SURNAME ..... FIRST NAME .....

JUNIOR SCHOOL ..... SENIOR SCHOOL .....

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 6 June 2011

Please read this information before the examination starts.

- This examination is 40 minutes long.
- The answers should be written on the question paper.
- Answer **all** the questions.
- Calculators may be required.

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1. Underline the option which best completes each of the following:

(a) All living organisms

breathe **have blood** **respire** **drink**

(b) All cells contain a

cell membrane **cell wall** **chloroplast** **permanent vacuole**

(c) The name given to the fusion of a sperm cell and an egg cell is

fertilisation **ingestion** **menstruation** **ovulation**

(d) A product of photosynthesis is

carbon dioxide **glucose** **nitrogen** **water**

(e) In classification, the name of one of the five kingdoms is

arthropod **fish** **mammal** **plant**

(f) The best example of a characteristic which has both an inherited and an environmental cause is

eye colour **gender** **height** **language spoken**

(g) Most primary consumers are

carnivores **herbivores** **omnivores** **plants**

(h) Leaf cells are best adapted to photosynthesis because they have

a cell wall **cytoplasm** **a nucleus** **many chloroplasts**

(i) When a food tests positively for starch, the iodine solution turns

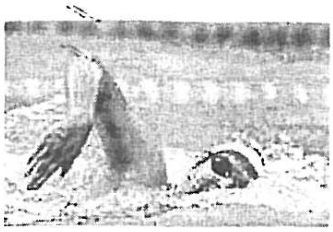
blue/black **cloudy** **green** **orange/brown**

(9)

2. Rebecca is training for the 2012 London Olympics.

She is an 800 m freestyle swimmer.

She trains to increase the efficiency of her respiration.



Rebecca Adlington

(a) Complete the word equation for respiration

oxygen + ... → ..... + ... + energy (3)

(b) Oxygen is obtained from the air when we breathe in.

It diffuses into the blood across the lung surface.

Give one feature of this surface which allows oxygen to move into the blood more quickly.

..... (1)

(c) Glucose is obtained from our food.

Athletes often eat foods, such as pasta, which contain a high level of starch.

Explain how glucose gets into the bloodstream after starch is eaten.

.....

.....

.....

..... (3)

(d) As part of her training, Rebecca eats a healthy, balanced diet and she does not smoke cigarettes or drink alcohol.

Give one harmful effect of smoking and one of drinking alcohol.

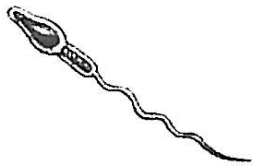
harmful effect of smoking: .....

harmful effect of alcohol: ..... (2)

3. This question is about some animal and plant cells which are specialised for particular functions.

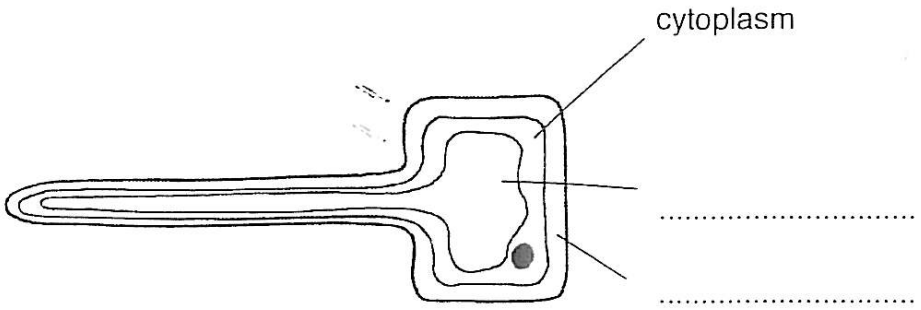
(a) Below are four specialised animal cells and four statements describing one of their characteristics.

Draw a line to link the correct statement with each cell.

no nucleus, disk-shaped to allow oxygen to be transported	 length: 0.008 mm
streamlined shape for movement	 length: 1 m
has tiny hairs, called cilia, to move mucus out of the trachea (wind pipe)	 length: 0.04 mm
long, to allow electrical impulses to travel through the body quickly	 length: 0.1 mm

(4)

(b) This is a specialised plant cell.



(i) Give the name of this cell.

..... (1)

(ii) Complete the two remaining labels on the diagram. (2)

(iii) Name the green structure, usually present in leaf cells, which is not present in this cell.

..... (1)

(iv) What is the function of these structures in leaf cells?

.....

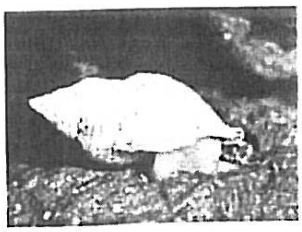
..... (2)

4. The pictures below show a dog whelk and a limpet.

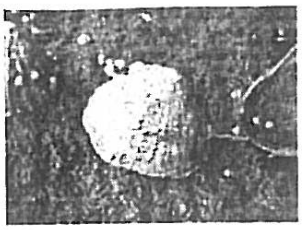
Dog whelks are found on rocky sea shores and are predators.

They feed mainly on limpets, which are also found on rocky sea shores.

dog whelk



limpet



Limpets are usually found attached to rocks.

(a) Describe how you could use a quadrat to estimate the size of the limpet population within a 100 m^2 area on a rocky shore.

Mention one safety precaution you would need to take.

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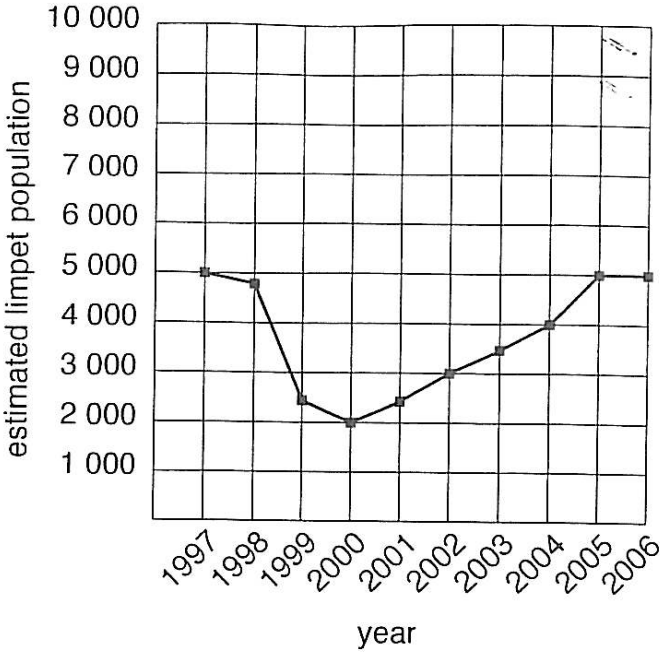
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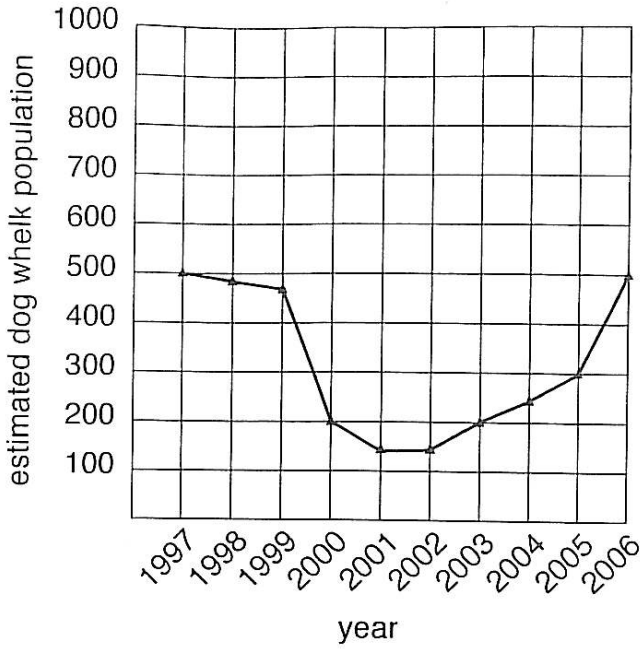
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..... (4)

The graphs below show the sizes of the limpet and dog whelk populations from 1997 to 2006.





(b) Describe the relationship between the size of the limpet population and the size of the dog whelk population.

.....

..... (2)

During 1998, the rocky sea shores where the limpets lived were exposed to storms.

(c) Suggest how this affected the size of the limpet population.

..... (1)

(d) The year after the storms, the dog whelk population decreased dramatically.
Suggest why this happened.

..... (1)

(e) Limpets and dog whelks are both molluscs.
This means they are invertebrates and have shells.
Name another group of invertebrates and give a characteristic of that group.

invertebrate group: .....

characteristic: ..... (2)

5. Teachers often tell pupils to revise in silence, with no distractions.

Peter and Abigail wanted to test if listening to music really does affect your ability to remember things.

They made three lists of twenty words and asked three friends to take part in their experiment.

They played some pop music and read out the first list of twenty words.

Their friends were given two minutes to write down as many words as they could remember.

Peter and Abigail repeated this with the other two lists of twenty words; once with classical music playing and once in silence.

Each time their friends were given two minutes to write down as many words as they could remember.

Here are the results:

type of music playing	number of words remembered			
	friend A	friend B	friend C	average
pop	10	6	8	8
classical	11	11	8	
silence	15	11	10	

(a) Complete the table by calculating the average number of words remembered for each row. (2)

(b) Give two ways in which Peter and Abigail tried to make the investigation a fair test.

.....

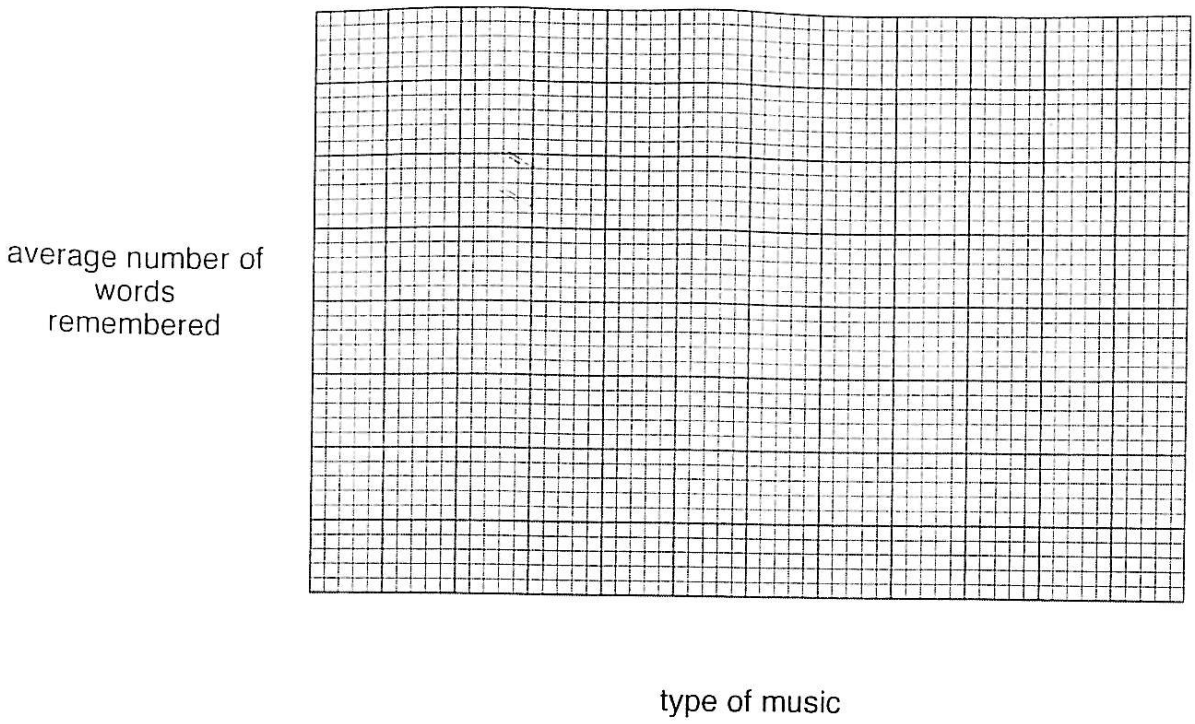
..... (2)

(c) Using the instructions below, plot a bar chart (top of page 9) to show the relationship between the average number of words remembered and the type of music being played.

Instruction 1: Add labels for the 3 types of music on the horizontal axis. (1)

Instruction 2: Add a sensible linear scale for the average number of words remembered on the vertical axis. (1)

Instruction 3: Draw the bar chart to show the average number of words remembered for each type of music. (2)



(d) Use the results to draw conclusions from this experiment.

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..... (3)

(e) Suggest how Abigail and Peter could improve the reliability of their experiment.

.....

..... (2)

6. The diagram below shows a Mauritius kestrel.

This rare bird nests in trees and is found only on the tiny island of Mauritius.

Thirty years ago the population of Mauritius kestrels fell to only one breeding pair.

This was because of deforestation and the introduction of cats which hunted the kestrels.

Fortunately, thanks to the Mauritian Wildlife Fund, there are now over 1000 Mauritius kestrels living in the wild.

The Mauritius kestrel was saved from extinction.



(a) Suggest why the survival of the Mauritius kestrel was threatened when there was only one breeding pair on the island.

..... (1)

Mauritius kestrels are small birds of prey.

They hunt geckos (small lizards).

Geckos eat insects which eat crops.

(b) Using this information, draw a food chain involving four organisms.

.....→.....→.....→..... (2)

(c) Using the picture above, and your own knowledge, suggest two adaptations which make the Mauritius kestrel a good predator.

adaptation 1: .....

adaptation 2: ..... (2)

(d) The conservationists have used a number of techniques to increase the size of the population of the Mauritius kestrel.

Suggest and explain two ways of conserving kestrels.

suggestion 1: .....

explanation: .....

.....

suggestion 2: .....

explanation: .....

..... (4)

(Total marks: 60)