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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

LEVEL 2

BIOLOGY

Monday 4 November 2013

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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Underline the option which best completes each of the following.

(a) The stain to use when observing cheek cells under the microscope is

iodine solution **methylene blue** **starch** **water**

(b) The union of a sperm and an egg is called

fertilisation **mating** **reproduction** **sex**

(c) An example of continuous variation is

blood grouping **gender** **handedness** **height**

(d) The removal of faeces through the anus is called

digestion **egestion** **excretion** **expulsion**

(e) The gas absorbed by plants during photosynthesis is

carbon dioxide **hydrogen** **nitrogen** **oxygen**

(f) The percentage of genes we inherit from our biological father is

0% **25%** **50%** **100%**

(g) The process which releases energy from food in our cells is called

excretion **perspiration** **reproduction** **respiration**

(h) A characteristic common to all spiders is

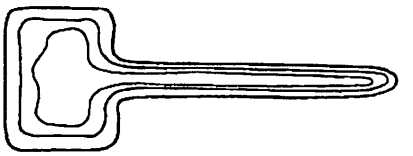
a pair of wings **3 body parts** **4 body parts** **8 legs** (8)

. Below are pictures of a specialised animal cell and a plant cell.

a specialised animal cell



a plant cell



(a) Identify each of the cells above and give one way in which their structure is adapted to their function.

(i) name of the animal cell: ..... (1)

adaptation: .....

..... (1)

(ii) name of the plant cell: ..... (1)

adaptation: .....

..... (1)

(b) Organs are specialised structures to carry out particular functions.

Name two organs in the human body and briefly describe how each structure is adapted to its function.

(i) organ 1: ..... (1)

adaptation: .....

..... (1)

(ii) organ 2: ..... (1)

adaptation: .....

..... (1)

3. The table below shows two possible menu options served after a sports match.

menu A	menu B
drink: orange juice	drink: chocolate milkshake
chicken, boiled potatoes and steamed green beans and carrots	deep-fried chicken and chips
strawberries	jam doughnut

(a) The coach of the sports team tells her team that menu A is more nutritionally balanced than menu B.

(i) Identify a food group present in menu A.

..... (1)

(ii) Name the source, in menu A, of this food group.

..... (1)

(iii) Write down what this food group is used for in the body.

..... (1)

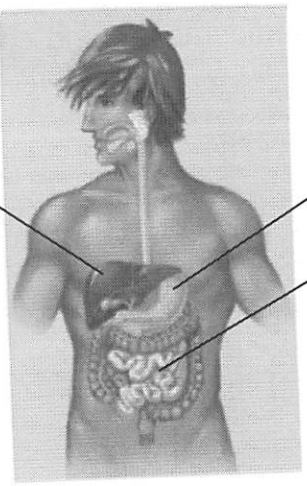
(b) Explain what health problems may result from a person regularly eating deep-fried chicken and chips from menu B.

.....

.....

..... (2

4. Below is a diagram of the human digestive system.



....

....

(a) Complete the missing labels on the diagram above. (3)

(b) Use the space below to complete the description of digestion.

You may wish to use the words and phrases in the box to help you.

small intestine	**blood**	**soluble molecules**
	broken down	**absorbed**

Digestion is when food is .....

.....

.....

..... (3)

.....

(c) Cells involved in digestion often release enzymes.

Write down the name of an enzyme and briefly explain the specific role this enzyme plays in digestion. (1)

name of enzyme: .....

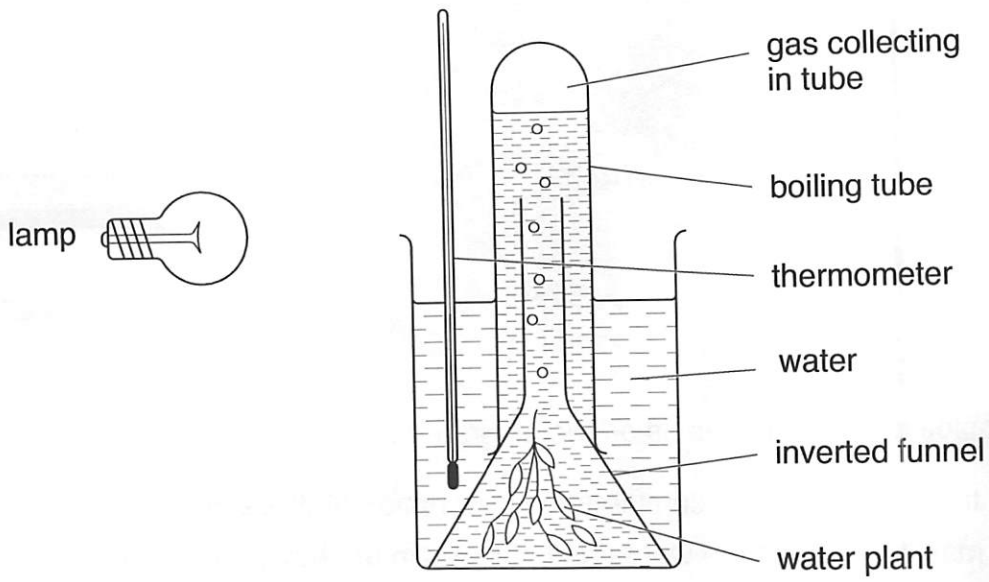
role of this enzyme in digestion: ..... (2)

.....

Turn ove

5. Izzy and Frankie wanted to investigate the effect of temperature on the rate of photosynthesis in plants.

They used water at four different temperatures and counted the number of bubbles produced by Elodea pondweed per minute at each temperature.



(a) Write down two factors, other than temperature, which affect the rate of photosynthesis in plants.

factor one: ..... (1)

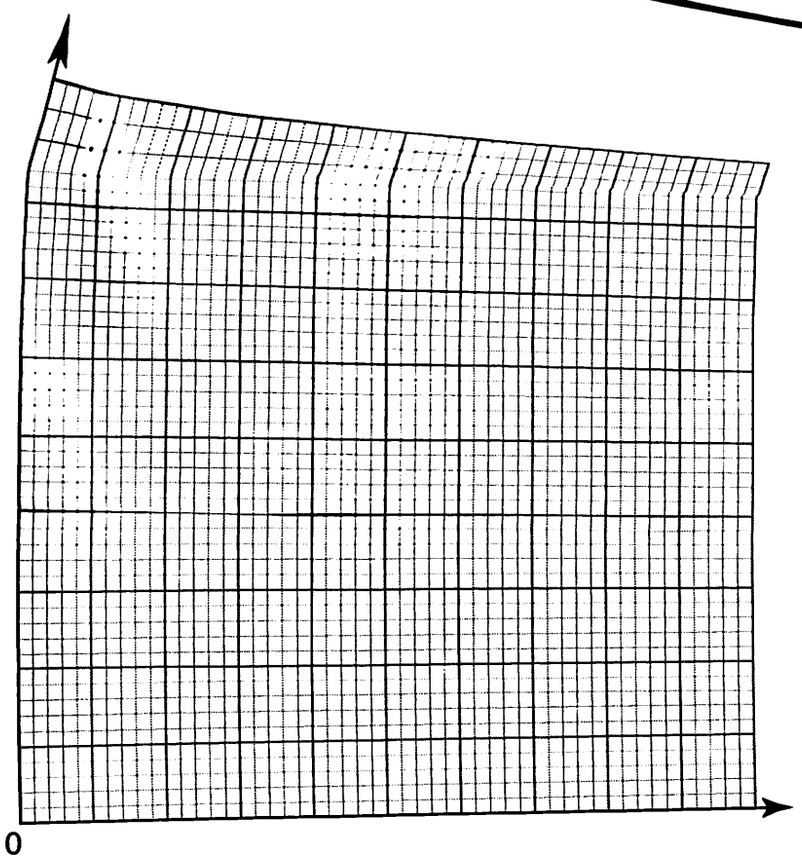
factor two: ..... (1)

Their results are shown in the table below.

temperature, in °C	number of bubbles produced per minute
10	4
15	12
20	36
25	68

(b) (i) Choose suitable scales and complete the axes of the graph opposite. (2)

(ii) Draw a line graph of this data on the graph paper opposite to show how the number of bubbles produced per minute by Elodea changes with temperature. (2)



(iii) Draw a line or curve of best fit on your graph above. (1)

(iv) Use your graph to describe the effect of increasing the temperature on the number of bubbles produced per minute by the Elodea.

.....

..... (2)

(v) Use your graph to predict the number of bubbles produced per minute by the Elodea pondweed at 22 °C.

You must show clearly on your graph how you arrived at your answer.

number of bubbles produced per minute at 22 °C ..... (2)

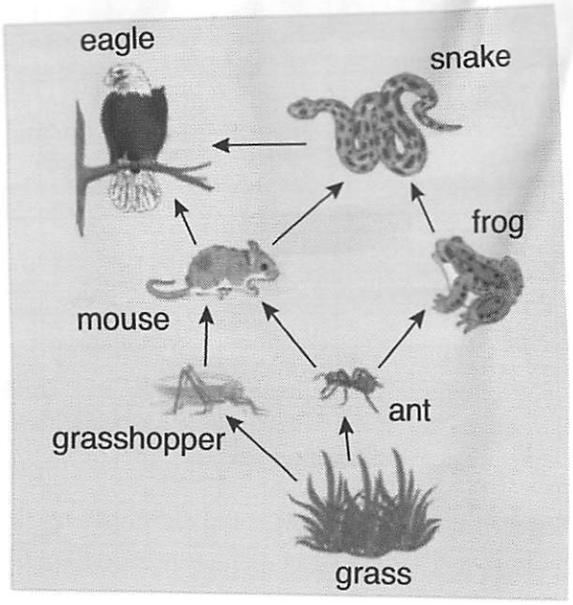
(c) Name the gas given off by the Elodea pondweed and describe a chemical test for this gas.

name of gas: ..... (1)

chemical test: ..... (1)

Turn over

6. Below is a diagram of a food web.



(a) Use the diagram above to construct a food chain containing four organisms.

..... → ..... → ..... → ..... (2)

(b) Name the predators of the mouse in the food web above.

..... (2)

An outbreak of disease dramatically reduces the size of the mouse population.

(c) Explain what effect this reduction in the number of mice would have on both the eagle and the grasshopper population.

(i) The eagle population would: ..... (1)

This is because: .....

..... (1)

(ii) The grasshopper population would: ..... (1)

This is because: .....

..... (1)

7. Mrs MacDonald has just had a baby and is recovering in hospital.

(a) State approximately how long the baby would have taken to develop inside her.

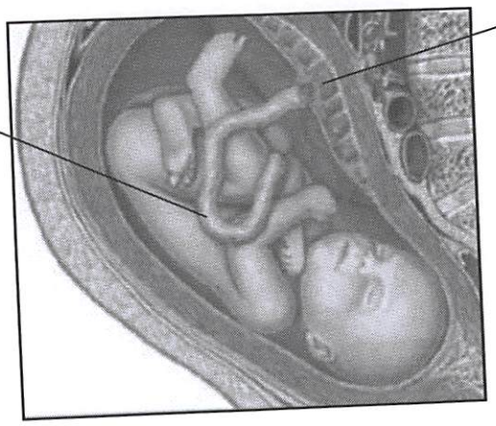
..... (1)

(b) The following passage is about human reproduction and the development of a fetus.

Fill in the gaps using the most appropriate words.

Fertilisation takes place in the ..... . The fertilised egg cell is called a ..... and this develops inside the mother's ..... . Whilst developing, an example of a waste product which the fetus produces and needs to be removed is ..... . An example of a substance which passes from the mother to the fetus is ..... (5)

(c) The diagram below shows a fetus developing inside its mother.



....

(i) Complete the two missing labels on the diagram above. (2)

(ii) Explain how the fetus is protected while it is developing inside its mother.

.....

..... (1)

(Total marks: 60)