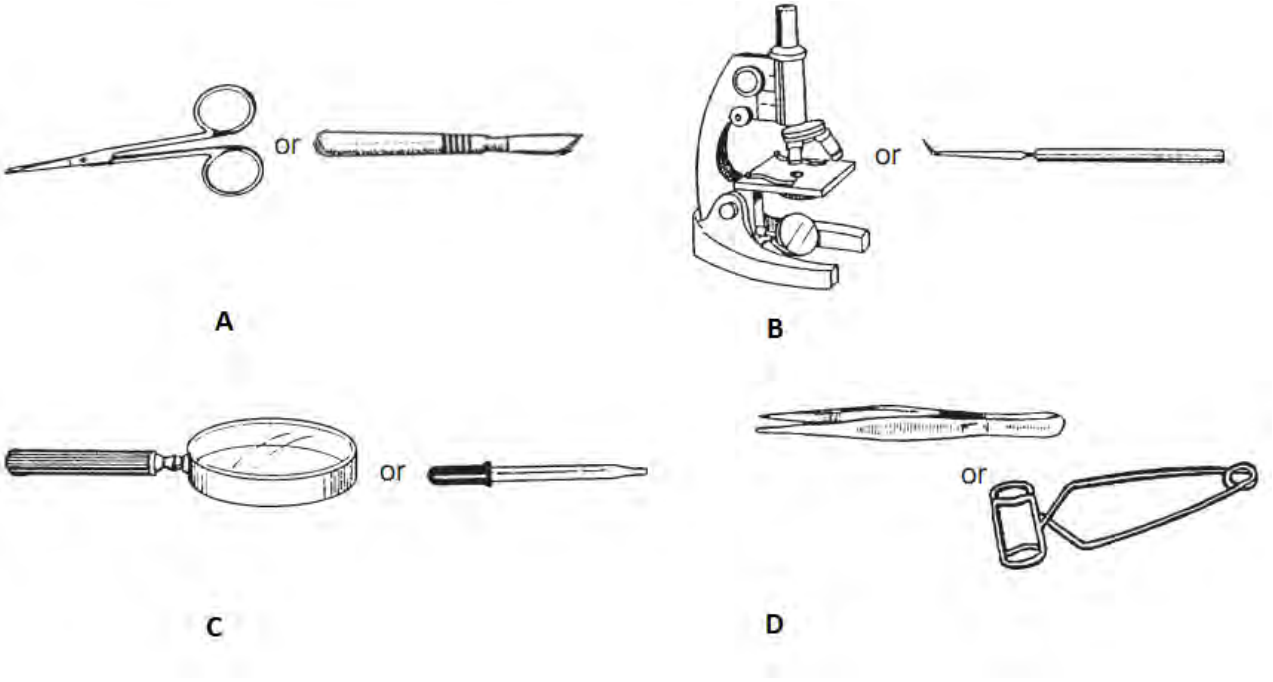
- Answer all questions
- All answers and working must be written on this paper in the spaces provided immediately after each question
- No extra paper is allowed. Rough work can be done on page 2. This will not be marked
- If you make a mistake, cross out the incorrect answer and clearly write your correct answer.

Use This Page for Rough Work, It Will Not Be Marked

SECTION A: MULTIPLE CHOICE QUESTIONS (10 MARKS)

Instructions for this section: For each question in this section, circle the correct answer

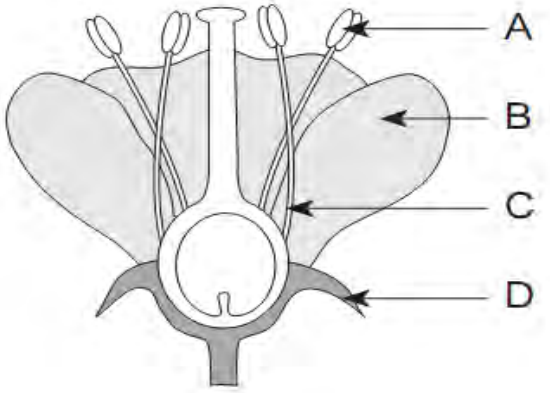
1. Which piece of laboratory equipment should a student use to remove the legs of a preserved grasshopper for further study?



2. White blood cells can release substances that kill invading micro-organisms. These substances are called

   A) allergies B) antibiotics C) antibodies D) allotropes

3. The diagram below shows parts of a flower.



In which structure does meiosis occur?

A

B

C

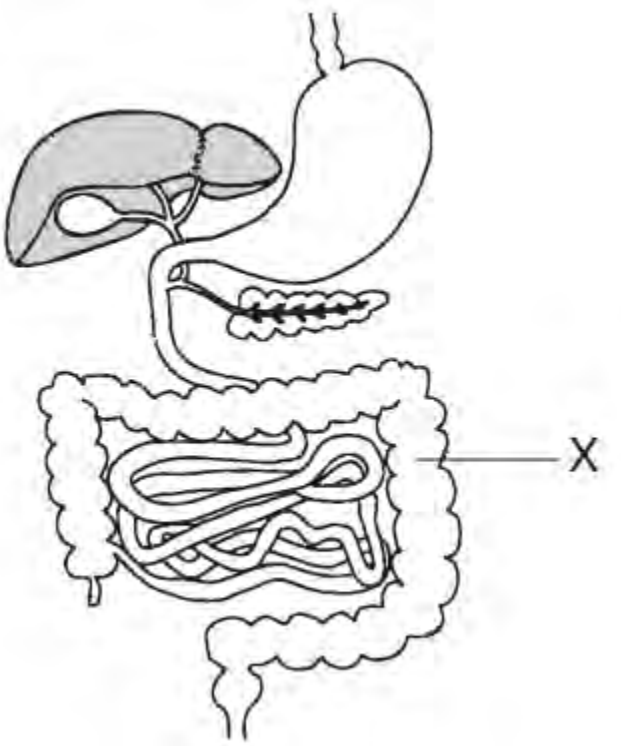
D

4. When you smell good food, your mouth waters. The type of nerve cells that carries the impulses to your salivary glands causing your mouth to water are called;

A) Sensory neurons B) Motor neurons

C) Dendrites D) Nerve endings

5. The diagram below represents a portion of the human body



The principal function of structure X is to

A) produce salivary enzymes

B) secrete sex hormones

C) absorb water

D) digest bile

6. The deficiency of vitamin B in the diet will result in

A) Beri beri B) Scurvy

C) Night blindness D) Weak bones

7. Genes make up chromosomes in the nuclei of cells. Which is the correct description of a gene?

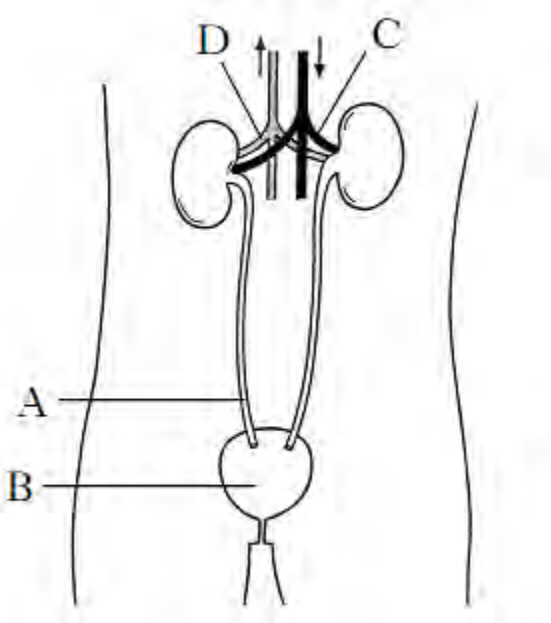
A) A section of a protein B) A section of an enzyme

C) A collection of enzymes D) A section of DNA

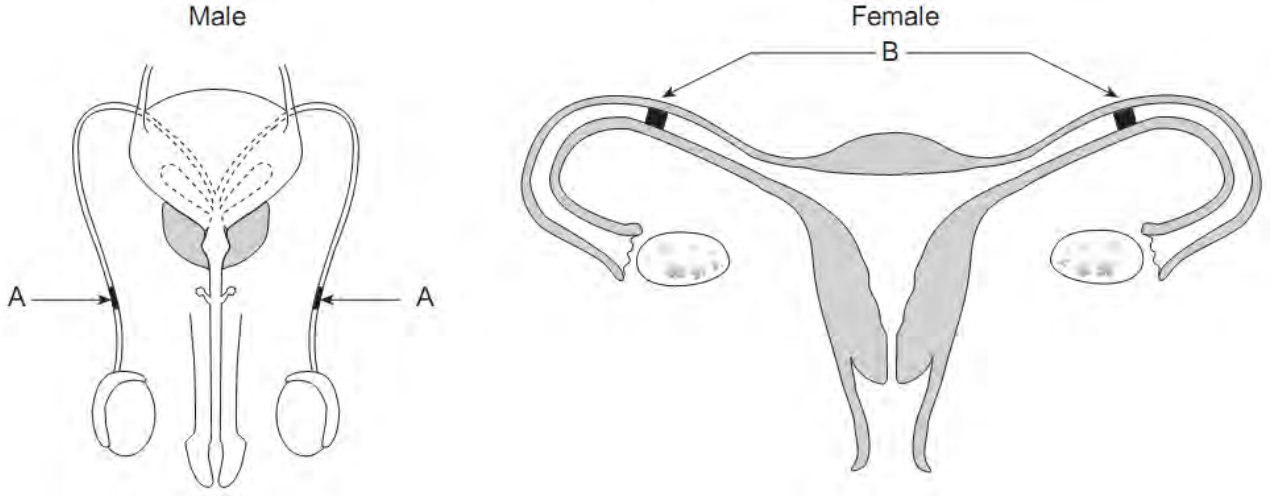
8. Which type of cell is not part of the nervous system?

A) sensor B) neurone C) effector D) muscle

9. The diagram below shows the human urinary system. Which labelled part is the ureter?



10. The diagrams below represent the reproductive systems in the human male and female.



The blockages shown at A and B would most likely interfere with the ability to

A) transport gametes

B) produce mature gametes

C) eliminate waste products through the urethra

D) express secondary sex characteristics

QUESTION ONE: REPRODUCTION IN PLANTS (8 Marks)

1.(a) The figure below shows a dicotyledonous flower in section.

Label on the figure using label lines

(i) a petal..... [1 mark]

(ii) a sepal ..... [1 mark]

(iii) a stamen ..... [1 mark]

(b) The table below shows one difference between insect-pollinated flowers and wind-pollinated flowers. Complete the table by listing three more differences. [3 marks]

insect- pollinated flowers	**wind pollinated flowers**
bright coloured petals	Green petals that are not obvious

(c) (i) State where pollination happens in a flower.

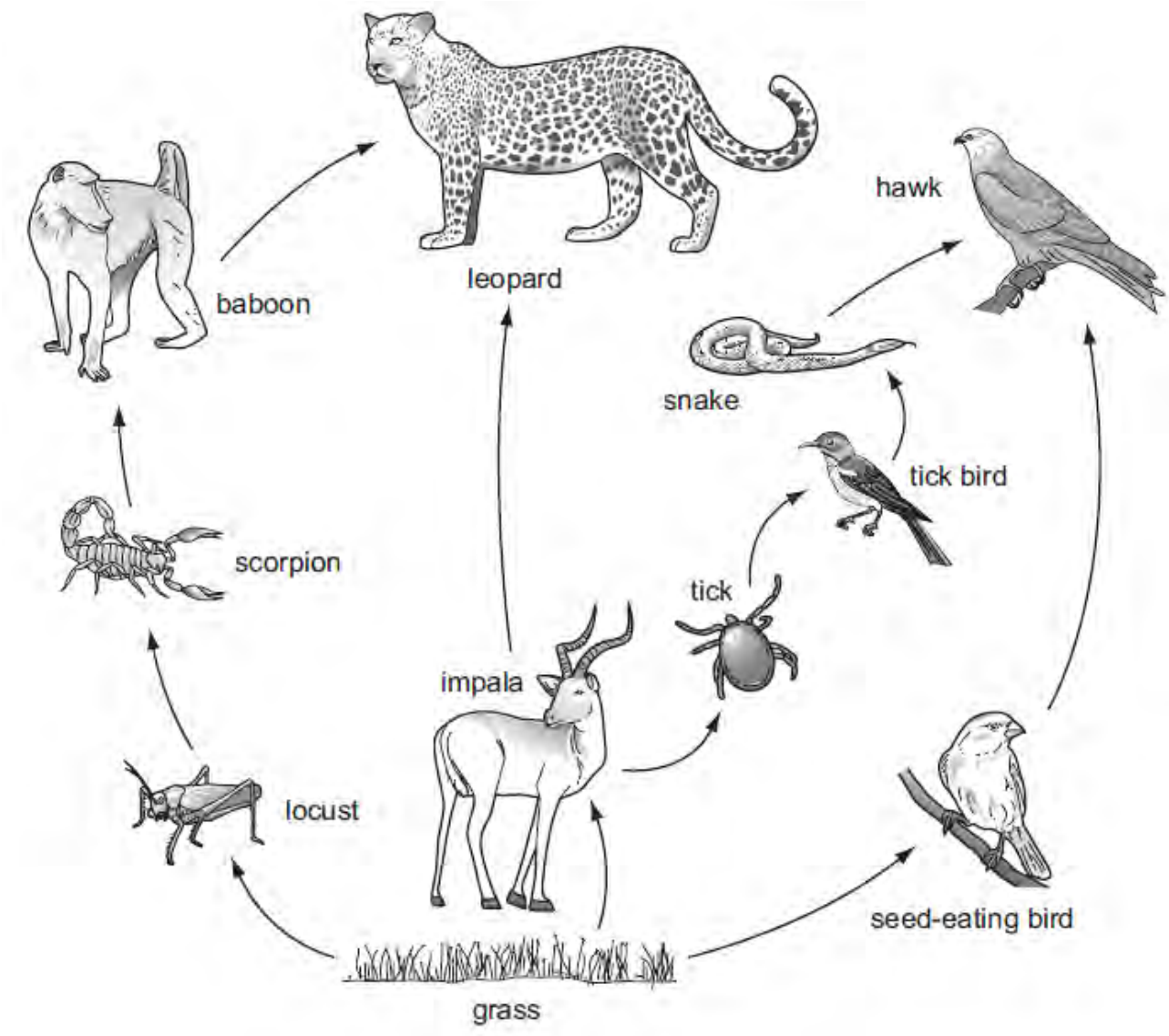
.....[1 mark]

(ii) State where fertilisation happens in a flower.

.....[1 mark]

QUESTION TWO: ECOLOGY (8 Marks)

2. The figure below shows a food web from the African grasslands.



(a) (i) Name an organism from this food web that is a

- primary consumer..... [1mark]
- tertiary (third level) consumer..... [1mark]
- producer..... [1mark]

(ii) Using information only from the above figure, complete the food chain.

..... → ..... → ..... → ..... → *leopard* [2*marks*]

(b) In a certain year a disease kills locusts. Predict and explain what could happen to the population of baboons when this occurs.

.....

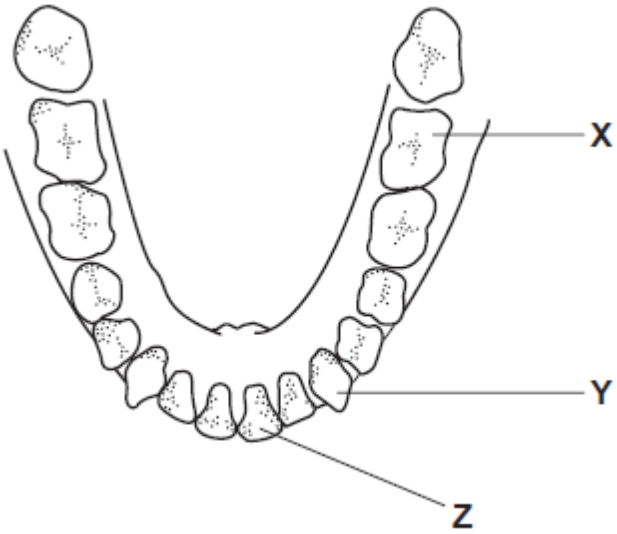
.....

.....

..... [3 marks]

QUESTION THREE: NUTRITION IN ANIMALS (13 Marks)

3. The figure shows the teeth in the lower jaw of an adult human.



(a) (i) Name the teeth labelled X, Y and Z.

- X.....
  .....
- Y.....
  .....
- Z.....
  .....

[3 marks]

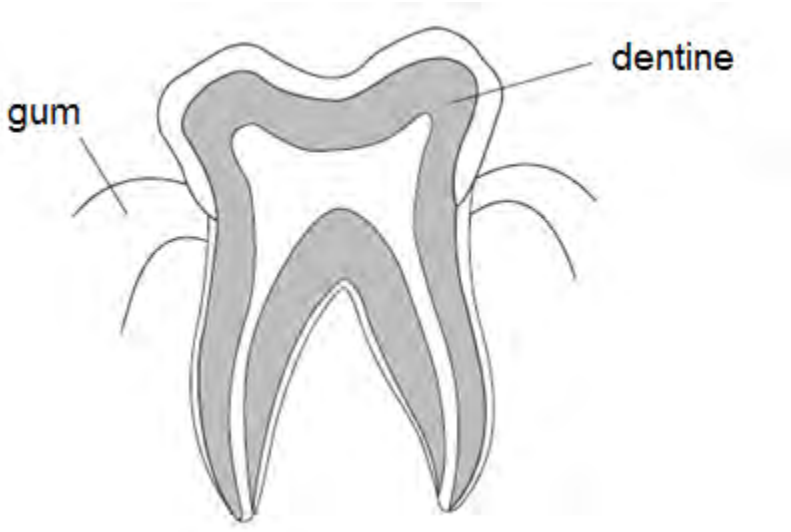
(ii) Describe the functions of teeth X and Z.

- X.....
- Z..... [2marks]

(b) Name one mineral and one vitamin that are essential for the healthy development of teeth.

- Mineral.....
- Vitamin..... [2 marks]

(c) The figure below shows a section through a tooth.



(i) Tooth decay is caused by bacteria getting into the dentine. Explain how bacteria can enter the dentine.

.....

.....

.....

.....[3 marks]

(ii) List three actions you could take to reduce the risk of tooth decay.

a) .....

b) .....

c) .....[3 marks]

QUESTION FOUR: GENETICS (9 Marks)

4 (a) Complete the following passage using **only** words from the list below.

diploid gametes haploid meiosis mitosis red blood cells

The transfer of inherited characteristics to new cells and new individuals depends on two types of cell division. During.... ....., the chromosomes are duplicated exactly and ..... cells are produced. However, during ....., the chromosome sets are first duplicated and then halved producing ..... cells. These cells will become ..... . [5 Marks]

(b) Using a labelled, genetic diagram, explain the inheritance of the sex of an individual. [4 marks]

QUESTION FIVE: NUTRITION IN PLANTS (10 Marks)

5. Photosynthesis is the process that produces food in green plants.

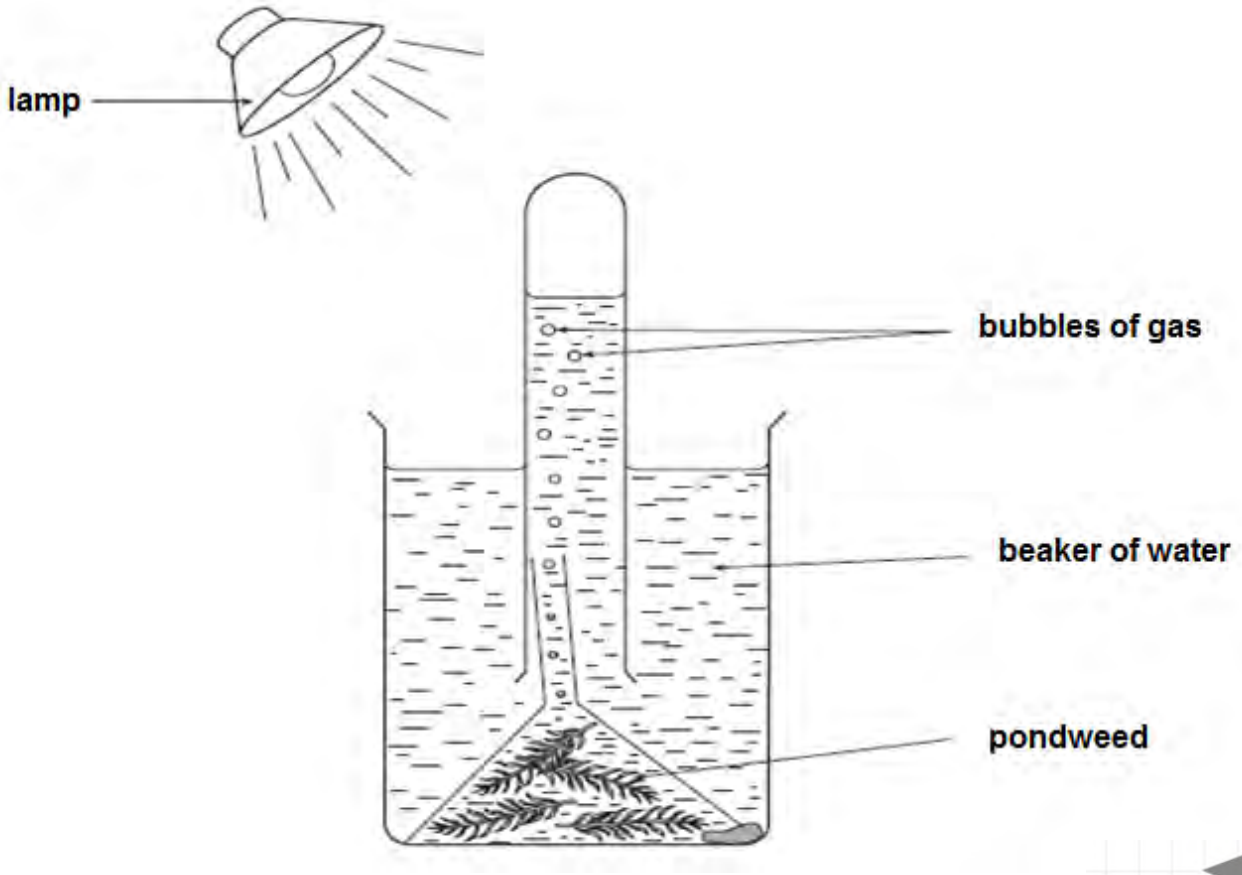
(a) Complete the word equation for photosynthesis. [2 marks]

Carbon dioxide + ... → *Glucose* + ...

(b) In which part of a plant cell does photosynthesis occur? [1 mark]

.....

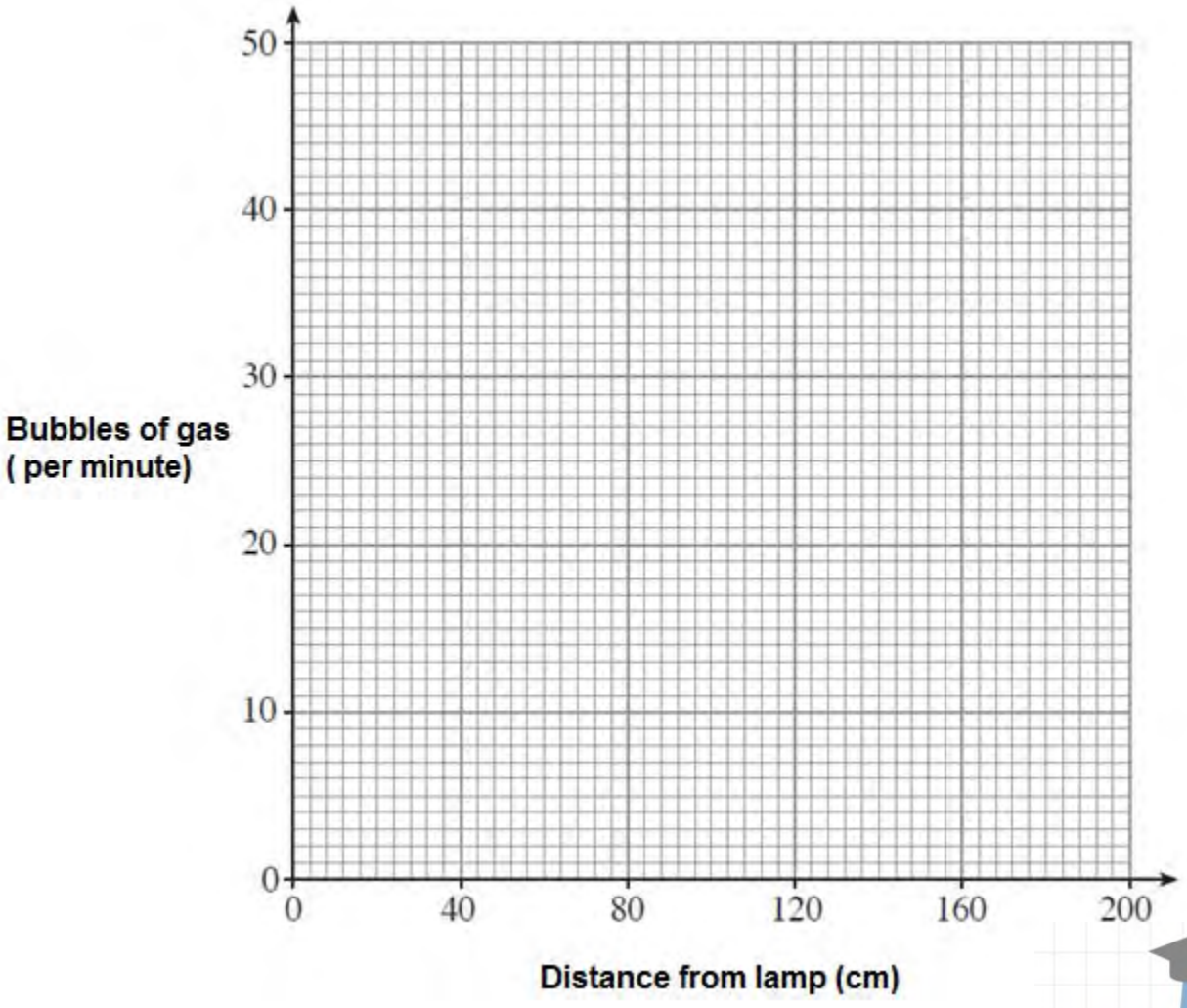
(c) Plants need light to carry out photosynthesis. The diagram below shows an experiment to investigate the effect of light intensity on the rate of photosynthesis. The number of bubbles produced in one minute was counted. The experiment was repeated with the lamp at different distances from the pondweed and the results shown in the table.



Distance from lamp to beaker (cm)	Bubbles of gas per minute
40	49
80	46
120	32
160	12
200	12

(i) Plot a line graph of the results. [2 marks]

Join the plots with a ruler. [1 marks]



(ii) What would be the rate of photosynthesis if the lamp was 100 cm away from the pondweed?

..... bubbles per minute. [1mark]

(iii) Using information from the table and the graph, describe the effect of light intensity on the rate of photosynthesis. [2 marks]

.....

.....

.....

.....

.....

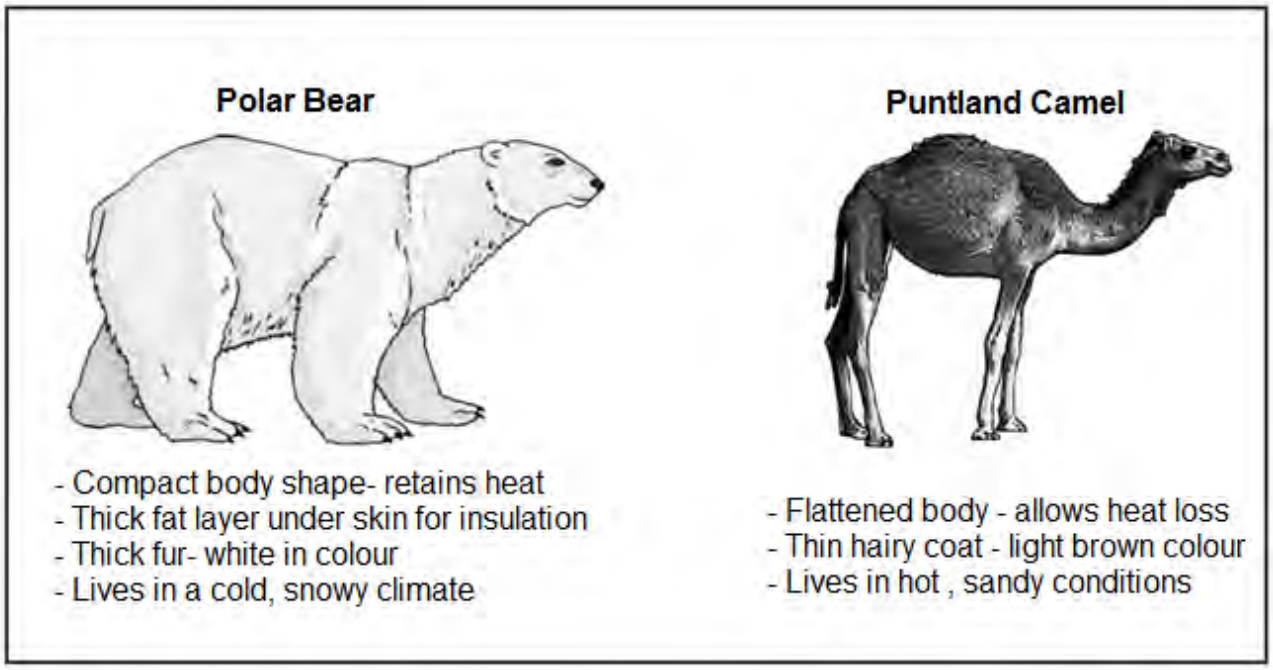
(d) State **one** *other* factor that affects the rate of photosynthesis. [1 mark]

.....

.....

QUESTION SIX : HOMEOSTASIS (6 Marks)

4. The diagrams show two animals from different environments. Study the information and answer the questions which follow.



(a) (i) List **three** ways in which the polar bear keeps warm. [3 marks]

1.....

2.....

3.....

(ii) How does the body shape of the camel help it to survive? [1 marks]

.....

.....

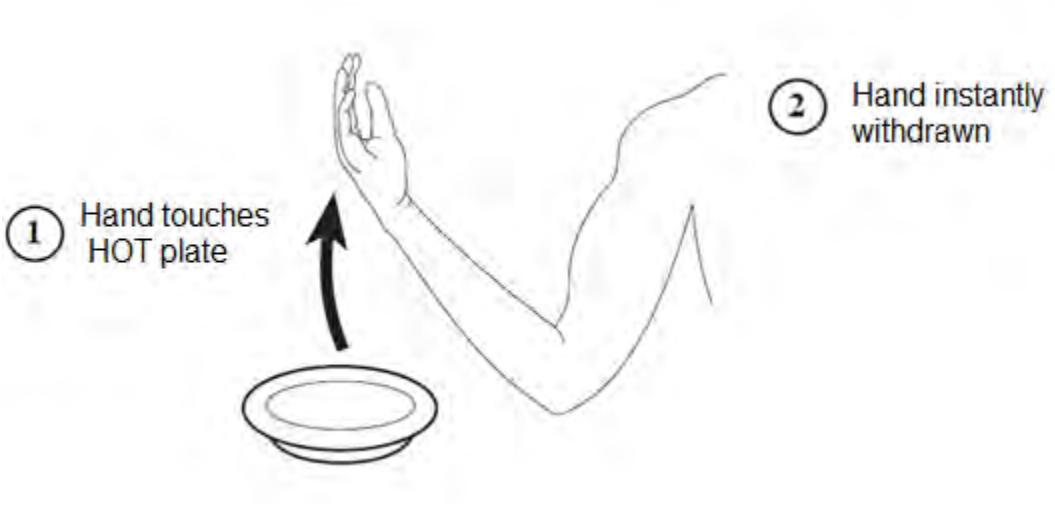
.....

(a) Some features are seen in both animals. Complete the table. [2 marks]

Feature	How this helps survival
Large flat feet	
Body colour matches environment	

QUESTION SEVEN : IRRITABILITY (6 Marks)

8.The diagram shows an example of a nervous response.



(a) Name this type of response [1 mark]

.....

(b) What is the purpose of this type of response? [2 marks]

.....

.....

.....

(c) Complete the sentences below using some of the words in the list. [3 marks]

rapid, automatically, nervous, deliberately

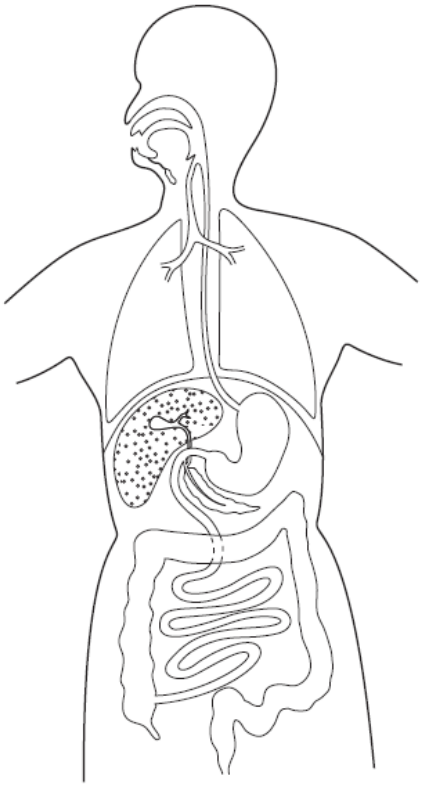
These responses of the .....system are very ..... They happen ....., without thought.

QUESTION EIGHT: (12 Marks)

9 (a) Using a single line in each case, link each definition to the correct process. [3 marks]

Definition	Process
Getting rid of fibre (roughage) from an animal	Digestion
Large food molecules broken down into simple substances	Egestion
	Excretion
Taking in food into an animal's alimentary canal	Ingestion

(b) The figure below shows the alimentary canal and associated organs.



On the figure, label the sites of each of the following processes.

(i) absorption of water [1mark]

(ii) bile production [1mark]

(iii) digestion of proteins [1mark]

(iv) pancreatic juice production [1mark]

(c) Complete the following sentences using some of the chemicals listed below. [3 marks]

fatty acids, amino acids, glucose, salts.

Proteins are broken down into .....

Carbohydrates are broken down into .....

Fats are broken down into..... and glycerol.

(d) (i) Name the process by which foods are broken down. [1 mark]

.....

.....

(ii) State why this process is necessary. [1 mark]

.....

.....

QUESTION NINE: CHEMICALS OF LIFE (8 Marks)

10. *(a)* Complete the following sentences using some of the words in the list: [4 marks]

protein, increase, decrease, chemical, temperature.

Enzymes are made of.....

They..... the rate of .....

reactions in living cells. Each works best at a particular.....

and pH value.

(b) i) What happens to enzymes at 100°C? [1 mark]

.....

.....

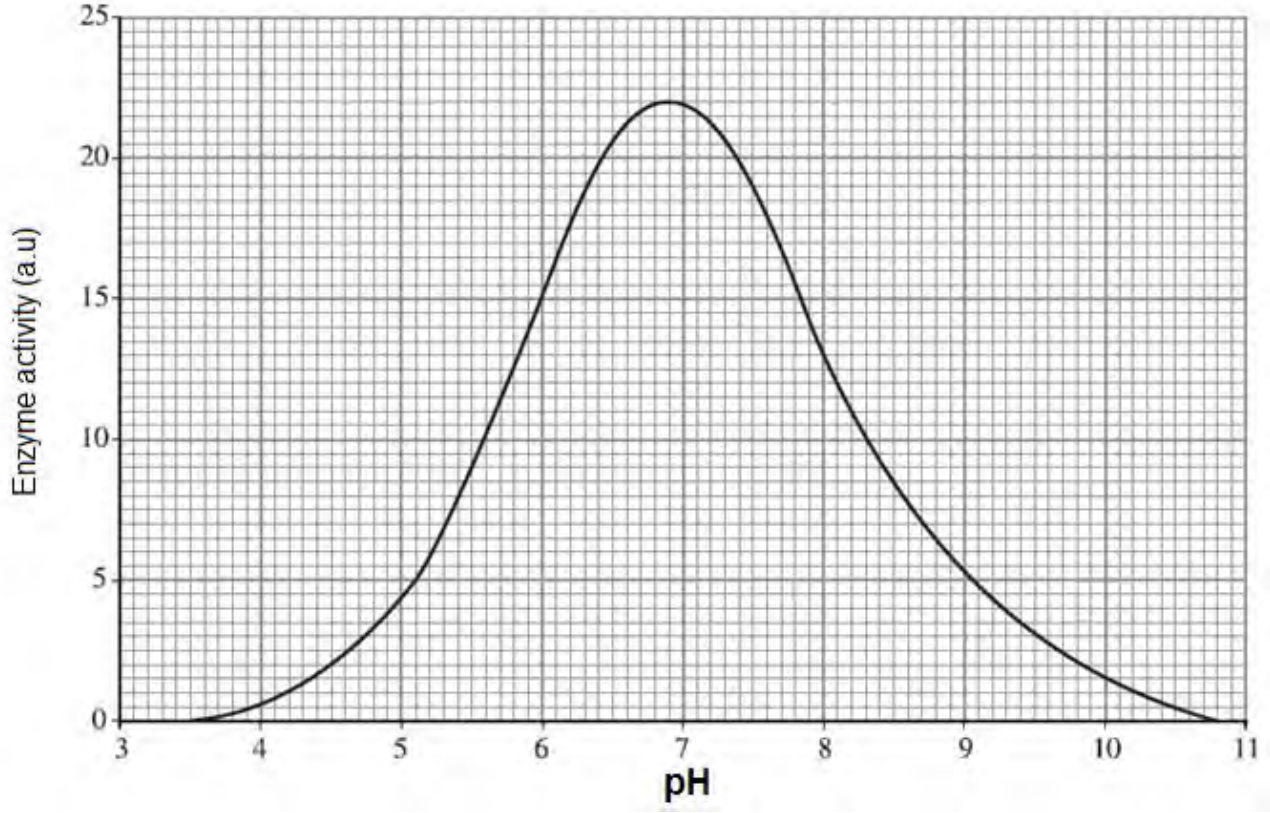
ii) What happens to enzymes at 15^0C?

.....

.....

[1 mark]

c) The graph shows the activity of an enzyme at different pH values.



From the graph:

(i) At which pH value does this enzyme work best? [1 mark]

.....

.....

(ii) Give the activity of the enzyme at pH 5.5. [1 mark]

.....

.....

END