



**Glenalmond College**  
let your story begin

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# **Scholarship Exam 2019**

## **Biology**

**Time: 30mins**

**Marks: 39**

## Questions

Q1.

Living organisms share some basic characteristics.

Draw a straight line from each characteristic to its correct description.

The first has been done for you.

(4)

### Characteristic

sensitivity

respiration

excretion

reproduction

growth

nutrition

### Description

production of new organisms

respond to the surroundings

taking in of food

increase in number of cells

release of energy in cells

removal of metabolic waste



(Total for question = 4 marks)

**Q2.**

The passage describes human reproduction.

Complete the passage by writing a suitable word or words in each blank space.

**(10)**

During sexual intercourse the male's ..... is inserted into the vagina. The male gametes, known as

....., are released from the male urethra into the vagina. The male gametes carry on swimming until one meets a female gamete, known as the .....

This process is fertilisation and takes place in a tube called the .....

The fertilised female gamete, also known as the ....., moves down this tube. It undergoes the type of cell division called ..... and is now known as an ..... . This structure may then become implanted in the wall of the .....

The number of chromosomes in the fertilised female gamete is ..... the number found in the unfertilised gamete and is known as the ..... number.

**(Total for question = 10 marks)**

**Q3.**

(a) The table contains names and descriptions of processes involved in the digestive system. Complete the table by filling in the missing names and descriptions.

(5)

Name of process	Description of process
	food enters the mouth
digestion	
	small food molecules move from the small intestine into the blood
	small food molecules are used to build large molecules
egestion	

(b) Describe the process of digestion in the mouth.

(3)

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(c) A student carried out some food tests on two samples of food, A and B. The table shows the results.

Sample	Reagent used in food test	Colour seen after adding the reagent
A	iodine solution	blue black
B	Benedict's	brick red

The student concluded that both samples of food contained carbohydrates.

Do you agree with this conclusion?

Give reasons for your answer.

(2)

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**(Total for question = 10 marks)**

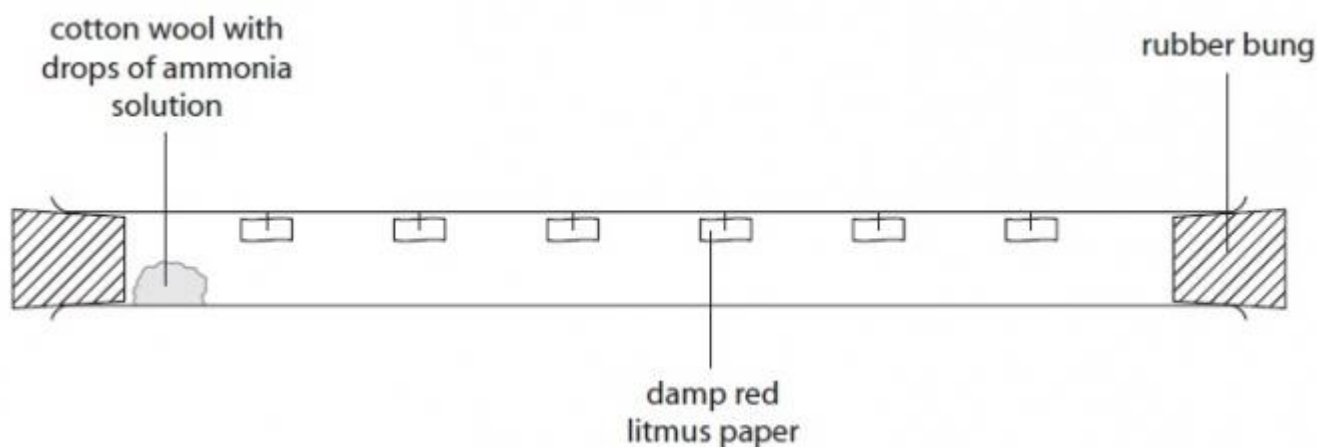
**Q4.**

Lily investigated the effect of concentration of a substance on the rate of diffusion.

In a fume cupboard she set up a glass tube with small squares of damp red litmus paper spaced at 4 cm intervals along its length.

She added 1 drop of ammonia solution to some cotton wool and used tweezers to place the cotton wool at one end of the tube. She closed the tube with a bung. She timed how long it took for each square of litmus paper to change colour.

She then set up an identical tube and repeated the experiment, but this time she used 3 drops of ammonia solution.



Her results are shown in the table.

Number of drops of ammonia solution	Time taken for litmus paper to change colour in seconds					
	4 cm	8 cm	12 cm	16 cm	20 cm	24 cm
1	7	13	19	26	32	37
3	3	7	10	13	16	20

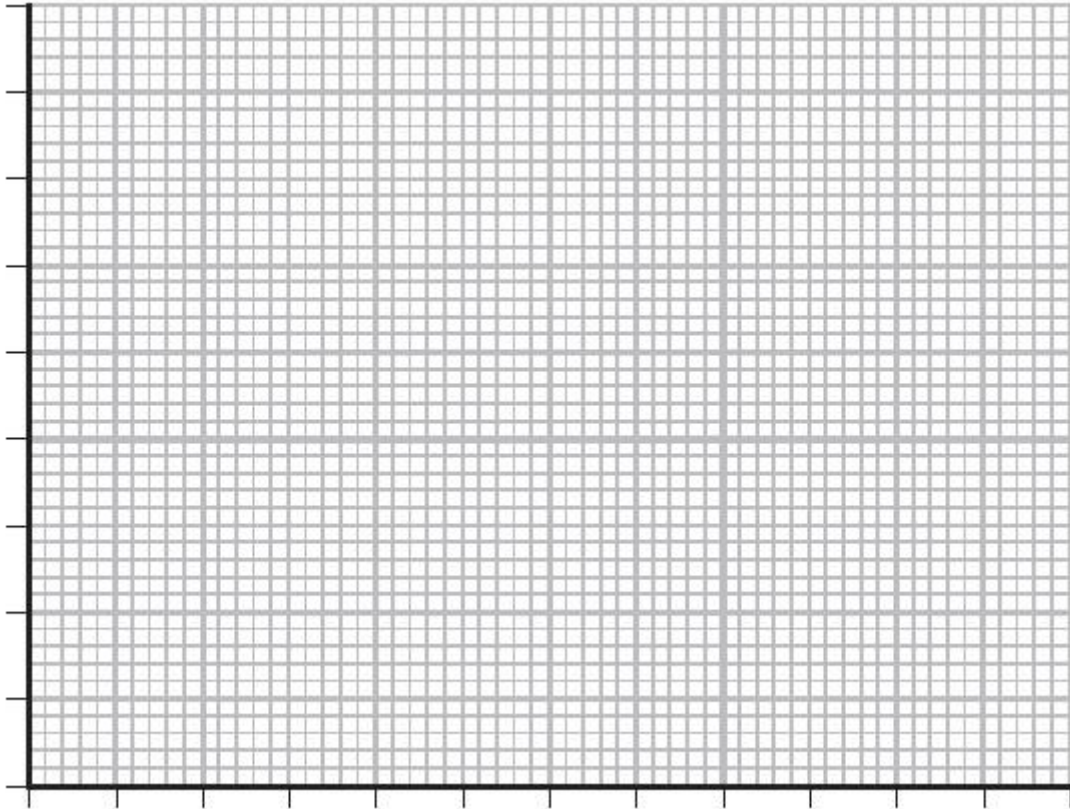
(a) Describe what is meant by the term **diffusion**.

(2)

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(b) Plot these results on the grid. Use straight lines to join the points.

(6)



(c) Describe the results shown by the graph.

(2)

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(d) Calculate the average rate of diffusion, in centimetres per second of ammonia, from the 3 drops of ammonia solution between the litmus papers at 4 cm and 24 cm. Show your working.

(2)

Answer ..... cm/s

(e) Explain the difference in the rate of diffusion between the experiment using 1 drop of ammonia and the experiment using 3 drops of ammonia.

(1)

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(f) Suggest how Lily could modify her experiment to investigate the effect of temperature on the rate of diffusion.

(2)

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**(Total for question = 15 marks)**