2.1 BIOLOGY (231)

2.1.1 Biology Paper 1 (231/1)

1 Name **two** kidney diseases. (2 marks)

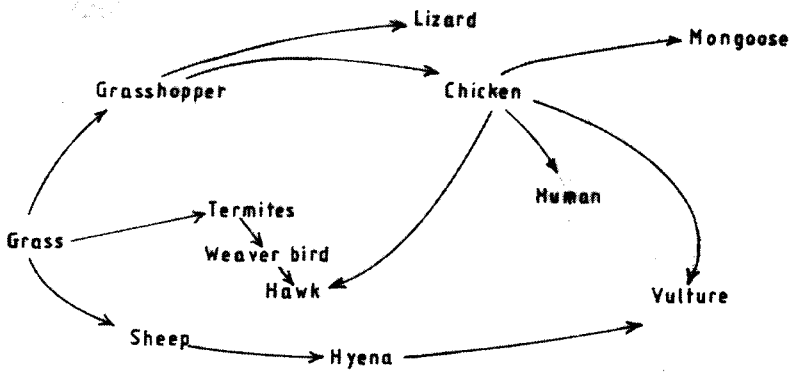
2 (a) Write the dental formula of an adult human. (1 mark)

(b) Name **two** dental diseases. (2 marks)

3 Give **three** reasons for classifying organisms. (3 marks)

4 State **one** use for each of the following apparatus in the study of living organisms.
(a) Pooter. (1 mark)

5 The figure below illustrates a food web in a certain ecosystem.



From the food web:

(a) draw the shortest food chain; (1 mark)
(b) identify the organisms with the highest

(i) number of predators; (1 mark)

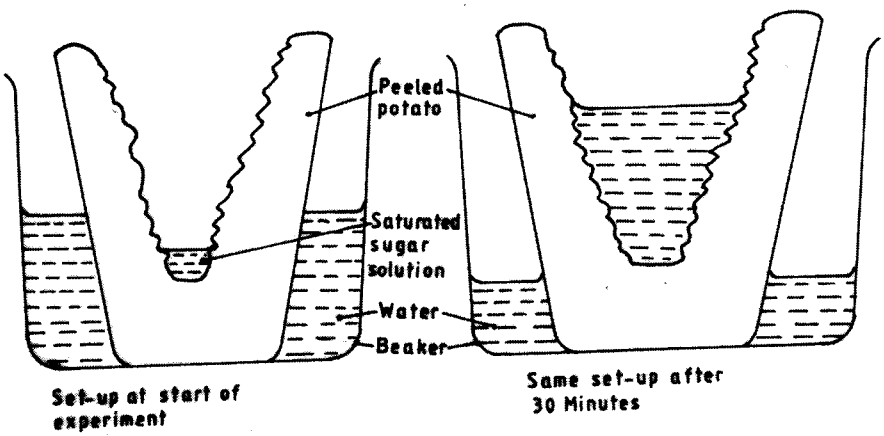
(ii) biomass. (1 mark)

6 What is meant by the following terms?

(a) Ecology. (1 mark)

(b) Carrying capacity. (1 mark)

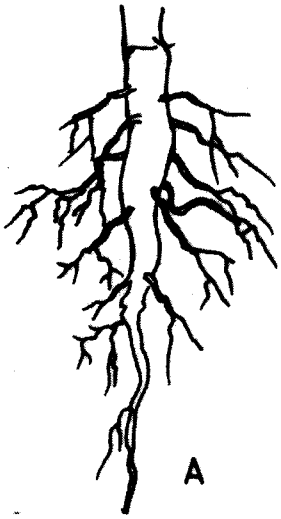
7 The diagrams below show an experimental set-up to investigate a certain process in a plant tissue.

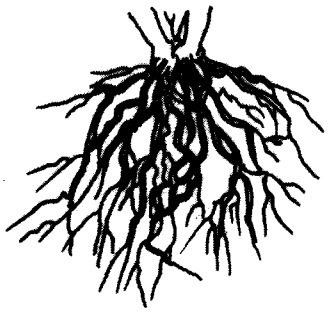


Explain the results obtained after 30 minutes. (4 marks)

8 State **three** characteristics of the class crustacea. (3 marks)

9 The diagrams below illustrate the organs of some flowering plants.





State the classes of plants to which each belong. (2 marks)

A .....

B .....

10 (a) Give **two** differences in the products of anaerobic respiration between plants and animals. (2 marks)

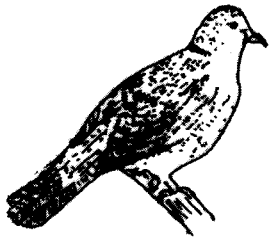
(b) Name the site of anaerobic respiration in a cell. (1 mark)

11 State the functions of the following parts of a light microscope.

Fine adjustment knob.

Stage. (2 marks)

12 The diagram below represents a certain organism.



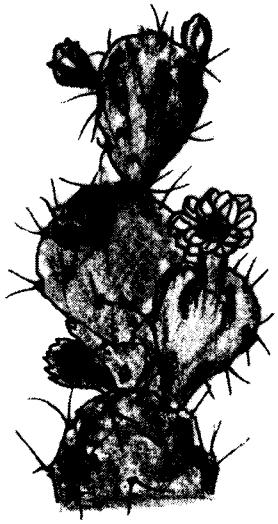
State the phylum and class to which it belongs. (2 marks)

Phylum .....

Class .....

13 State **two** functions of carbohydrates in the human body. (2 marks)

14 The diagram below represents a certain plant.



(a) What is the likely habitat for the plant? (1 mark)

(b) Give **two** reasons for your answer in (a) above. (2 marks)

15 Give reasons for carrying out the following procedures when preparing temporary wet mounts of plant tissues.

(a) Making thin plant sections. (1 mark)

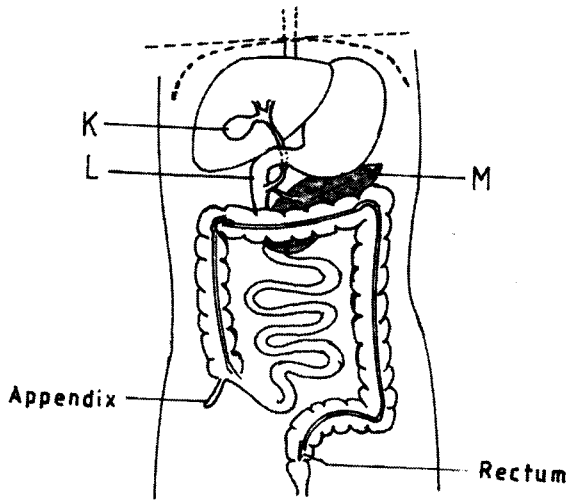
(b) Adding water on the plant section. (1 mark)

(c) Placing a cover slip over the plant section. (1 mark)

16 (a) Describe the condition known as varicose veins. (2 marks)

(b) What is the role of blood platelets in the blood clotting process? (2 marks)

17 The diagram below represents part of the human digestive system.



(a) Name the organs labelled L and M. (2 marks)

L .....

M .....

(b) (i) Name the substance produced by the organ labelled K. (1 mark)

.....

(ii) State the function of the substance named in b(i) above. (1 mark)

18 (a) Name **one** salivary gland in humans. (1 mark)

(b) State **two** functions of saliva. (2 marks)

19 (a) Apart from the lungs, name **two** gaseous exchange surfaces in a frog. (2 marks)

(b) Write an equation that summarises the process of aerobic respiration. (1 mark)

20 The number of stomata on the lower and upper surfaces of two leaves from plant species **X** and **Y** were counted under the field of view of a light microscope. The results were as shown in the table below.

Leaf	Number of stomata	
	Upper surface	Lower surface
X	4	12
Y	20	23

(a) Which of the two leaves would be expected to have a lower rate of transpiration? (1 mark)

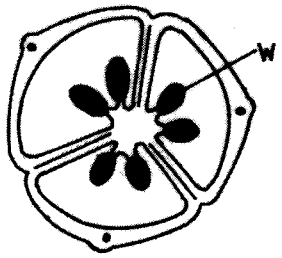
(b) Give a reason for your answer in (a) above. (1 mark)

21 (a) What is meant by convergent evolution? (1 mark)

(b) State **two** limitations of fossils as an evidence of evolution. (2 marks)

22 State the difference in content of oxygen and carbon (IV) oxide in the air that enters and leaves the human lungs. (2 marks)

23 The diagram below represents a transverse section of an ovary from a certain flower.



(a) (i) Name the structure labelled W. (1 mark)

(ii) Name the type of placentation illustrated in this diagram. (1 mark)

.....

(b) Give an example of a plant whose flowers have the type of placentation named in (a)(ii) above. (1 mark)

24 (a) Differentiate between the following terms:

(i) dominant gene and recessive gene; (1 mark)

(ii) continuous variation and discontinuous variation. (1 mark)

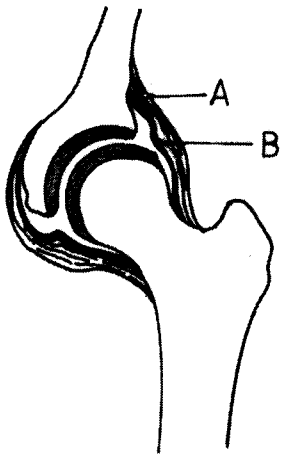
(b) What would be the expected results from a test cross? (2 marks)

25 State **one** economic importance of each of the following plant excretory products. (3 marks)

(a) Tannin.
(b) Quinine.
(c) Caffeine.

26 Name the gamete cells that are produced by the ovaries. (1 mark)

27 The diagram below represents features of a joint in a mammal.



(a) Name the part labelled A. (1 mark)

(b) State the function of the part labelled B. (1 mark)

28 (a) What is a tropic response? (1 mark)

(b) State **two** ways by which auxins regulate growth in seedlings. (2 marks)

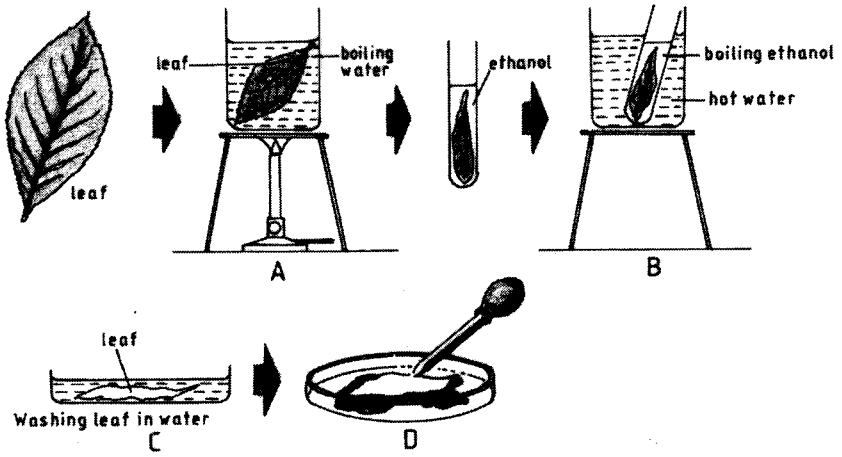
29 State **four** reasons why water is significant in seed germination. (4 marks)

2.1.2 Biology Paper 2 (231/2)

SECTION A (40 marks)

*Answer **all** the questions in this section in the spaces provided.*

1 The set-up below illustrates a procedure that was carried out in the laboratory with a leaf plucked from a green plant that had been growing in sunlight.



(i) What was the purpose of the above procedure? (1 mark)

.....

(ii) Give reasons for carrying out steps A, B and C in this procedure. (3 marks)

A.....

.....

B.....

.....

C.....

.....

(iii) Name the reagent that was used at the step labelled D. (1 mark)

.....

.....

(iv) State the expected result on the leaf after adding the reagent named in (iii) above. (1 mark)

.....

2 In humans, hairy ears is controlled by a gene on the Y Chromosome.

(a) Using letter Y^H to represent the chromosome carrying the gene for hairy ears, work out a cross between a hairy eared man and his wife. (4 marks)

(b) (i) What is the probability of the girls having hairy ears? (1 mark)

(ii) Give a reason for your answer in (b(i) above. (1 mark)

(c) Name **two** disorders in humans that are determined by sex-linked genes. (2 marks)

(d) Explain how comparative embryology is an evidence for organic evolution. (2 marks)

3. (a) Name the causative agents for the following respiratory diseases. (2 marks)

(i) Whooping cough.

.....

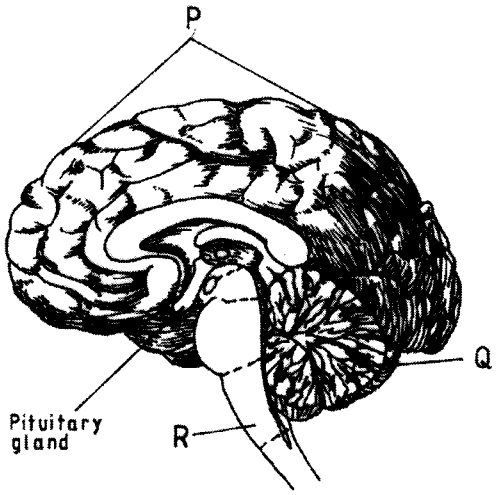
(ii) Pneumonia.

.....

(b) Describe how oxygen in the alveolus reaches the red blood cells. (4 marks)

(c) How are the pneumatophores adapted to their function? (2 marks)

4 (a) The diagram below represents a section of the human brain.



(i) Name the structures labelled P and R. (2 marks)

P .....

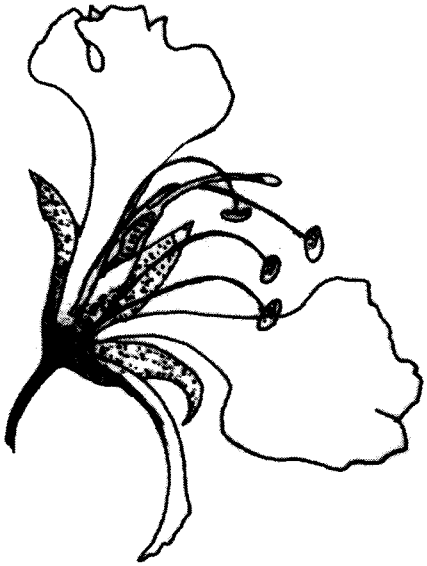
R .....

(ii) State **two** functions of the part labelled Q. (2 marks)

(b) (i) Name **two** reproductive hormones secreted by the pituitary gland in women. (2 mark

(ii) State **one** function of each of the hormones named in (b)(i) above. (2 mark

5 (a) The diagram below represents a flower.

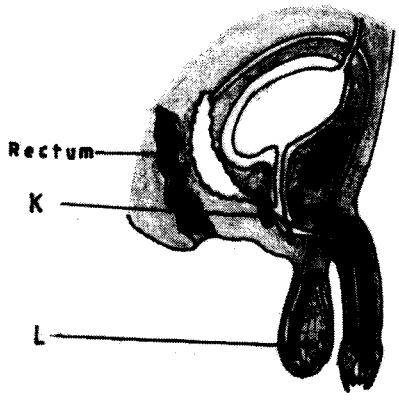


(i) On the diagram, name **two** structures where meiosis occurs. (2 marks)

(ii) How is the flower adapted to prevent self-pollination? (2 marks)

(ii) How is the flower adapted to prevent self-pollination? (2 marks)

(b) The diagram below represents a human reproductive organ.



(i) Explain **two** adaptations of the structure labelled **L** to its functions. (2 marks)

(ii) Explain the role of the gland labelled **K**. (2 marks)

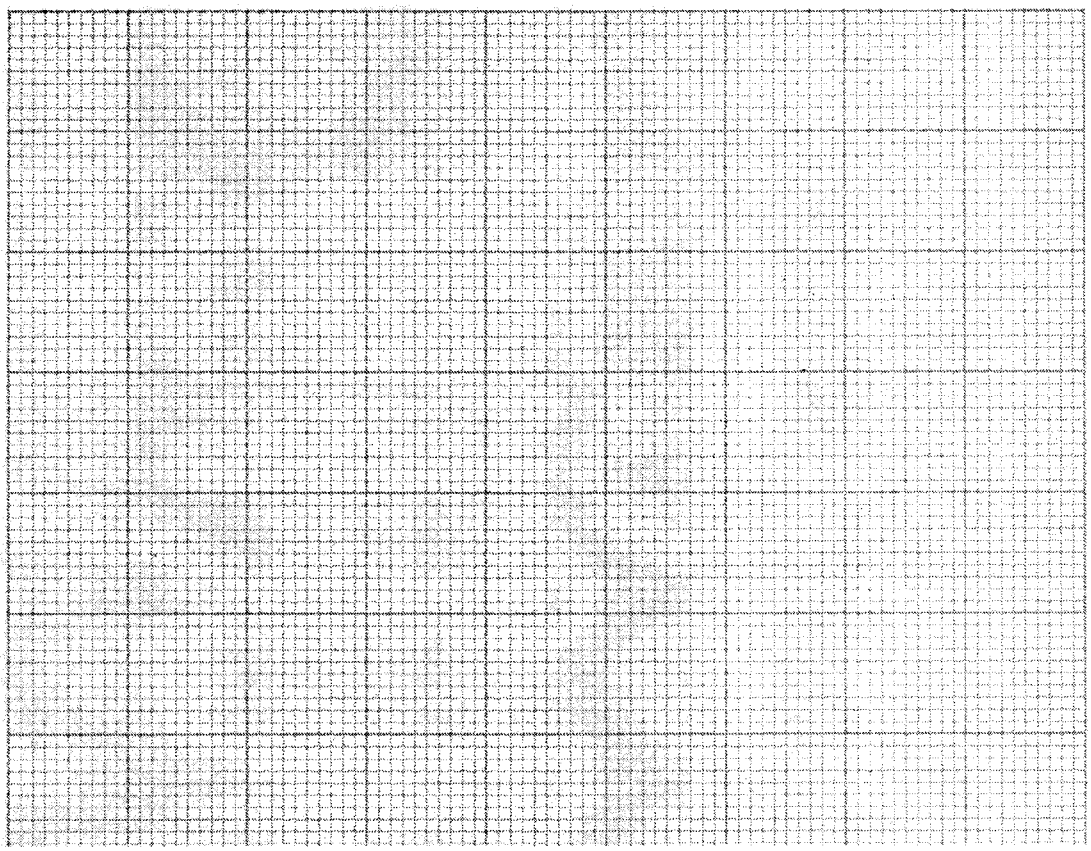
SECTION B (40 marks)

*Answer question **6** (**compulsory**) and either question **7** or **8** in the spaces provided after question 8.*

6 (a) An experiment was carried out to investigate the population of a certain micro-organism. Two petri-dishes were used. Into the petri-dish labelled M, $60cm^3$ of a culture medium was placed while $30cm^3$ of the same culture medium was placed in petri-dish labelled N. Equal numbers of the micro-organisms were introduced in both petri-dishes. The set-ups were then incubated at 35°C. The number of micro-organisms in each petri-dish was determined at irregular intervals for a period of 60 hours. The results were as shown in the table below.

Relative number of micro-organisms	M	40	40	180	280	1200	1720	1600	1840	1560	600
	N	40	40	120	200	680	560	560	600	600	400
Time in hours		0	5	10	15	23	30	35	42	45	60

(i) On the same axes, draw the graphs of relative number of micro-organisms against time on the grid provided. (7 marks)



(ii) After how many hours was the difference between the two populations greatest? (1 mark)

(iii) Work out the difference between the two populations at 50 hours. (2 marks)

(iv) With a reason state the effect on the population of micro-organisms in petri-dish M if the temperature was raised to 60°C after 20 hours. (2 marks)

(v) Account for the shape of the curve for population in petri-dish N between 46 hours and 59 hours. (3 marks)

(b) Explain how the osmotic pressure in the human blood is maintained at normal level. (5 marks)

7 (a) Explain how structural features in terrestrial plants affect their rate of transpiration. (13 marks)

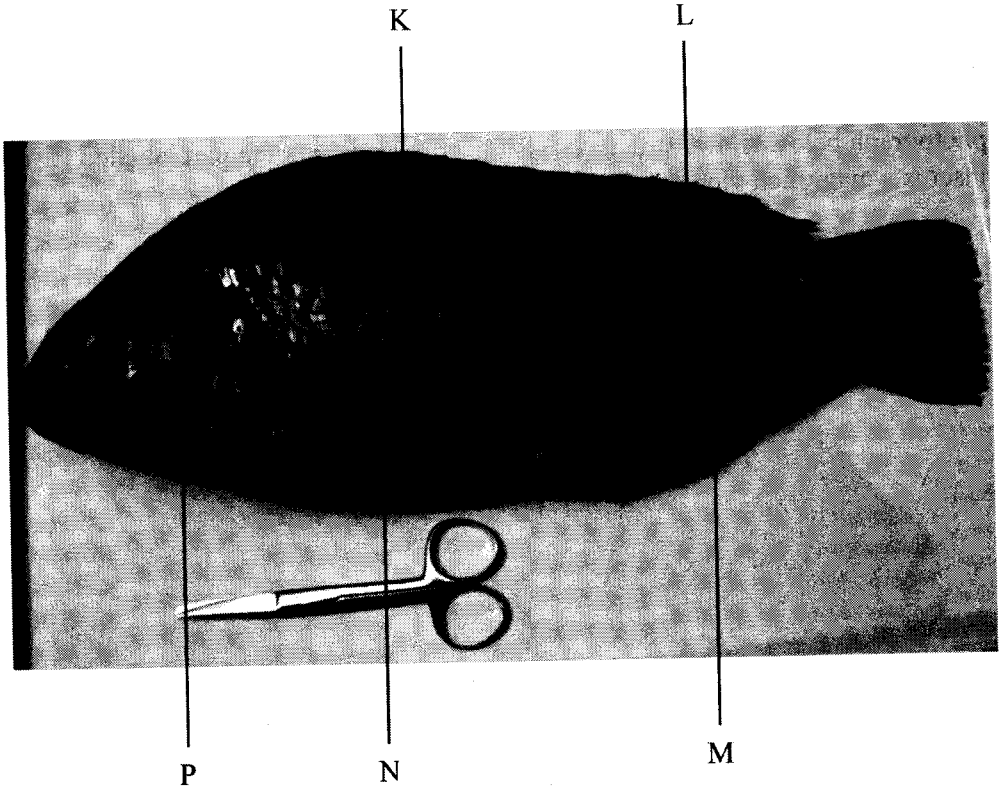
(b) Explain how the human skin brings about cooling of the body on a hot day. (7 marks)

8 (a) Describe the exoskeleton and its functions in insects. (13 marks)

(b) Describe how accommodation in the human eye is brought about when focusing on a near object. (7 marks)

2.1.3 Biology Paper 3 (231/3)

1 Below is a photograph of a fish. Examine it and answer the questions that follow.



(a) Name the parts labelled K, L , M and N. (4 marks)

K .....

L .....

M .....

N .....

(b) The actual length of the pair of scissors next to the fish is 12.5cm. Using this information, calculate the actual length of the fish. (3 marks)

(c) Name the fins that prevent the following movements of fish during swimming. (3 marks)

(i) Yawing: .....

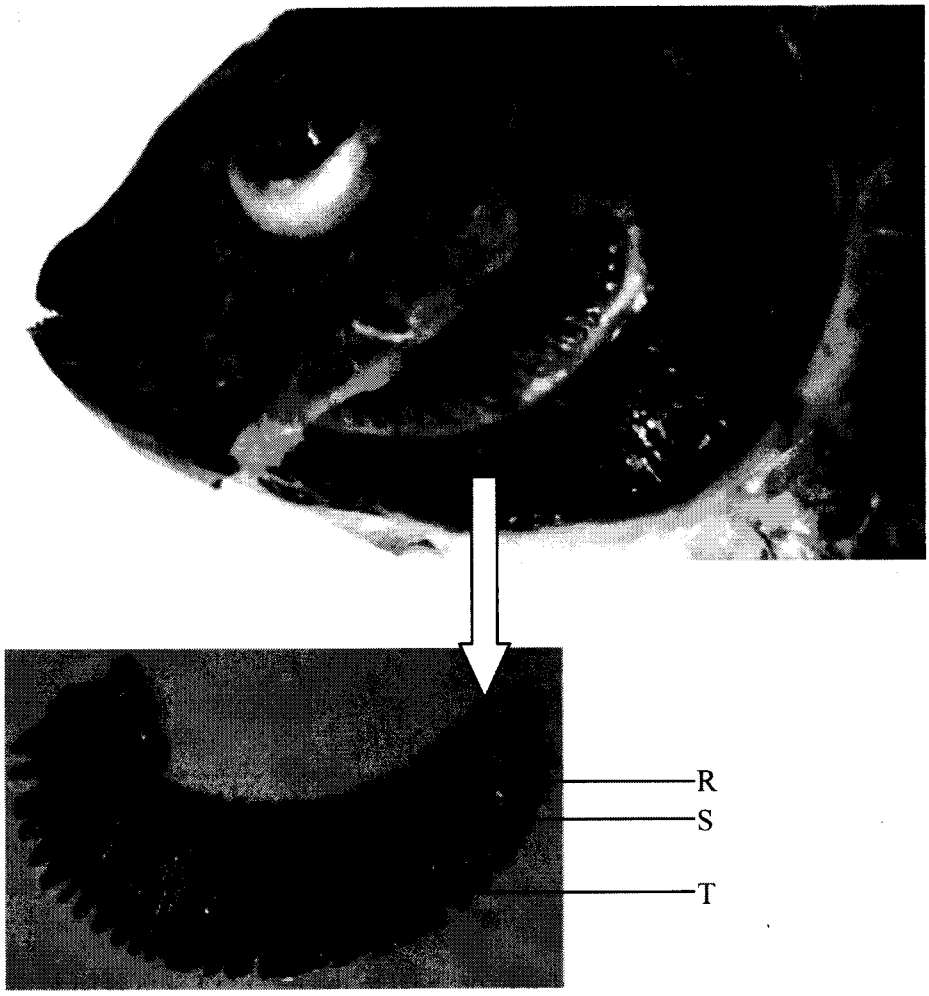
(ii) Pitching: ..... and .....

(c) Name the fins that prevent the following movements of fish during swimming. (3 marks)

(i) Yawing: .....

(ii) Pitching: ..... and .....

(d) The photograph below shows structures visible after removing the part labelled P. The inset is a magnified view of one of the structures.



(i) Name the parts labelled R, S and T. (3 marks)

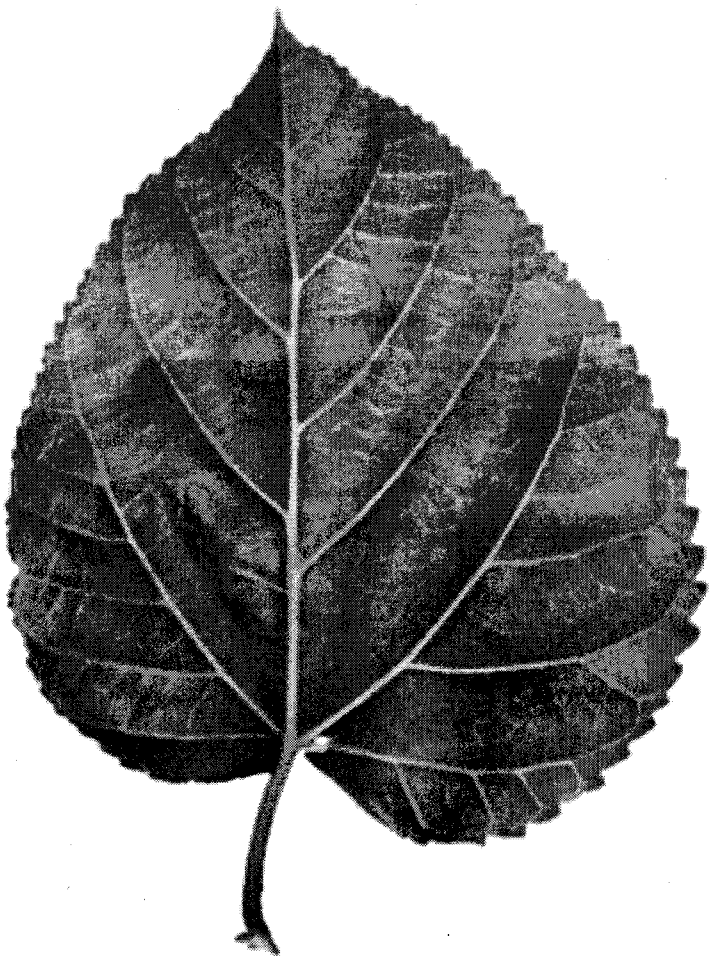
R .....

S .....

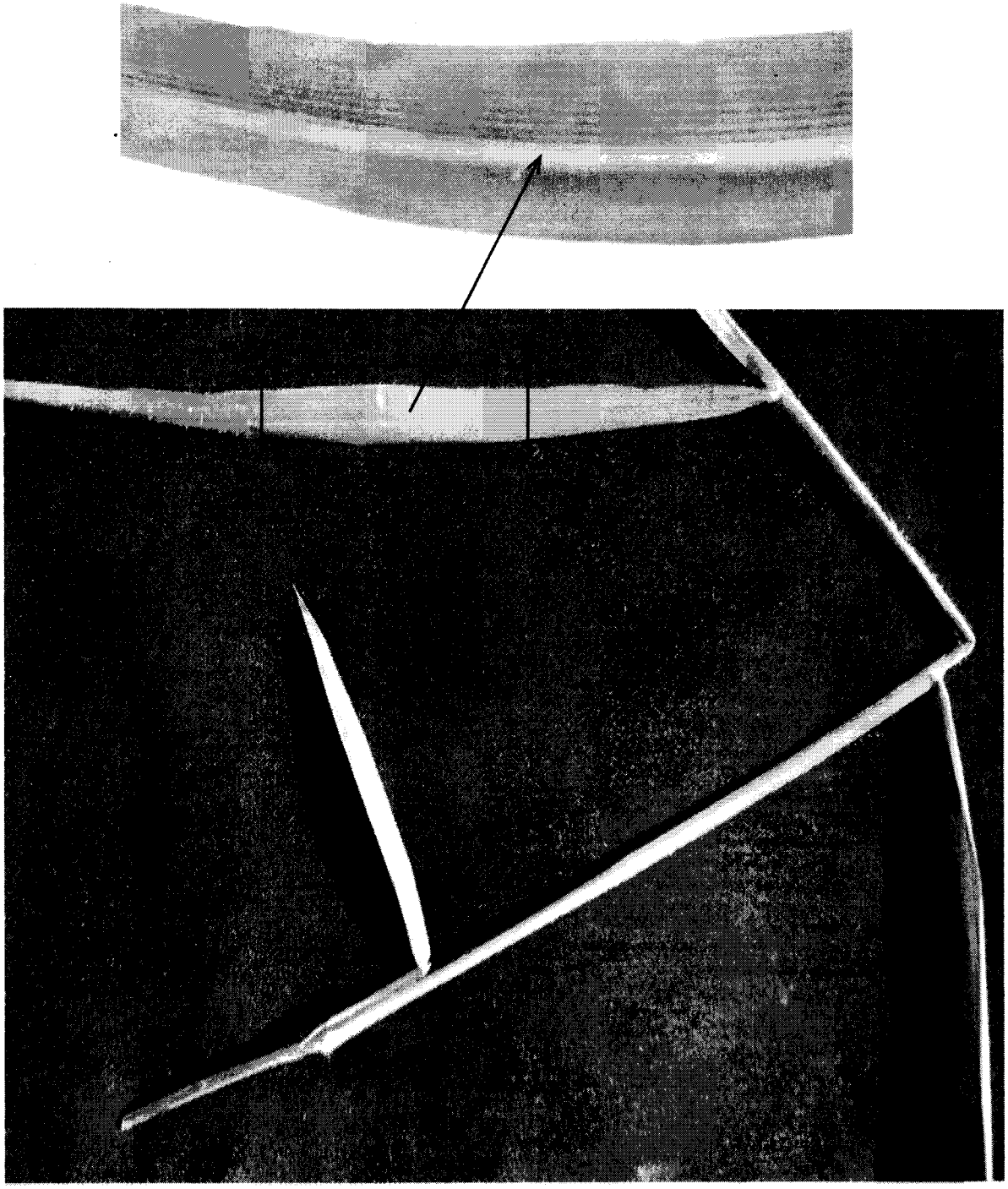
T .....

(ii) Explain how each of the parts named in (d) (i) above is adapted to its function. (3 marks)

2 The photographs labelled D and E show two types of leaves.



PHOTOGRAPH D



PHOTOGRAPH E

(a) With a reason, state the classes of plants from which the leaves in Photographs D and E were obtained. (4 marks)

Photograph D .....

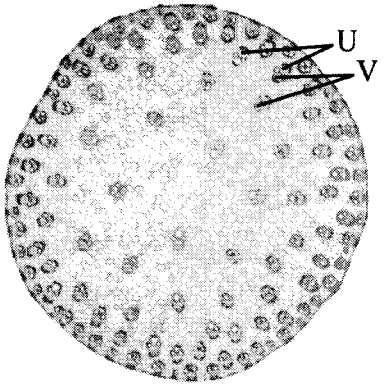
Reason .....

Photograph E .....

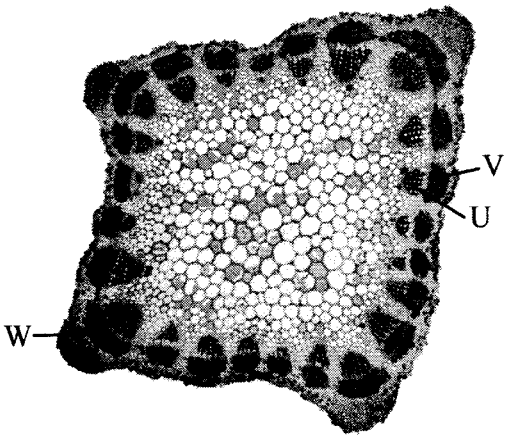
Reason .....

(b) State **three** features in the leaf shown in photograph D that adapt it to its functions. (3 marks)

(c) The photographs below show the structures observed in cross sections of parts of two types of plants as seen under a light microscope.



PHOTOGRAPH F



PHOTOGRAPH G

(i) Name the parts labelled U, V and W. (3 marks)

U .....

V .....

W .....

(ii) Identify **five** differences between cross sections F and G and record them in the table below. (5 marks)

Cross Section F	Cross Section G
.....	.....
.....	.....
.....	.....
.....	.....
.....	.....

3 You are provided with a sample of food labelled **X** in solution form, solution **J** (Iodine solution), solution **K** (Benedict's solution) and solution **L** (Biuret's reagent). Carry out tests on the food sample to identify the type of food substances present. (9 marks

Food being tested for	Procedure	Observations	Conclusion