

NAME:	SCIENCE TEACHER:	<b>9C</b>
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# SCIENCE

## Year 9 Examination 2007

**9C – 40 marks**

**Make sure that you have answered all the questions in paper 9B before you start this paper**

***Time allowed for both examinations: 2 hours***

Answer all questions in the spaces provided on the paper.

You may use a calculator.

Show all your working in calculations; marks are awarded for it.

Give units for all answers (eg kg or m) unless they are already provided.

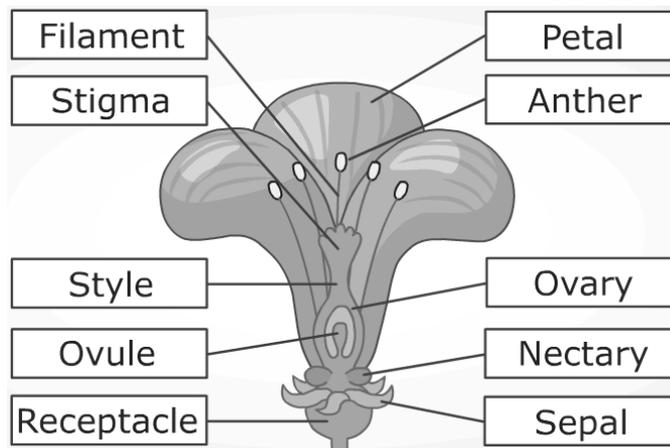
*For Teacher Use*

<i>Question</i>	1	2	3	4	5	6	7	8	9	10	<i>Total</i>
<i>Marks gained</i>											
<i>Marks available</i>	5	3	2	5	8	4	3	4	4	2	40

**Question One: Flowering plants [5 marks]**

Reproduction of flowering plants is made possible through the processes of pollination, seed production, seed dispersal and germination.

You may wish to refer to the diagram opposite in your answers.



- (a) Pollination is the transfer of pollen from the anther to the stigma, and is usually done by insects.

Describe, in detail, some of the features of flowers that encourage insects to carry out this important job.

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- (b) Once a flower has made seeds it is important to disperse them (spread them out and away from the parent plant).

Why is it important that the seed starts to grow some distance away from the parent plant?

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- (c) Here are some pictures showing seeds. Complete the table opposite.



dandelion



miroberry



goose grass

Seeds are spread by:

- wind    sticking to fur/feathers    explosive fruit    water    being eaten by animals/birds

Seed	How are the seeds spread?	What is special about the way these seeds <b>are made</b> that help them get spread in this way?	What might be good about seeds being spread <b>in this way</b> ?
dandelion			
miro berry			
goose grass			



### Question Two: Separation techniques [3 marks]

Read the sentences below:

When copper sulfate is dissolved in water in a beaker, a bright blue liquid is formed. If copper sulfate is added until no more dissolves, a saturated solution is formed. Some blue crystals will remain at the bottom of the beaker.

(a)

(i) What is the solvent used?

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(ii) What is the solute used?

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(iii) What happens to the copper sulfate?

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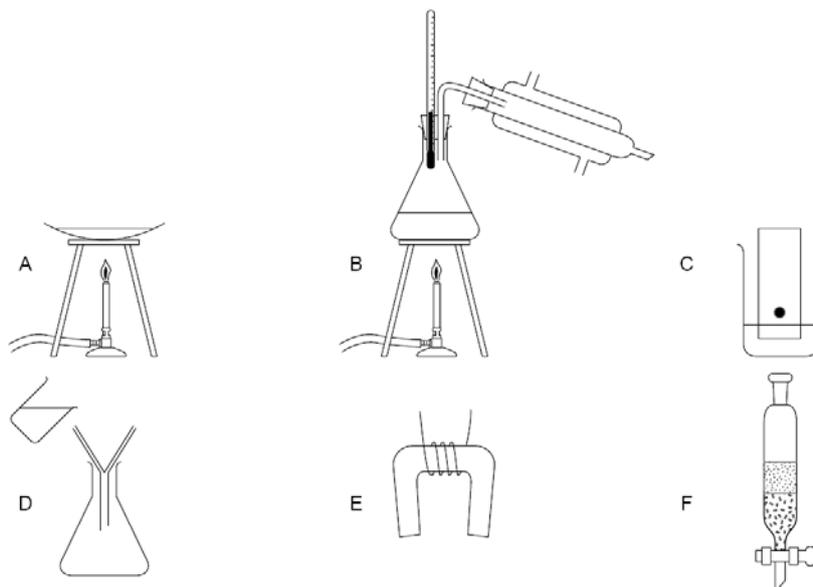
(iv) What would you call the bright blue liquid?

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Below are drawings of apparatus you could use to separate some mixtures.

- (b) Put in the table the letter of the apparatus you would choose to do each job (Not all will be used).

Separating sand and water		Getting salt from a solution of salty water	
Separating the colours in a blot of ink		Getting water from a solution of ink	
Separating some iron nails from sand			



### Question Three: Coloured chemicals [2 marks]

The information below would be much easier to use in a well designed table with suitable headings.

Copper oxide is black

Lead oxide is red

Lead sulfide is black

Copper carbonate is green

Lead sulfate is white

Copper sulfide is black

Copper sulfate is blue

Lead carbonate is white

Use the space below to make a table and fill it in so that the information is easy to see and use. (Use a ruler).

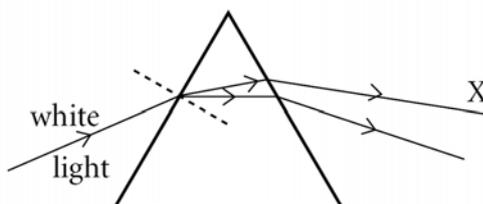
**Question Four: Light [5 marks]**

(a) From the list below, select the object or objects that best fit the following descriptions.

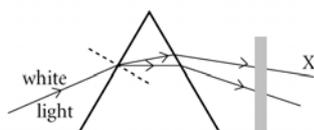
*mirror unpainted wooden door kitchen window frosted glass window white painted wall*

- (i) opaque \_\_\_\_\_
- (ii) transparent \_\_\_\_\_
- (iii) translucent \_\_\_\_\_
- (iv) the best reflector of light \_\_\_\_\_
- (v) the best absorber of light \_\_\_\_\_

(b) Sunlight is split up into a spectrum of colours by a triangular prism, as shown below.



- (i) What colour is the light seen at X?  
\_\_\_\_\_
- (ii) A green filter is placed in the path of the spectrum (between the prism and X). What is seen now? Explain your answer.



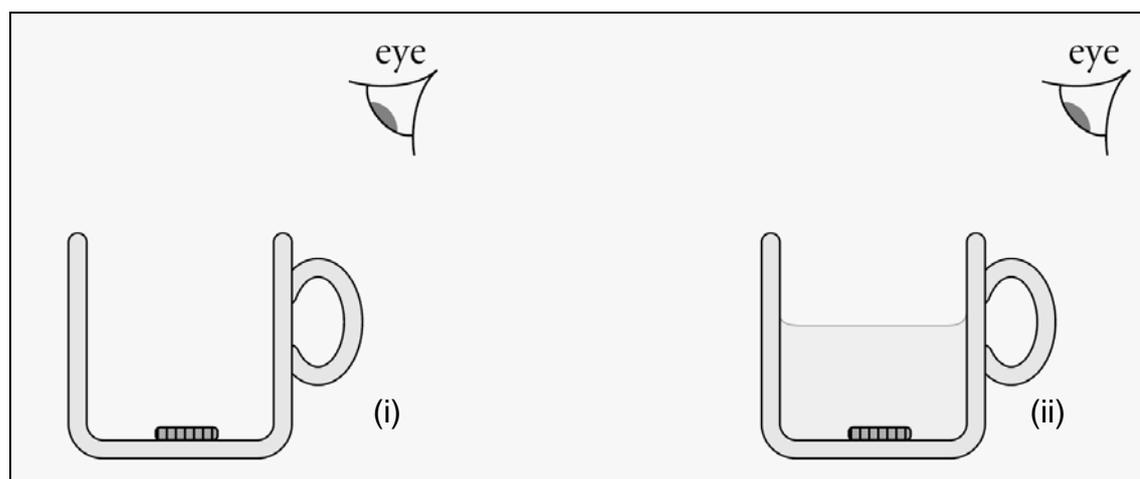
\_\_\_\_\_  
\_\_\_\_\_

(c) A student carried out the disappearing coin trick on her friend.

Place a coin in the bottom of a cup. Tell the friend to move his head back until he *just cannot* see the coin. Tell your friend NOT to move his head. Pour water into the cup – and as if by magic your friend will see the coin come into view.

**Add rays to the 2 diagrams** to show

- (i) why the coin cannot be seen
- (ii) how the coin becomes visible



**Question Five: The body [8 marks]**

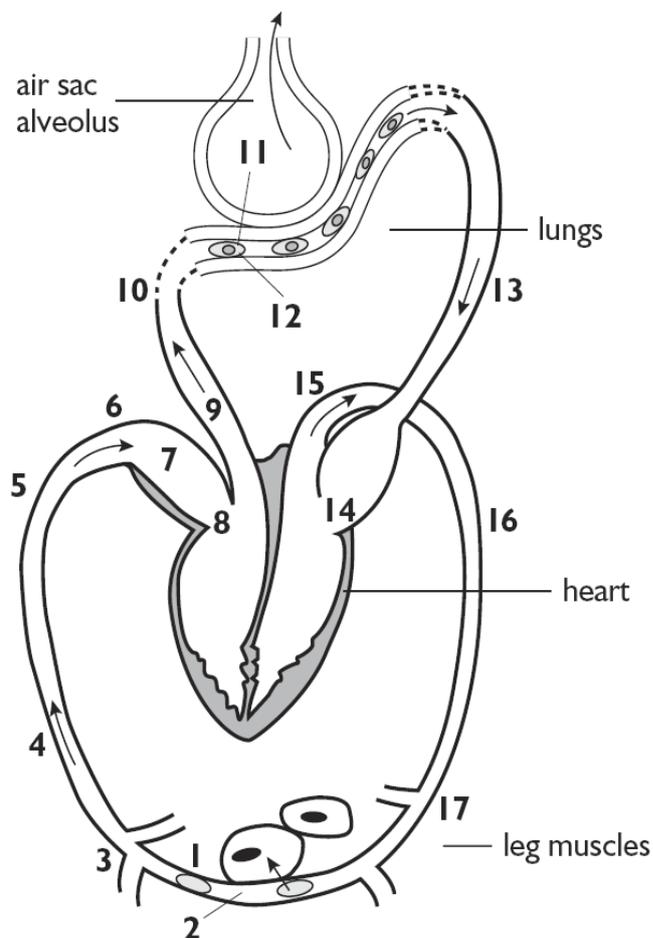
(a) Trace the journey of a red blood cell around the body.

The journey starts as a red blood cell leaves the leg muscles of a marathon runner as she runs a race.

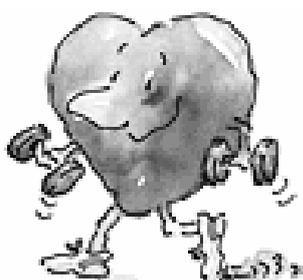
Link the numbers on the diagram with the letters at the beginning of each text label.

For example 1 = F, 3 = C etc

- A *The journey back to the heart*
- B The blood passes through a valve into the right ventricle**
- C *The capillaries join up to form a larger blood vessel called a vein*
- D The blood travels along the vena cava**
- E The red blood cell travels in a thin-walled vessel called a capillary**
- F *A deoxygenated red blood cell*
- G *The blood passes into the right atrium*
- H The blood is pumped at low pressure and leaves the heart along the pulmonary artery**
- I The blood enters the lungs**
- J *The blood passes along the pulmonary vein to the heart*
- K *Haemoglobin in the red blood cell combines with oxygen to form oxyhaemoglobin.*
- L *The blood travels along a blood vessel at high pressure.*
- M The blood enters the heart**
- N Oxygen from the air diffuses into the blood**
- O The blood is pumped at high pressure along the aorta**
- P The blood enters the left atrium and passes through a valve into the left ventricle**
- Q The blood enters a capillary network and releases oxygen very close to individual muscle cells**



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
F		C	A			G					K	J			L	



(b) The bar chart shows the pulse rates of four students before and after vigorous exercise.

(i) Describe the effect of exercise on pulse rate.

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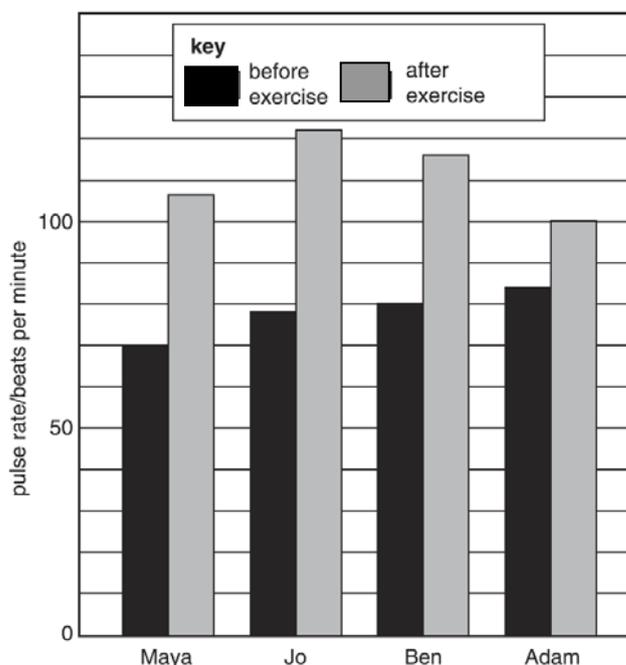
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(ii) Whose pulse rate changed the most? Explain how you got this answer.

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(iii) Explain why the pulse rate needs to increase during vigorous exercise.

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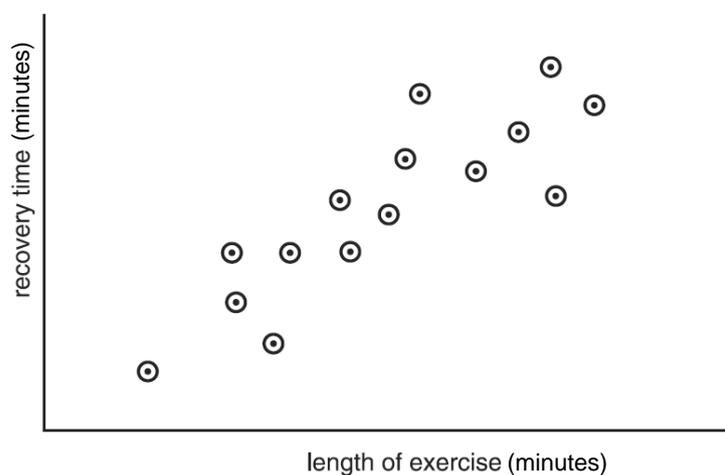
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**Recovery time** is the time taken for the pulse rate to return to normal after exercise has stopped.

(c) The graph shows the relationship between the length of exercise taken by a group of pupils and their recovery time.





**Question Six: Atoms and molecules [4 marks]**

The atoms of each element are different from the atoms of every other element.

(a) The table gives information about the atoms of two elements, helium and fluorine.

	helium	fluorine
Atomic number (proton number)	2	9
Mass number (Mass number = number of protons + number of neutrons)	4	19

Use this information to help you to complete the sentences below.

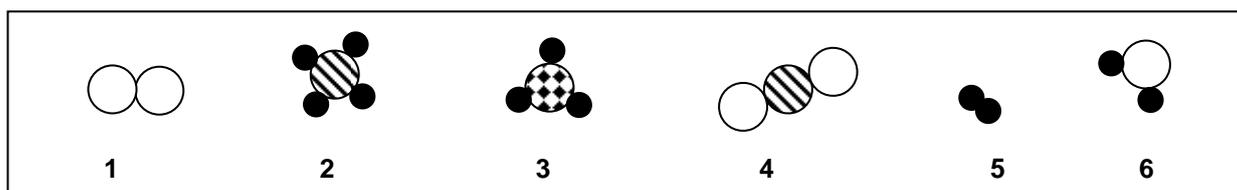
This helium atom is different from this fluorine atom because:

- the helium atom contains \_\_\_\_\_ protons while the fluorine atom contains \_\_\_\_\_ protons;
- the helium atom contains \_\_\_\_\_ neutrons while the fluorine atom contains \_\_\_\_\_ neutrons.

(b) The left diagram shows the electronic structure of a helium atom, He, which has 2 electrons. Complete the diagram to show the electronic structure of a fluorine atom, F, with 9 electrons.



(c) Each sphere represents one atom. For example ● represents one hydrogen atom.

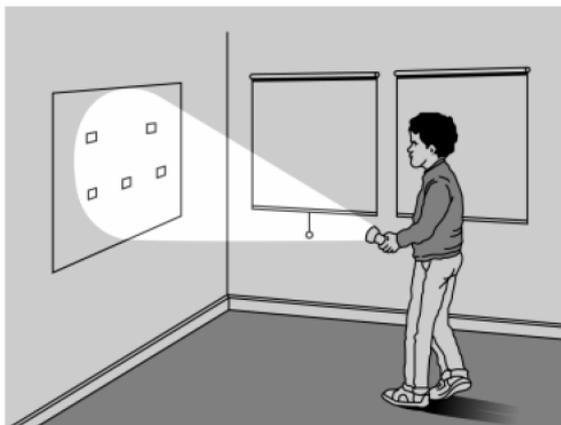


(i) What molecule does each diagram represent? (One has been done as an example, and one number won't be needed).

Hydrogen H <sub>2</sub> 5	oxygen O <sub>2</sub>	methane CH <sub>4</sub>	water H <sub>2</sub> O	ammonia NH <sub>3</sub>
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(ii) One number was not needed in (i). What is the name and chemical formula of this molecule?

## Question Seven: Seeing things [3 marks]



To be seen walking along the road on a dark night, it is important to wear clothing which will reflect light from street lights and car headlamps.

Isaac investigated which colours are best at reflecting light.

He stuck small squares of different coloured material on to a black card at one end of a darkened laboratory.

He switched on his torch and moved towards the squares.

When he could clearly see a coloured square, he measured the distance between his torch and the square.

- (a) Why did Isaac do the investigation in a darkened laboratory?

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- (b) Give **one** variable that Isaac should keep the same for each square.

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Isaac's results are shown below.

Colour	Distance from torch to square in metres
Blue	2.3
Orange	3.4
Green	3.2
Brown	2.1
Red	3.0

- (c) From his results, which colour clothing should Isaac recommend a walker wears at night? You must give a reason for your choice.

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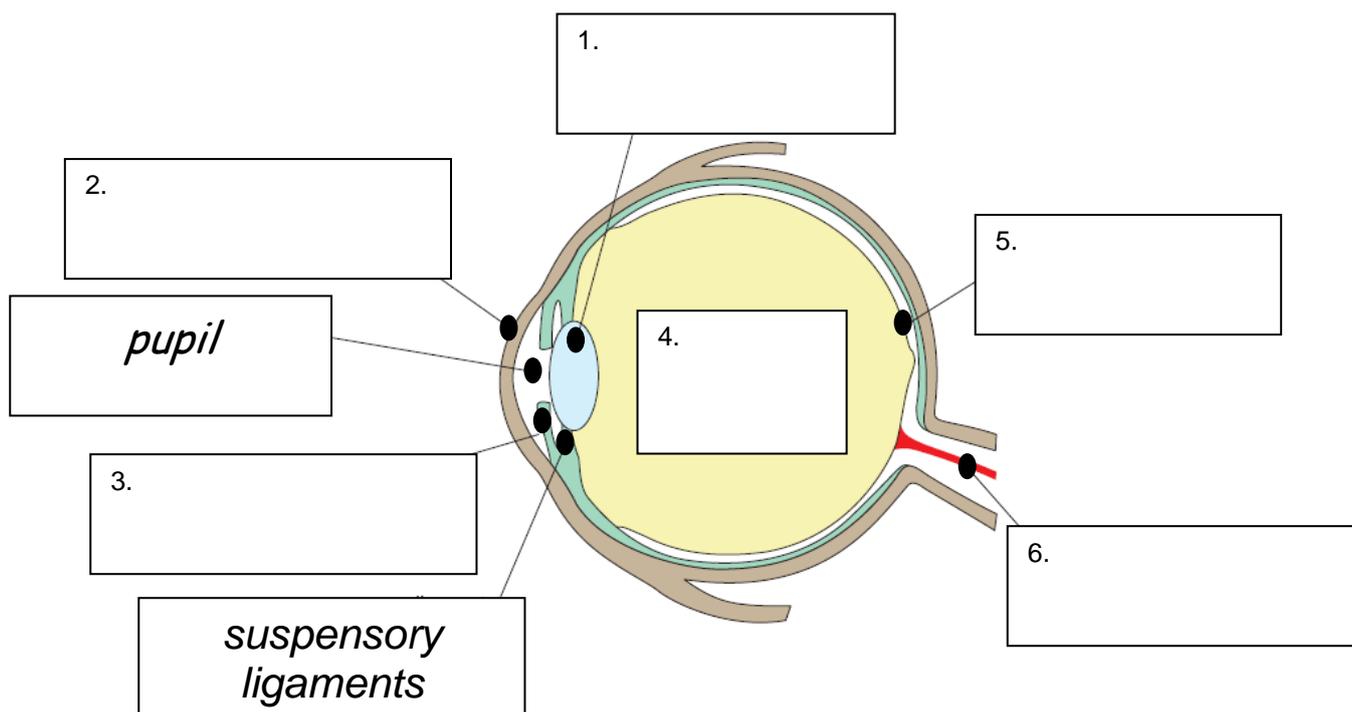
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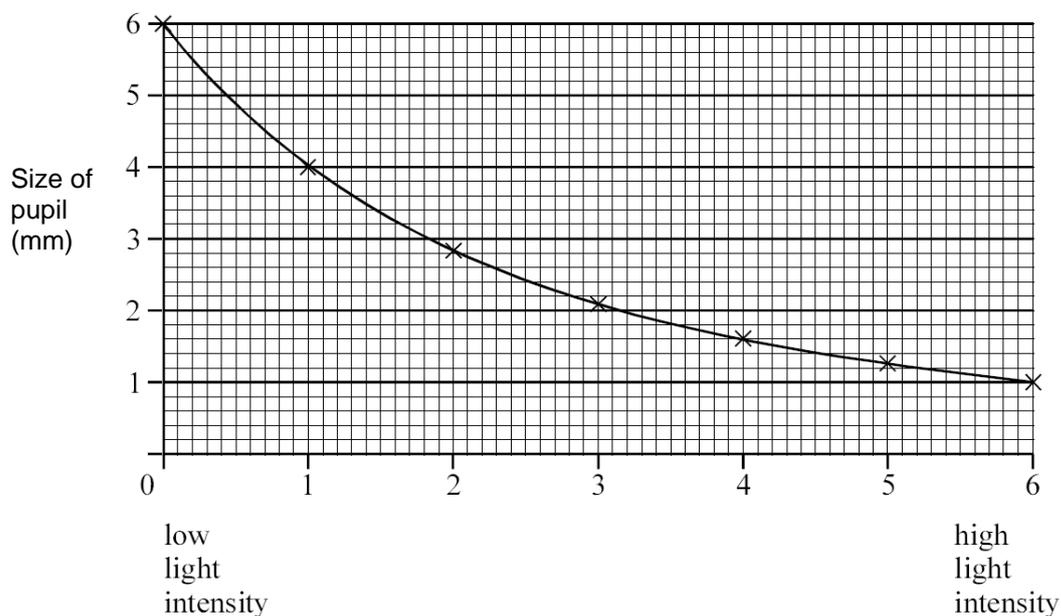
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### Question Eight: The eye [4 marks]

(a) Label the diagram of the eye. Two have been done for you.



(b) The graph shows the size of the pupil in a student's eye in different light intensities.



Estimate the size of the pupil if the experiment had been done at a light intensity of 2.5?

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(c) Describe why the size of the pupil varies with the light intensity.

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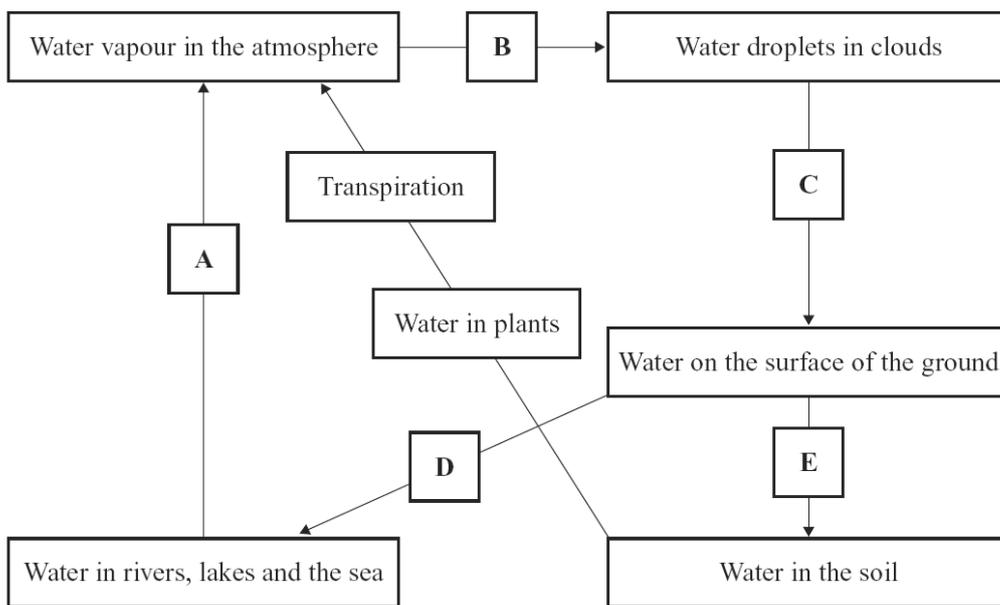
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**Question Nine: Our Earth and atmosphere [4 marks]**

The diagram shows some of the stores and processes in the water cycle.



- (a) Complete the key by writing the correct letters from the diagram in the spaces in the table below. One has been done for you.

Condensation	Evaporation	Infiltration	Precipitation	Run-off
B				

- (b) Complete the following sentences using words chosen from box below.

condensation      evaporation      infiltration      precipitation      run-off

- (i) ..... can happen as rain, sleet, snow or hail.
- (ii) ..... happens most quickly on a warm and windy day.
- (iii) ..... is a process which can cause soil erosion.

- (c) Ozone is a gas found in the Earth's atmosphere. It is a form of the element oxygen.

- (i) Select words from the box to complete the paragraph below.

CFC compounds      infra-red      lower      oxides of nitrogen      ultraviolet      upper

Scientists have found that ..... damage the Earth's ozone layer. The ozone layer is found in the ..... parts of the Earth's atmosphere. It provides important protection against ..... radiation which can cause harm to people and other forms of life.



- (ii) State **one** way in which people's health could be harmed because of damage to the ozone layer.

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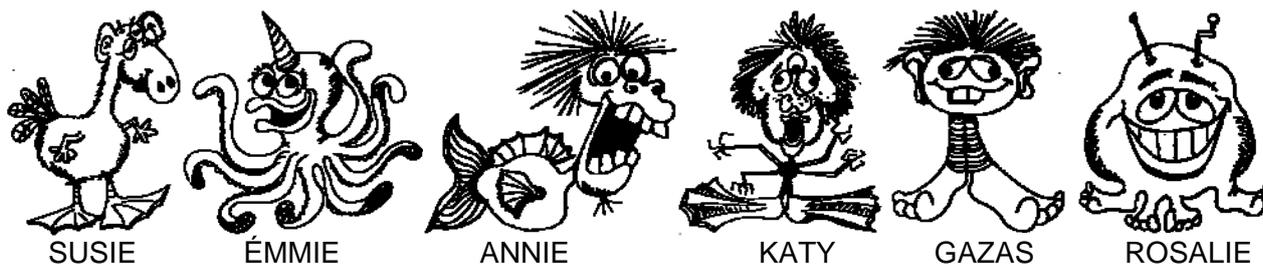


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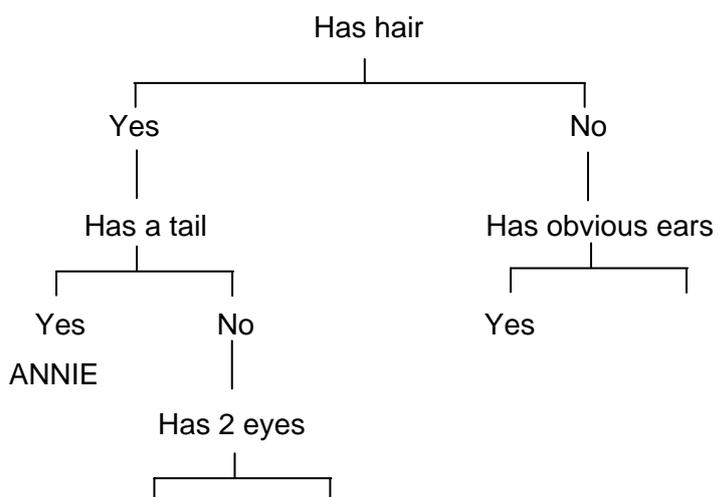


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**Question Ten: Classification [2 marks]**



Here are 6 creatures. Complete the dichotomous key to identify them all.



**Now check your answers**

