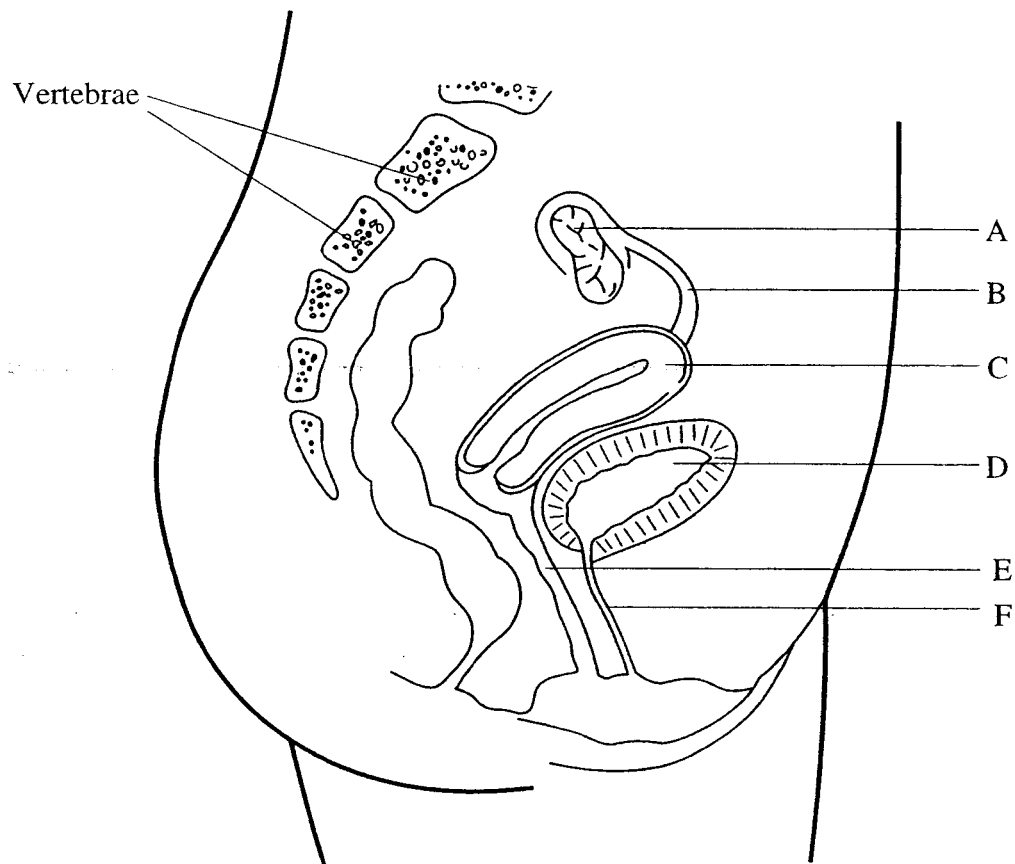


1. The diagram below shows the human female reproductive system and related organs.

Leave blank



- (a) The table below refers to structures shown in the diagram. Complete the table by writing the correct letter, name of structure, or function in the empty boxes.

Letter	Name of structure	One function
		Stores urine
	Vagina	
C		
B		

(8)

(b) Describe how the role of F in the male differs from its role in the female.

*Leave
blank*

.....

.....

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(2)

(c) Give **two** ways that the gametes produced by a human female differ from those produced by a male.

1

.....

2

.....

(2)

Q1

(Total 12 marks)

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2. The table below shows the relationship between body mass and oxygen consumption in a range of mammals. The volume of oxygen is in dm^3 (litres) per kg per hour.

Leave
blank

Mammal	Mass in kg	Oxygen consumption in dm^3 per kg per hour
Shrew	0.005	7.4
Harvest mouse	0.009	2.5
Kangaroo mouse	0.015	1.8
Rat	0.29	0.87
Cat	2.5	0.68
Dog	11.7	0.33
Sheep	42.7	0.22
Human	70.0	0.21
Horse	650.0	0.11
Elephant	3833.0	0.07

Adapted from Schmidt-Neilson. 1980

- (a) Name the process in which animals use oxygen.

.....
(1)

- (b) (i) Using the data in the table, describe the relationship between body mass and oxygen consumption.

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

- (ii) A mammal loses heat from the surface of its body. Suggest why the oxygen consumption of smaller mammals (per kg body mass) differs from that of larger mammals.

.....
.....
.....
(3)

- (c) The largest known insect (the Goliath beetle) has a body mass of about 0.1 kg. Describe **one** feature of insects that might limit their size.

*Leave
blank*

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(2)

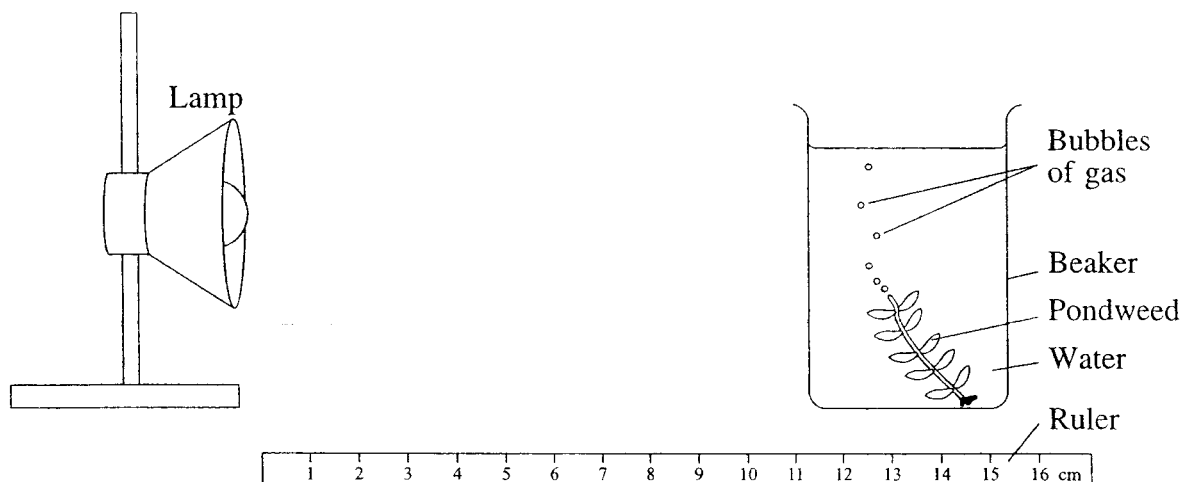
Q2

(Total 8 marks)

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3. A student carried out an investigation into the effect of light intensity on the rate of photosynthesis in an aquatic plant. The diagram below shows the apparatus used.

Leave blank



The student placed the beaker at different distances from the light and, at each position, counted the number of bubbles given off by the plant in one minute. The results are shown in the table below.

Distance from the light in cm	5	6	7	8	9	10	11	12
Number of bubbles released per min	30	27	21	18	13	9	No result	3

- (a) (i) Plot a graph of these results on the grid opposite. Join the points with straight lines.

(4)

- (ii) Describe the relationship between light intensity and the rate of photosynthesis.

.....

(1)

- (iii) At 11 cm, no result was recorded. From your graph estimate the expected number of bubbles released per minute at this distance.

.....

(1)

- (b) One student suggested placing another beaker of water between the light source and the beaker containing the plant. Give a reason for this suggestion.

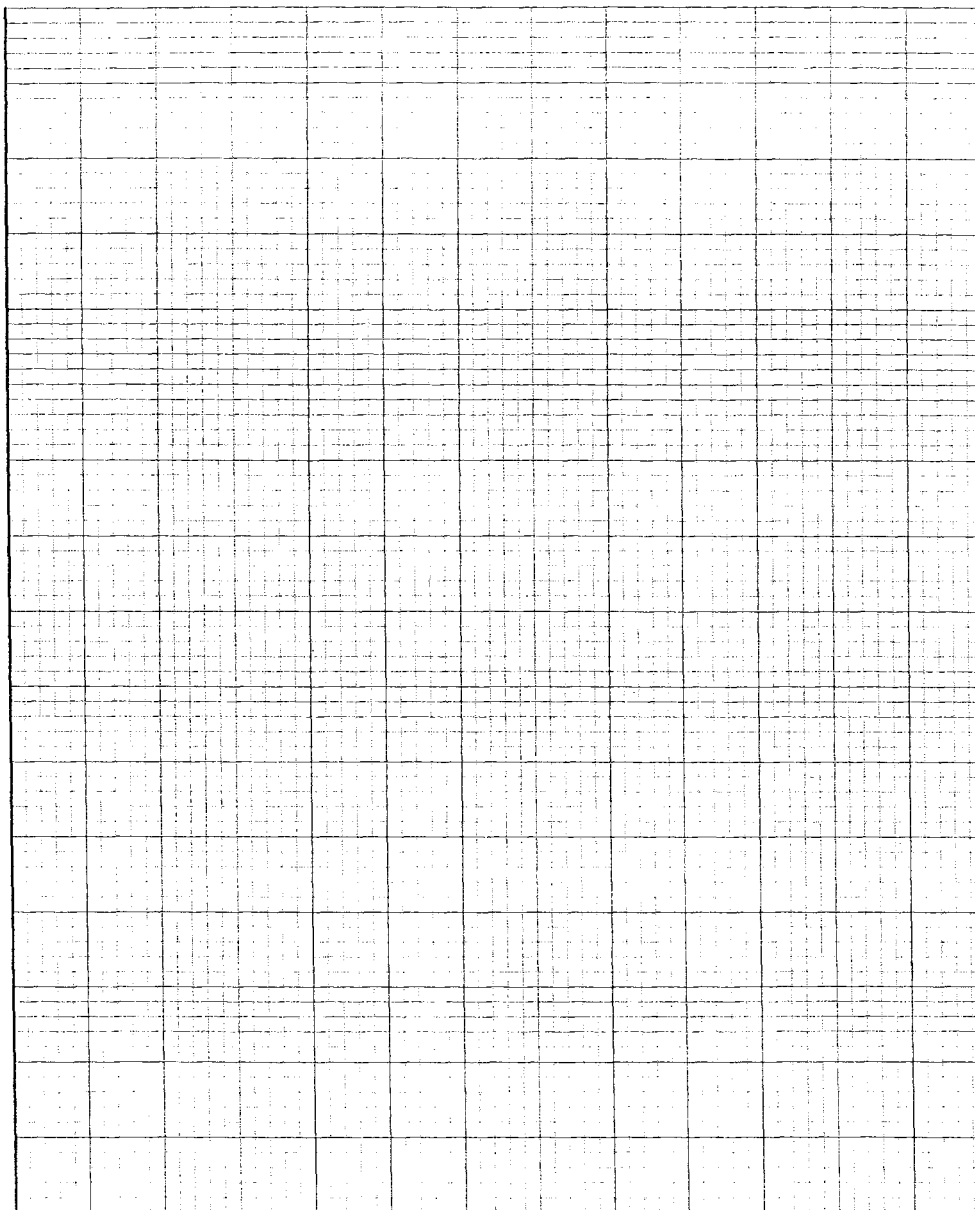
.....

.....

(1)

Leave
blank

Number of
bubbles
released
per minute



Distance from the light in cm

(c) Name the gas given off during photosynthesis.

.....
(1)

(d) Counting bubbles of gas is a simple way of measuring the rate of gas production.

*Leave
blank*

(i) State **one** likely source of error in this method.

.....

.....

(1)

(ii) Suggest a more accurate method that could be used to measure the rate of gas production.

.....

.....

.....

.....

.....

(3)

Q3

(Total 12 marks)

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4. The table below refers to three major groups of living organisms: bacteria, plants and animals. The table also lists cell structures that may or may not be found in these groups of organisms.

Leave blank

If a structure is present in the group of organisms, place a tick (✓) in the box and if the structure is absent place a cross (X) in the box. Two boxes have been done for you.

Cell structure	Plants	Animals	Bacteria
Nucleus	✓		
Chloroplast			X
Cell membrane			
Cell wall			

Q4

(Total 10 marks)

5. The food chain below shows the feeding relations between four organisms in a freshwater lake.

Leave blank

Algae → Water fleas → Sticklebacks → Pike
(small fish) (large fish)

- (a) In this food chain identify the following.

- (i) The producer

..... (1)

- (ii) The secondary consumer

..... (1)

- (iii) In the space below draw a pyramid of biomass for this chain.

(2)

- (b) Give **two** ways in which energy is lost between trophic levels.

1

2

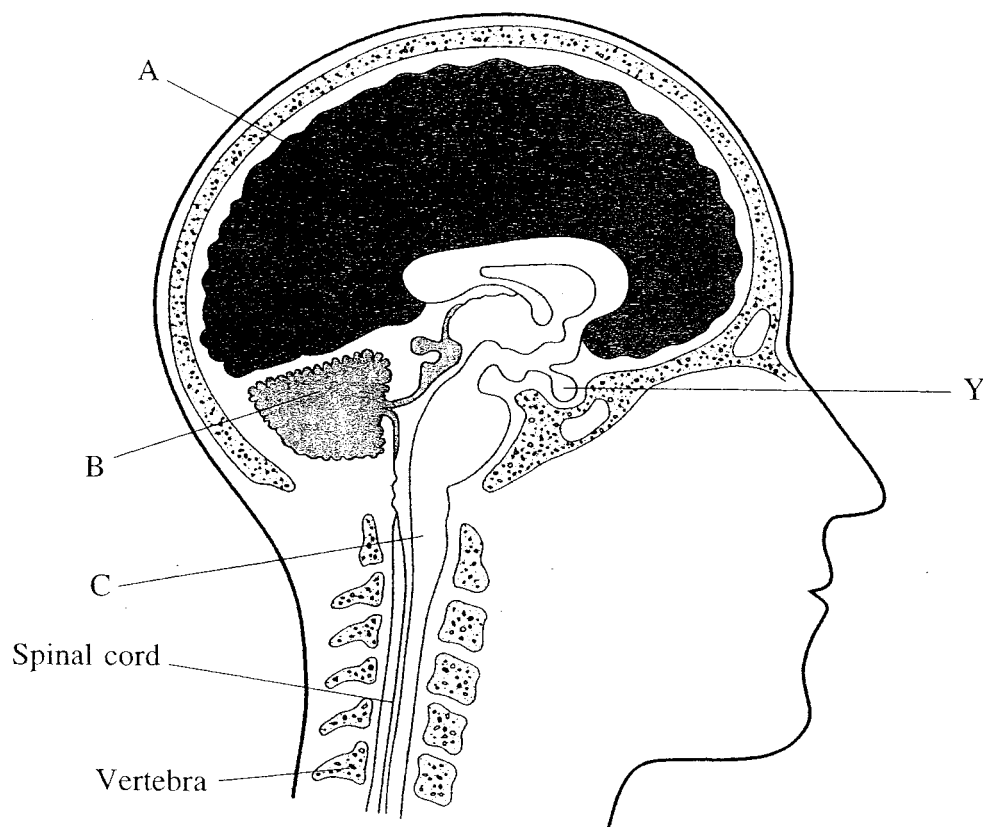
(2)

Q5

(Total 6 marks)

6. The diagram below shows a section through a human head.

Leave
blank



- (a) Name the structures labelled A, B and C and give their functions. Write your answers in the table below.

Name of structure	Function
A	
B	
C	

(6)

- (b) On the diagram, label with a letter X the position of the sight (visual) centre.

(1)

(c) The structure labelled Y on the diagram is an endocrine gland.

*Leave
blank*

Name the gland and **one** hormone that it produces, and state the function of the hormone.

Name of gland Y

Name of hormone produced by Y

Function of this hormone

(3)

(d) Plants respond to changes in their environment.

Give **one** stimulus that a growing shoot responds to. Name and describe the response.

Stimulus	Name of response	Description of response

(3)

Q6

(Total 13 marks)

7. Diagrams A and B below show the lower jaws from two different mammals. Diagram B shows the lower jaw and teeth of a sheep.

*Leave
blank*

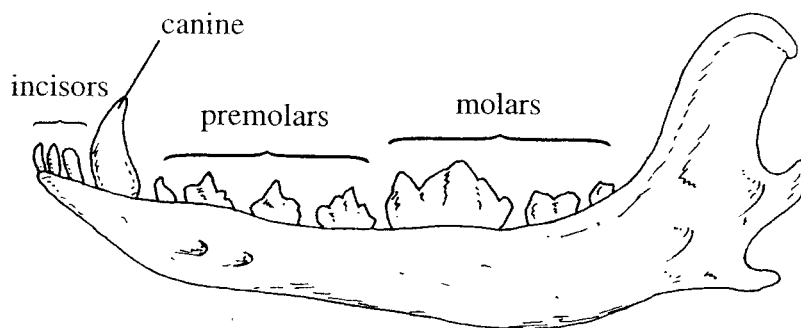


Diagram A

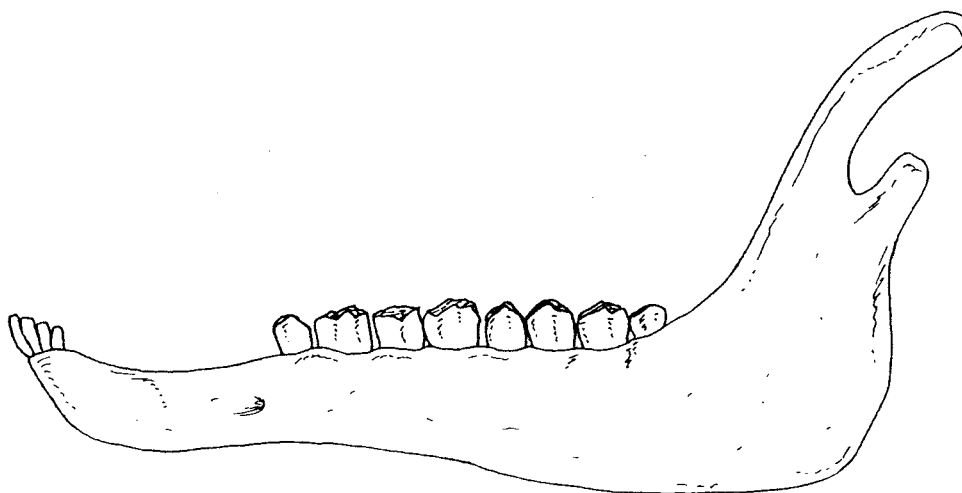


Diagram B (sheep)

- (a) State **three** ways that the teeth in the lower jaw of animal A differ from those of animal B.

- 1
-
- 2
-
- 3
-

(3)

- (b) (i) Give **two** ways that the teeth in the lower jaw of the sheep are adapted for its diet.

*Leave
blank*

1

.....

2

.....

(2)

- (ii) Give **two** ways that the gut of the sheep is adapted for its diet.

1

.....

2

.....

(2)

- (c) Mammals require mineral salts in their diet. Give **one** function of each of the following essential elements in the diet.

Calcium

.....

Iron

.....

Phosphorus

.....

(3)

Q7

(Total 10 marks)

8. In guinea pigs, the allele **A** for short hair is dominant to the allele **a** for long hair (also known as 'angora').

Leave blank

- (a) A male that was heterozygous for this gene was mated with a female that was homozygous dominant for this gene.

For this cross, give the genotype and phenotype of each parent. Write your answers in the table below.

Parent	Genotype	Phenotype
Male		
Female		

(4)

- (b) In a second cross, a male guinea pig (**Aa**) was mated with a female guinea pig (**aa**).

- (i) Give the possible gametes produced by each parent.

Male parent

Female parent

(2)

- (ii) Give the genotypes of the possible offspring and state whether they have short hair or long hair.

.....

.....

.....

.....

(4)

- (iii) Give the expected ratio of short-haired to long-haired guinea pigs from this cross.

.....

(1)

Q8

(Total 11 marks)

9. Insect pests can be controlled by use of a chemical insecticide. Use of chemicals, such as DDT, can have harmful effects on the environment.

*Leave
blank*

- (a) Suggest **two** ways that the use of insecticides can be harmful.

1

.....

2

.....

(2)

- (b) (i) Biological control methods may be used to reduce pests. Explain what is meant by biological control and give **one** example of its use.

.....

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(3)

- (ii) Give **two** disadvantages of using biological control.

1

.....

2

.....

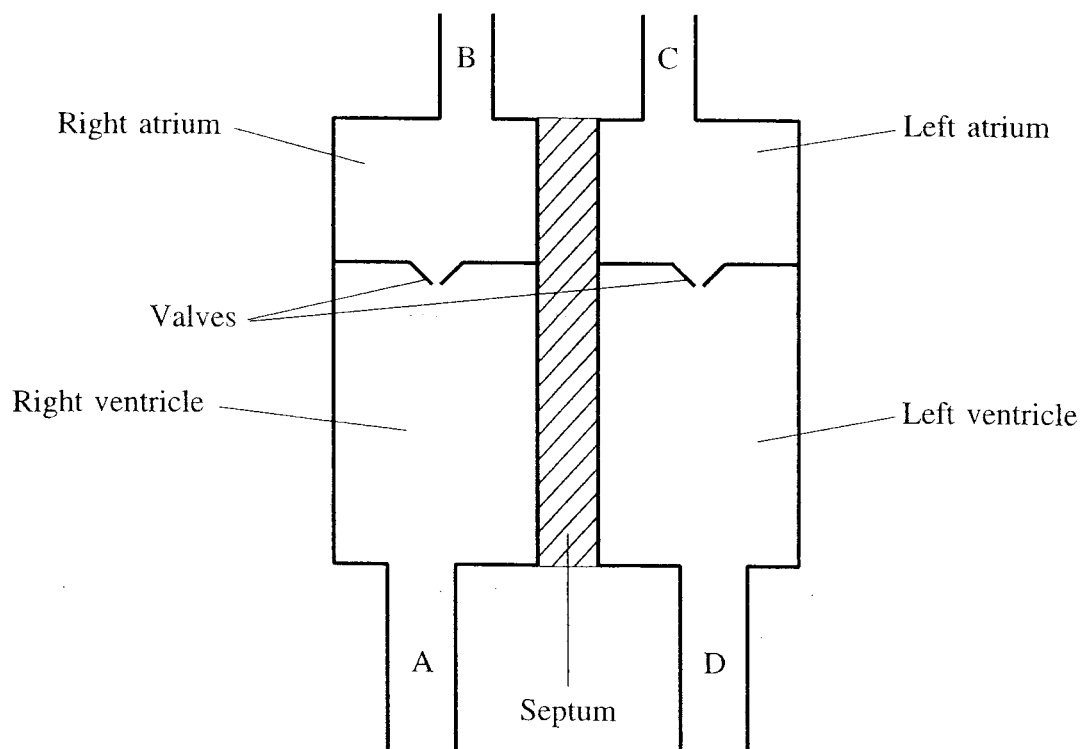
(2)

Q9

(Total 7 marks)

10. The diagram below is a simplified plan of the human heart.

*Leave
blank*



(a) Name the blood vessels labelled A, B, C and D.

A

B

C

D

(4)

(b) State **one** way that the blood in vessel B differs from the blood in vessel C.

.....

.....

(1)

- (c) When a person exercises for a short period, the heart responds to the increased level of activity.

*Leave
blank*

What is the heart's response to exercise and how does it enable greater physical activity?

.....

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.....

.....

(3)

- (d) Some babies are born with a heart defect, in which there is a hole in the septum between the left and right ventricles. Suggest how this might affect the functioning of the heart and the response of the body to exercise.

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.....

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(3)

Q10

(Total 11 marks)

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TOTAL FOR PAPER: 100 MARKS

END