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

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

Independent Schools Examinations Board

COMMON ENTRANCE EXAMINATION AT 13+

SCIENCE

BIOLOGY

Monday 7 November 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) An example of a food which is high in calcium is

cabbage **cheese** **chicken** **rice**

(b) An animal which is classified as an arthropod is

a crab **a mussel** **an octopus** **a worm**

(c) Digestion of food begins in the

intestines **mouth** **oesophagus** **stomach**

(d) Wind-pollinated flowers are unlikely to have

dangly anthers **nectar** **an ovary** **pollen**

(e) The process when faeces passes out of the body is known as

egestion **ejection** **excretion** **expulsion**

(f) A substance which is not directly involved in respiration is

carbon dioxide **glucose** **oxygen** **starch**

(g) Iodine solution is used to test for

chlorophyll **glucose** **protein** **starch**

(h) Root hair cells enable greater

absorption **fertilisation** **photosynthesis** **stability** (8)

2. The following sentences are about cells.
Use the words in the box below to fill in the spaces.
These words may be used once, more than once or not at all.

brain	**cytoplasm**	**genes**	**muscle**
nucleus	**organs**	**tissues**	

Animals and plants are made up of cells. Inside a cell, the ..... controls all the reactions which take place.

The ..... are found inside the nucleus and these determine the characteristics of an organism.

Similar cells combine together to form ..... These, in turn, combine together to form ....., for example, the ..... (5)

3. Scientists on the Galápagos Islands have identified a species of pink iguana which may have existed for more than 5 million years.



(a) Name one feature which shows that the pink iguana is a reptile.

..... (1)

(b) Scientists have said that the pink iguana faces extinction.
Name two factors which could affect the size of the population of the pink iguana.

factor 1: ..... (1)

factor 2: ..... (1)

4. (a) Name a habitat which you have studied.

.....

Name a physical feature which you measured in that habitat and the instrument used to measure it.

physical feature: .....

instrument used: ..... (2)

(b) Give an example of how an animal or a plant you have studied is adapted to daily changes in the environment.

name of animal or plant: .....

its adaptation to daily changes in the environment:

.....

..... (1)

(c) Give an example of how an animal or plant you have studied is adapted to seasonal changes in the environment.

name of animal or plant: .....

its adaptation to seasonal changes in the environment:

.....

..... (1)

5. Freddie and Henry are training to take part in the London Marathon next year.



(a) Freddie says they should eat a meal full of carbohydrates before the race.

(i) Name a suitable food which would supply this nutrient.

..... (1)

(ii) Name the process which uses carbohydrates to supply them with energy during the race.

..... (1)

(b) Henry smokes cigarettes.

Explain what damage this can cause to his health.

.....

.....

.....

..... (3)

(c) Freddie says that it is important for them to eat a balanced diet.

What does he mean by this?

.....

..... (2)

(d) During one training session on a running machine, Freddie decides to investigate his heart rate over a ten-minute period.

He walks slowly for the first 2 minutes, then runs between minutes 2 and 4, and then walks slowly for the last 6 minutes.

(i) Name one place on the body where Freddie can measure his pulse.

..... (1)

(ii) What causes the pulse to be felt?

..... (1)

The table below shows Freddie's results.

time, in mins	pulse rate, in beats per min
0	76
1	78
2	80
3	120
4	138
5	138
6	120
7	96
8	84
9	78
10	76

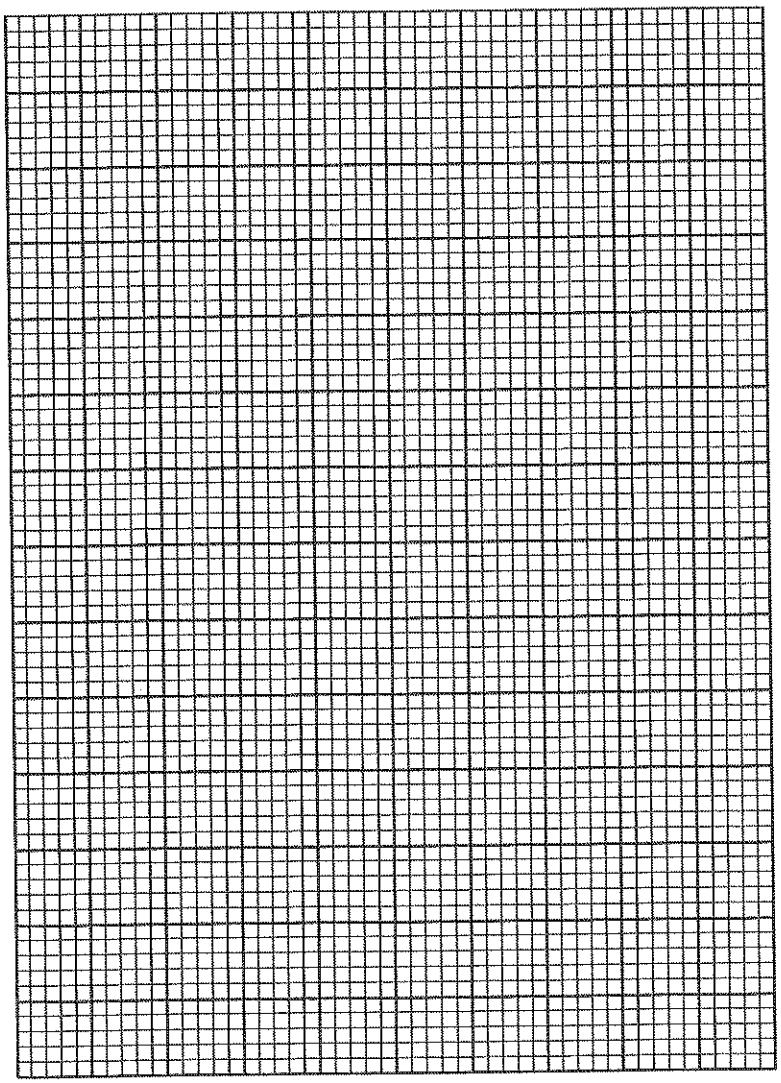
(e) Using the instructions below, plot a line graph of Freddie's results to show how his heart rate changes during his 10 minutes of exercise.

instruction 1: add sensible scales to complete the horizontal and vertical axes (2)

instruction 2: carefully plot the points on the graph to show the change in heart rate against time (2)

instruction 3: draw a best fit smooth curve through the data points (1)

pulse rate, in beats per min



time, in mins

(f) Freddie's resting pulse rate is 76 beats per minute.

By how much did this increase when his pulse rate was at its maximum?

..... (1)

(g) Henry is a smoker.

He carries out the same investigation.

How do you think his results might compare with Freddie's results?

.....

..... (2)

(h) Explain the changes which occur to your heart rate during exercise.

You should try to include the following words in your answer.

energy **glucose** **heart** **respiration**

.....

.....

.....

.....

..... (4)

6. (a) Living organisms can be grouped into five different kingdoms.

There is one kingdom for fungi, one kingdom for single-celled organisms with a nucleus and one kingdom for plants.

Name the two remaining kingdoms.

1: .....

2: ..... (2)

(b) Explain why a fungus, such as a mushroom, cannot be placed in the plant kingdom.

..... (1)

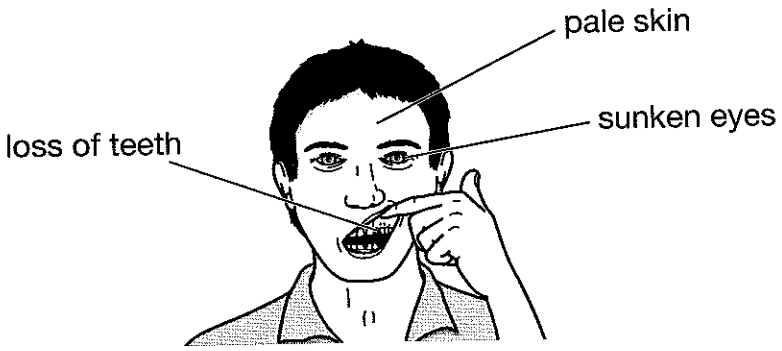
(c) Vertebrates can be split into five different groups.

Complete the blanks in the table below, naming the missing vertebrate group, or giving a characteristic for that particular group.

name of vertebrate group	characteristic of vertebrate group
bird	has feathers
	suckle their young with milk
amphibian	
reptile	
	has gills for ventilation to obtain oxygen

(4)

7. In the eighteenth century, sailors often became ill on long voyages.
They developed sores in their mouth, bleeding gums and their teeth fell out.
Their legs bruised easily and eventually sick sailors died.



In 1747, Dr Lind decided to test out his hypothesis that this disease was caused by the sailors' diet.

(a) What is a *hypothesis*?

..... (1)

Dr Lind experimented with six groups of sailors.
The table below shows the different treatments he gave to the six groups.

group	treatment
1	mug of cider
2	gargle with sulphuric acid
3	2 spoonfuls of vinegar 3 times a day
4	mug of seawater
5	barley water
6	2 oranges and lemons

The men in group 6 started to get better and were back at work in six days.

(b) What do you think the oranges and lemons provided which helped the sailors?

..... (1)

(c) What was the name of the disease from which the sailors were suffering?

..... (1)

8. A cosmetics manufacturer claims that 7927 mint leaves are needed to make just one bottle of minty shower gel.



The mint plants make their food by the process of photosynthesis.

(a) (i) Write the word equation for photosynthesis below.

$$\text{.....} + \text{.....} \xrightarrow[\text{sunlight}]{\text{chlorophyll}} \text{.....} + \text{.....}$$ (2)

(ii) One farmer decides to grow his plants in a greenhouse instead of outside in a field.

Suggest two ways in which this farmer could increase the growth rate of his mint plants.

suggestion 1: .....

.....

suggestion 2: .....

..... (2)

(b) Name one mineral which plants need to absorb through their roots for healthy growth.

..... (1)

TURN OVER FOR PART (c)

(c) How would you set about extracting the green pigment if you were given a large handful of leaves?

Explain what apparatus you would use, and any safety precautions which you would take.

You may draw a diagram, using the blank space at the bottom of the page, to help with your answer.

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.....

.....

..... (4)

(Total marks: 60)